This document was developed in 2017 and contains information and research that is no longer current. In some instances, the language and descriptions used do not reflect current evidence, views or values about body image, disordered eating, eating disorders and the system of care. We ask that you are thoughtful in your application of this information, refrain from using outdated language and concepts when referring to this work, and access more up to date information via our Resources and Research pages.

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Eating Disorders Prevention, Treatment and Management

An Updated Evidence Review

Prepared for the Commonwealth Department of Health
By **National Eating Disorders Collaboration**

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Acknowledgements

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Acronyms & Abbreviations

AN	anorexia nervosa
BN	bulimia nervosa
BED	binge eating disorder
BMI	body mass index
CBT	cognitive behavioural therapy
DSM	Diagnostic and Statistical Manual of Mental Disorders
EDNOS	eating disorder not otherwise specified
OSFED	other specified feeding or eating disorders
RCT	randomised controlled trial
SR	systematic review

Executive Summary

Eating disorders are serious illnesses associated with a high level of morbidity and burden of disease. They have a significant negative impact on cognitive, physical, social, and psychological aspects of health, and are one of the 12 leading causes of hospitalisation costs due to mental health issues in Australia. The suicide and mortality rates for individuals with eating disorders are significantly higher than those of the general population. Women with anorexia nervosa are more than 31 times more likely to attempt suicide and have a mortality rate that is 12 times higher than expected for gender and age.

There are several types of eating disorders, including anorexia nervosa, bulimia nervosa, binge eating disorder and a group of disorders classed as 'Other Specified Feeding and Eating Disorders' (OSFED). Eating disorders involve both abnormal eating behaviours and psychological disturbance. Abnormal eating behaviours include excessive dietary restriction (e.g. fasting, skipping meals, and cutting out entire food groups), binge eating (consuming large amounts of food in a short period of time with a sense of loss of control), and behaviours designed to rid oneself of food and/or control shape or weight, such as self-induced vomiting, excessive exercise, laxative misuse, diet pills, diuretics, and illicit drugs. Psychological disturbances may include an intense fear of becoming fat, disturbed body image, and exaggerated emphasis on weight and shape in relation to one's self worth.

Eating disorders defy classification solely as mental illnesses as they not only involve considerable psychological impairment and distress, but are also associated with major wide-ranging and serious medical complications, which can affect every major organ in the body. Despite this knowledge, eating disorders are often under-recognised as significant physical and mental health conditions.

Disordered eating and eating disorders affect a significant number of Australians. More than 55% of Australian girls and 57% of Australian boys are dissatisfied with their body between the ages of 8 and 9, and 56% of girls and 61% of boys are trying to control their weight at the ages of 10 and 11. Similarly, nearly half of Australian women and just over one third of Australian men are dissatisfied with their body. Individuals who engage in disordered eating display many symptoms of an eating disorder, but typically do not meet the full criteria for a clinical diagnosis of an eating disorder.

There are two peak risks periods for the onset of eating disorders, early adolescence and in the late teens, though eating disorders may first present at any age. Eating disorders appear to have an array of biopsychosocial causes though these are not clearly understood. Important risk factors for the development of an eating disorder include dieting, disordered eating, and poor body image. Recent surveys, in Australia and internationally, have reported lifetime prevalence rates of 0.1 – 3.6% for AN, 0.9 - 2.6% for BN, 0.5 - 3.0% for BED and 3.4% - 11.5% for OSFED.

Eating disorders are a significant public health problem, not only because they are associated with substantial psychological and medical comorbidity, functional impairment, and high medical costs, but because they are often poorly recognised and undertreated. In order to address this issue, eating disorders must be recognised as a mainstream health priority in Australia. Action is required to prevent eating disorders and to support identification, early intervention, and readily accessible, evidence-based treatment throughout all stages of the illness process.

In 2010 the NEDC published a literature review that evaluated the health promotion, prevention, early intervention and treatment interventions available for anorexia nervosa, bulimia nervosa and binge eating disorder. Since there has been considerable empirical work in these areas since the original review was published, the current report was conducted to evaluate the breadth of recent literature (2009-2016) and update the discussion around current limitations in the evidence base and best steps forward.

Evidence for this report was collated by systematically reviewing the existing scientific evidence base using an analogous methodology to the original report. Scientific databases were systematically searched and the National Health and Medical Research Council level of evidence scheme was applied to address key questions pertaining to both youth and adult populations. In total, 3687 unique citations were assessed for potential relevance to the study questions and 158 studies (31 systematic reviews and 140 randomised

controlled trials) met all criteria and were evaluated in this review.

Promotion and Prevention

A review of research into prevention initiatives suggests that there are evaluated prevention programs that successfully reduce eating disorder risk. Health promotion and prevention initiatives for diseases work by modifying risk factors, enhancing protective factors, and/or reducing early warning signs, and ultimately aim to reduce the incidence of a disease. Prevention initiatives occur across a spectrum from universal (i.e., general community or entire populations with no known risk factors) to selective (i.e., populations or groups at elevated risk) to indicated (i.e., groups with early warning signs), though indicated prevention methods are generally seen as a form of early intervention. Evidence summarised within this report from systematic reviews and randomised controlled trials identifies efficacious interventions to reduce eating disorder risk across all three prevention categories of universal, selective, and indicated.

The prevention interventions have generally been evaluated among students in classroom settings or among university-aged individuals, either face-to-face or in a computer-based format. These programs affect various risk and protective factors such as desire for thinness, negative emotionality, body dissatisfaction, self-esteem, shape and weight concern, and may prevent eating disorder symptoms such as disordered eating behaviours.

Universal prevention involves promoting healthy development within the whole population in hope that these initiatives will prevent the onset of a condition in both healthy and at risk individuals. Eating disorders have a bimodal pattern of onset with adolescence and early adulthood presenting as peak periods of risk. As such, universal prevention programs for eating disorders are typically targeted at adolescent school children or high school-age individuals to coincide with these peak periods of risk. Media literacy, multicomponent and healthy weight interventions were the most validated forms of universal prevention evaluated in this review. These interventions each had a moderate evidence base and moderate to substantial magnitude of effect, which included improvements in eating attitudes, weight and shape concern and unhealthy weight control behaviours in male and female participants.

Selective prevention targets a smaller subgroup of individuals who are considered to be high risk for developing a condition, as indicated by the presence of at least one risk factor. Similar to universal approaches, selective prevention programs for eating disorders are usually administered around the same peak age risk periods, with participants being selected because they display one or more risk factors. Commonly, female sex is used as the most practical risk identifier for the implementation of such programs; however other examples include being overweight, an athlete, dieting and a family history of eating disorders. The most validated approaches in selective prevention were cognitive dissonance and multicomponent interventions, which were supported by a substantial evidence base with moderate to substantial positive effects. Media literacy, mindfulness and psychoeducation were supported by a moderate evidence base and produced moderate effects.

Identification and Early Intervention

Identification and early intervention are a critical part of the mental health promotion spectrum. Public, policy-maker, and administrator attention is arguably most commonly cast on acute treatment and prevention, so this spectrum component can appear to "fall through the gap". Individuals who are showing warning signs of eating disorders are at much higher risk of developing an eating disorder, and partial syndrome eating disorders alone carry heightened risk of impairment. Further, research shows significantly improved outcomes for individuals who are identified and treated early in the course of illness.

Indicated prevention is a form of early intervention targeted to those showing early signs of a problem or illness, or individuals identified as at very high-risk of developing a disorder. There is evidence of the effectiveness of indicated programs that successfully reduce risk factors for eating disorders. The most validated approaches identified in this review were cognitive behavioural therapy, which had a substantial body of supporting evidence as well as a substantial magnitude of effect, and cognitive dissonance, which had a moderate degree of support and a moderate magnitude of effect.

Treatment Standards and Strategies

Many individuals with eating disorders recover successfully through appropriate care and treatment, particularly if treatment is accessed in a timely manner. Although the clinical picture is bright for many people with eating disorders, significant gaps remain in the treatment research.

Family-based treatment (also sometimes called Maudsley family therapy), which was supported by a substantial evidence base and had substantial positive effects, was the most validated approach for treating young people with **anorexia nervosa**. Multidisciplinary specialised outpatient treatment (combining CBT, parental counselling and dietary therapy) had a moderate evidence base and moderate magnitude of effect, with improvements occurring up to five years after treatment completion. Amongst adults with anorexia nervosa, cognitive behavioural therapy was the most validated intervention (although outcomes are not consistently greater than comparison therapies). Cognitive behavioural therapy was supported by a substantial evidence base and had a moderate magnitude of effect. Specialist supportive clinical management, psychodynamic and psychoanalytic therapies, and MANTRA were all moderately effective treatments for anorexia nervosa, and were supported by a moderate evidence base.

Evidence on treating young people with **bulimia nervosa** is very limited, and provides some support for family-based therapy. Only two RCTs met inclusion criteria and were evaluated in this review. One study reported significantly greater rates of abstinence from binge eating and purging in participants receiving family-based treatment compared to those receiving cognitive behavioural therapy. Likewise, a second study reported a greater proportion of remitted patients in participants receiving family therapy compared with supportive psychotherapy.

Amongst adults with bulimia nervosa, cognitive behavioural therapy, delivered as guided self-help, individually or in group formats, was strongly supported by the literature, with a substantial evidence base and substantial and persistent improvements in primary and secondary symptoms. Exposure therapy, which aims to reduce conditioned responses to specific problematic environmental cues using graded exposures, was also well validated for this group. Exposure therapy was supported by a substantial body of evidence and produced moderate treatment outcomes.

There were no studies investigating interventions targeting young people with **binge eating disorder**. Among adults with binge eating disorder, cognitive behavioural therapy was found to be the most validated intervention. Cognitive behavioural therapy was supported by a substantial evidence base and led to substantial treatment effects, including improvements in eating disorder psychopathology, depressive symptoms, self-esteem and weight. While cognitive behavioural therapy outperformed most comparison therapies, it was as effective as interpersonal therapy, psychodynamic interpersonal psychotherapy and brief strategic therapy in a subset of studies. In addition, effects were not always sustained over the long-term.

Dialectical behavioural therapy had a substantial degree of evaluation with moderate outcomes, while interpersonal psychotherapy and virtual reality-based therapies had a moderate degree of evaluation and effect. Short-term treatment with the central nervous system stimulant lisdexamfetamine had a moderate degree of evaluation and produced substantial therapeutic effects and effect sizes, while anticonvulsant medications had a moderate degree of evaluation and effect.

Recommendations for Research and Practice

While the evidence base for preventing and treating eating disorders is promising, it faces a number of challenges and gaps. Prevention and treatment interventions are often limited by short follow-up periods and inclusion of narrow demographic groups, with underrepresentation of individuals with OSFED, chronically ill individuals, minority populations, males, and individuals younger or older than adolescence/early adulthood. Research is needed to help understand prodromal and subsyndromal presentations, and relationships to full clinical syndromes, so that early detection and intervention pathways can be strengthened. Other areas that have undergone insufficient evaluation include investigations into the role of facilitators in prevention programs (e.g. the role of exogenous facilitators such as psychologists compared to endogenous facilitators such as teachers or peers); the role of treatment settings in treatment outcomes; the mediators and moderators of treatment outcomes; the success of widely disseminated but untested programs; and research into the optimal methods for disseminating programs with the strongest evidence-base. In addition, a greater understanding of the genetic, epigenetic and neurobiological basis for eating disorders may reduce stigma in individuals with eating disorders and may contribute to improved and more targeted interventions.

Evidence from randomised controlled trials is not the only information to consider when planning the path forward for effective treatment standards and strategies. Although these trials confer high-quality

evidence of treatment effectiveness, they are not generally set up to evaluate complex treatment models. Eating disorders are characterised by impairment to cognition, behaviour, psychological and social functioning, feeding and nutrition practices, physiological processes and medical status. The clinical eating disorder literature clearly recognises the importance of a cross-sector, multidisciplinary approach, supporting availability of medical, psychiatric, psychological, dietetic, and allied health care, across a continuum of care from inpatient to day patient to outpatient, when indicated. Likewise, potentially valuable applied prevention initiatives such as public awareness and media campaigns, media codes of conduct, campaigns to enhance community mental health, training and education for health and education professionals, and whole-of-school or community-based programs, are less amenable to evaluation with randomised controlled, methodology, yet their potential contribution is significant.

Mental health literacy interventions, such as public awareness campaigns, support dissemination of effective treatment standards and strategies by removing barriers to help-seeking, reducing stigmatisation and shame, and raising awareness of available and effective treatment options. Given that body image is a leading concern among youth in Australian society and that the incidence of disordered eating is increasing, it would be valuable to disseminate a planned, evaluable public awareness campaign across the Australian community.

One of the dangers of prevention initiatives for eating disorders is that non-evidence-based initiatives may actually be harmful, particularly if they contain content or overt discussion on eating disorders and disordered eating. Individuals who are at-risk may learn and apply extreme weight and shape control practices. Another risk is if the content is delivered in a manner that moralises eating patterns or intensifies eating, weight, and shape concern. The golden rule guiding all prevention initiatives for eating disorders should be "first, do no harm", and evaluation for harm and benefit should be a built-in requirement of any dissemination strategy. All prevention initiatives require thorough piloting and evaluation to ensure that they are safe.

Finally, there is an imperative need for an integrated, partnered approach to eating disorders prevention. There is currently a lack of collaboration between the eating disorders and obesity sectors in Australia, despite overlap in behaviours and attitudes targeted and comorbidity, which may ultimately detract from the success of initiatives in either sector. Ideally, obesity and eating disorder prevention and public messaging initiatives should be integrated, with experts from each field involved in development and evaluation, with an emphasis on healthy eating and exercise rather than weight. Training programs for clinicians should ensure that obesity and eating disorders are covered in equal measure, with particular attention given to the significant shared space between them.

The evidence and discussion summarised in this report contributes a clinical and empirical foundation for advancement of eating disorders promotion and prevention, early intervention, and treatment in Australia. Further research targeting the gaps highlighted in this report alongside collaboration within and across sectors is required to move the field forward and improve care.

1. Background

In recognition that body image and eating disorders are a pressing issue within the Australian community, in 2009 the Australian Government commissioned a literature review on the health promotion and prevention, early intervention, and treatment of eating disorders. This report was prepared by The Butterfly Foundation on behalf of the National Eating Disorders Collaboration (NEDC), published in 2010, and was part of a strategy to identify the way forward for eating disorder management in Australia.

There has been considerable empirical work in the areas of eating disorders promotion, prevention, early intervention and treatment since the original Evidence Review was published, and the field has seen many changes and advances. The current report extends upon the findings of the original review by evaluating the breadth of recent literature (2009-2016) and updating the discussion around current limitations and best steps forward.

Eating disorders are a significant public health issue both in Australia and internationally[23,326]. They carry a significant burden of disease in the form of individual and community health, and social and economic costs[123,161]. Most individuals with an eating disorder do not receive treatment[326] and the treatment options that are available are often expensive, complicated and the prognosis for full recovery is poor[123]. It is therefore an important public health priority to develop and disseminate effective prevention programs for eating disorders.

This review begins by presenting background information on body image, disordered eating, and the epidemiology, aetiology, risk factors and mortality of eating disorders. The article then outlines the systematic review methodology adopted herein (*chapter 2)*, and presents three chapters that encompass the outcomes from all prevention (*chapter 3, 4)* and treatment (*chapter 5*) studies evaluated. We conclude by highlighting gaps in the current literature base and recommending next steps forward in research and practice (*chapter 6)*.

Body Image

Body image can be defined as the thoughts, feelings and perceptions that individuals have toward their bodies[239]. The cognitive component is measured in terms of satisfaction or dissatisfaction with one's body shape or weight, and is the method commonly used to assess the degree of body image disturbance[59]. Body dissatisfaction is increasingly becoming a cultural norm in Western society. Data from a longitudinal study of Australian children found that 55% of girls and 57% of boys between the ages of 8 and 9 are dissatisfied with their body, and 56% of girls and 61% of boys between the ages of 10 and 11[85] are trying to control their weight. Similarly, a recent study found that nearly half of Australian women and just over one third of Australian men are dissatisfied with their body[232]. While women's body image concerns are centred around weight, particularly the desire to weigh less[6], males are more likely to desire a muscular appearance[131], although this ideal can vary depending on the sociocultural context the individual identifies with.

Body image is an issue of public health concern because poor body image is linked with a variety of adverse physical and psychosocial experiences, such as poor self-esteem, depression, eating disorders and obesity[114,176]. Individuals with poor body image are more likely to engage in risky dietary and weight control behaviours, excessive exercise, substance abuse and surgery to alter their appearance. Accordingly, poor body image has been recognised as one of the strongest risk factors for both disordered eating and eating disorders[80].

Disordered Eating

Disordered eating is the most significant risk factor for the onset of an eating disorder[205], yet even in the absence of a clinical eating disorder, disordered eating is associated with a range of physical, mental and social impairments. Disordered eating is defined as a disturbed and unhealthy eating pattern that can include restrictive dieting, compulsive eating, skipping meals and compensatory weight-loss methods[269]. Individuals who engage in disordered eating thus display many symptoms of an eating disorder, but typically do not meet the full criteria for a clinical diagnosis of an eating disorder[246].

Australian research indicates that rates of disordered eating are on the rise. At least 16% of adolescent girls and 7% of adolescent boys claim to

have already employed at least one potentially dangerous method of weight reduction, including starvation, vomiting and laxative abuse[122]. A large proportion (66%) of Australian women are either trying to lose weight or avoiding weight gain, despite most being within a healthy weight range[117]. Purging and binge eating have more than doubled in females and extreme dieting has increased four-fold in males[238]. Further, adolescent females who engage in severe dieting have a 20% chance of developing an eating disorder over the following year[189]. Given that extreme dieting, particularly among adolescent and adult females is high, the association between disordered eating and eating disorders is of substantial concern.

Eating Disorders

Eating disorders are serious and complex mental illnesses associated with a high level of impairment and significant socio-economic costs[89]. They involve poor body image, abnormal eating behaviours, overemphasis of the importance of weight and shape, and the use of extreme weight control behaviours[312]. Despite their severity, eating disorders are often poorly understood and underestimated in contemporary society. There are misconceptions that eating disorders are about vanity, a dieting attempt gone wrong, an illness of 'choice', a cry for attention or a person 'going through a phase'[303]. These types of misconceptions are made not only by the general public, but are commonly the responses sufferers receive when they present for help from general practitioners. In reality, eating disorders are complex and multifaceted illnesses characterised by severe psychiatric and medical symptoms.

Eating disorders are one of the 12 leading causes of hospitalisation costs due to mental health[89]. In Australia 14% of mental health hospitalisations of young women are due to eating disorders[389]. The mortality rate for people with eating disorders is significantly higher than that of the average population[121]. According to recent estimates[121], mortality is 5 times higher in individuals with AN than the general population, when matched for age and sex. The rate of mortality in individuals with BN and BED is considerably lower than those with AN, but still significantly higher than the general population. Worryingly, death by suicide is significantly more prevalent in eating disorders populations compared to the general population: individuals with AN and BN are 31 and 7.5 times more likely to commit suicide than individuals from the general population, respectively[279].

People with eating disorders can become very unwell and may require access to hospital treatment. Common reasons for hospitalisation include medical complications (rapid weight loss, a very low weight, cardiac irregularities, hypoglycaemia, electrolyte imbalance), suicidal behaviour, and lack of response to outpatient treatment in a very underweight patient[168].

Diagnostic Characteristics

Eating disorders have a cultural history that precedes the relatively recent Western sociocultural fusion of thinness with 'beauty ideal'. The first complete medical descriptions of anorexia nervosa (AN), for example, were recorded separately in 1873 by French neuropsychiatrist Charles Lasegue and British physician, Sir William Gull. Best estimates of incidence over time and cross-culturally have remained markedly stable, including among non-Western societies and cultures that do not overvalue thinness. Bulimia nervosa (BN) was described in 1979[296] and was formally recognised as a distinct disorder in the third edition of the Diagnostic Statistical Manual in 1980. Bulimia nervosa also has marked pathological significance, yet is likely to have arisen in the context of emerging Western society[171]. Binge eating disorder (BED) was identified in the 1990s, where it was made a provisional research diagnosis in the fourth edition of the Diagnostic and Statistical Manual (DSM) under the umbrella category Eating Disorders Not Otherwise Specified (ENDOS). It was recognised as its own clinically diagnosable eating disorder in the fifth and most recent DSM[10].

Changes to the diagnostic criteria of eating disorders in the current DSM came about in part because of the over reliance on the EDNOS diagnosis[8,326]. Previously, in clinical settings, around half of individuals seeking treatment received an EDNOS diagnosis[8,326], and in the community this rose to over 70% of eating disorder cases[209]. The effectiveness of the EDNOS diagnosis was criticised because individuals with this diagnosis did not differ significantly on functional impairment compared to those diagnosed with AN or BN[104].

Changes to the classification of each eating disorder in the DSM-V are outlined within each section below.

Anorexia Nervosa

Anorexia nervosa involves the persistent restriction of energy intake leading to significantly low body weight relative to age, sex and developmental stage. It is a disorder characterised by an intense fear of gaining weight or becoming fat, and/or

persistent behaviours that interfere with weight gain despite significantly low body weight. Individuals also present with disturbed perception of their own body weight or shape, often without recognition of the seriousness of their current low weight status. There are 2 subtypes of AN specified in the DSM-5, a restrictive sub-type and a binge-and-purge subtype[10]. Individuals with restrictive subtype typically engage in significant dietary restriction, and those with binge-and-purge subtype display binge eating and purging behaviours[76]. In both cases, severity is specified according to BMI (BMI≥17kg/m^2 is mild; between 16-16.99kg/m^2 is moderate; between 15-15.99 kg/m^2 is severe; and <15 kg/m^2 is extreme[168]). Amenorrhea (an abnormal absence of menstruation) was previously a diagnostic symptom for anorexia but has been removed in the current DSM due to a lack of empirical support[10].

Short term consequences include fluid depletion, electrolyte imbalance, anaemia, decreased immunity, amenorrhea, low blood pressure, muscle weakness, dehydration, dry hair and skin, low body temperature and the development of lanugo[13,76]. If malnutrition is prolonged, AN can impact all major organ systems in the body. Anorexia nervosa can damage the heart, liver and kidneys; it can result in infertility, osteoporosis, and gastrointestinal, hematologic, dermatologic and metabolic complications[13,76]. Children and adolescents with AN can experience additional physical consequences such as delayed puberty[168], and even after recovering from the eating disorder, as adults they are likely to experience significantly higher levels of cardiovascular symptoms, chronic fatigue, pain, neurological problems, and anxiety and depressive disorders[76,280] which can limit social and economic activities in later life.

Women and girls with AN may use dieting behaviour in an attempt to achieve a culturally constructed thin ideal whereas men may over exercise and control their diet to achieve a muscular body[80]. Despite being underweight or malnourished, people with AN may see themselves as overweight, become preoccupied with eating, food, and weight and shape control. They engage in a range of extreme weight-control behaviours, including severely restricting their food intake, compulsive exercising, laxative and diuretic use and abuse, and purging to expel calories. They may eat in private or avoid eating with others, eat small quantities and portions of food, skip meals and become concerned about the macronutrient content of food, particularly avoiding fats and carbohydrates[76]. In the early phase of the illness, AN may be difficult to distinguish from normal dieting or weight loss, which typically involves restricting certain foods and portions of food, and increasing physical activity.

AN has the highest mortality of any psychiatric disorder, with aggregated annual mortality rates between 5 – 12 times higher than the annual death rate of the general population[13,121]. Most commonly, the cause of death for individuals with AN is cardiovascular complications[13], however death by suicide is 31 times higher for individuals with AN than it is for those in the general population[279].

Bulimia Nervosa

Bulimia nervosa is characterised by recurrent episodes of binge eating, defined as eating an objectively large quantity of food in a discrete period of time, followed by inappropriate compensatory behaviours to avoid weight gain, such as self-induced vomiting, misuse of laxatives, diuretics, fasting or excessive exercise[10]. If these behaviours occur in an instance in which all criteria for AN are met, then the diagnosis of AN with binge/purge subtype is made rather than BN. Similar to AN, individuals with BN are typically driven to attain a particular body shape or weight and self-evaluation is unduly influenced by body image[10]. Individuals with BN will often find themselves in a vicious cycle of self-starvation, bingeing and purging. They are usually an average weight for their height and weight, although it is not uncommon for their weight to fluctuate significantly[76]. The current DSM has reduced the frequency requirement for binge eating and compensatory behaviours from twice weekly to once weekly and removed the purging and non-purging subtypes[240].

The most common physical consequences of BN are dental and gum problems, such as the erosion of dental enamel and the development of cavities, which are primarily caused by self-induced vomiting[76]. Self-induced vomiting can also result in dehydration, low potassium and electrolyte imbalances, which can lead to irregular heartbeats, heart failure and death. Inflammation of the digestive tract, swollen glands, gastrointestinal rupture and bleeding are also known side effects[76].

The mortality rate for individuals with BN is significantly higher than that of the general population. Individuals with BN are 50% more likely to die than individuals from the general population[121], and they are 7.5 times more likely to commit suicide than individuals from the general population[279].

Binge Eating Disorder

Binge eating disorder is a condition characterised by recurrent episodes of binge eating accompanied by feelings of loss of control[10], and in many cases, guilt, embarrassment and disgust[11]. Unlike individuals with BN, those with BED do not regularly engage in inappropriate compensatory behaviours, and consequently are often overweight or obese[76,212]. Individuals with BED have a range of identifiable eating habits including eating very quickly, eating when they are not physically hungry, and continuing to eat even when they feel uncomfortably full[10]. Similar to individuals with AN and BN, those with BED are often secretive about their eating habits and will choose to eat alone[250]. Binge eating disorder has been included in the current DSM as its own category of eating disorder, whereas in previous editions of the DSM, BED symptoms were classified under the general category EDNOS. The frequency of binges required for a diagnosis of BED has reduced from twice to once weekly, and the duration of binge eating reduced from 6 to 3 months[240].

The primary physical and medical complications associated with BED, are those also associated with overweight and obesity, since individuals with BED are at an increased risk of weight gain. Conditions observed among these individuals include high blood pressure and cholesterol levels, type II diabetes, heart and gallbladder disease, and menstrual and gastrointestinal problems[76,135,178,250].

The incidence of obesity and eating disorders are interrelated beyond the shared physical consequences of overweight and obesity with BED. Obesity is both a risk factor for eating disorders[250] and a serious common outcome for individuals with BED and BN[112]. Binge eating disorder and obesity share a number of risk factors including dieting, unhealthy weight-control behaviours and self-esteem issues. Collectively, these factors contribute to body dissatisfaction that is a predictor of both eating disorders and excessive weight gain[35]. The higher mortality rate for individuals with BED is associated with both the physical consequences of overweight and obesity, and a higher suicide rate[52,97].

Other Specified Feeding or Eating Disorders

Other specified feeding or eating disorders is the diagnostic category for individuals who present clinically significant feeding and eating disorder symptoms but do not meet the full criteria for another diagnostic category[11]. Individuals with OSFED commonly experience distorted body image and an overvaluation of weight and/or shape as well as disturbed eating behaviours, as well as clinically significant distress or impairment[114]. Depending on the symptoms present, an individual may receive a sub-diagnosis that specifies the reason why they do not meet the full criteria of another disorder[10]. This category includes atypical AN (e.g. weight is within the normal range); low frequency or limited duration BN or BED; purging disorder (purging without binging); and night-eating syndrome.

The diagnostic criteria of OSFED may sometimes incorrectly be assumed to describe individuals with milder or less severe forms of eating disorders. This is a mistaken assumption as individuals with OSFED experience comparable psychological and physiological morbidity and impairment to those with AN and BN. It is estimated that this group represents around 30% of people who seek treatment for an eating disorder[114].

The physical and medical morbidities associated with OSFED are diverse and reflect the health consequences associated with AN, BN and BED. Common physical health consequences include weight loss, weight gain or weight fluctuations, a compromised immune system, loss or disturbance of menstrual cycles, damage to teeth and gastrointestinal problems associated with purging, and dehydration[115]. It should be noted again that the health consequences associated with OSFED should be taken equally as seriously as those associated with AN, BN and BED. Other Specified Feeding and Eating Disorder is an equally serious mental illness that effects a significant proportion of the eating disorders population[115].

Table 1. DSM-5[10] Diagnostic Criteria for Eating Disorders

Anorexia Nervosa
• Restriction of energy intake relative to requirements resulting in significantly low body weight for age, sex, developmental trajectory and physical health • Intense fear of gaining weight or becoming fat, or persistent behaviour that interferes with weight gain, even though at a significantly low weight • Disturbance in the experience of one's body weight or shape with undue influence of body weight or shape on self-evaluation. Or consistent lack of recognition of the seriousness of low body weight - *Restricting sub-type*: During the episode of AN, the person has not regularly engaged in binge eating episodes or purging behaviours - *Binge-eating/Purging sub-type:* During the episode of AN, the person has regularly engaged in binge eating episode and purging behaviours
Bulimia Nervosa
• Recurrent episodes of binge eating, characterised by: - eating, in a discrete period of time, an amount of food that is objectively larger than most people would eat in a similar time and under similar circumstances, - A sense of lack of control over eating during the episode • Re-occurring inappropriate compensatory behaviour in order to prevent weight gain, such as self-induced vomiting, laxative misuse, fasting, excessive exercise or medications • Binge eating and inappropriate compensatory behaviours both occur on average at least once a week for 3 months • Self-evaluation is overly influenced by body weight and shape • The disturbance does not occur exclusively during episodes of AN
Binge Eating Disorder
• Recurrent episodes of binge eating as defined under BN • Binge eating episodes are associated with three or more of the following; - Eating much more rapidly than usual - Eating large amounts of food when not feeling physically hungry - Eating alone because of feeling embarrassed by how much one is eating - Feeling disgusted with oneself, depressed or guilty afterwards • Marked distress regarding binge eating • Binge eating occurs, on average, once a week for 3 months • Binge eating is not associated with recurrent use of inappropriate compensatory behaviours as in BN
Other Specified Feeding or Eating Disorders
• OSFED is the diagnostic category for individuals who present with many of the symptoms of other eating disorders such as AN, BN or BED but will not meet the full criteria for diagnosis of these disorders • A diagnosis is sometimes allocated that specifies reasons why the individual does not meet the specifics of another disorder, for example: - *Atypical AN*: All criteria are met except that the individuals weight is within or above the normal range - *Binge eating disorder* (of low frequency and/or limited duration): All of the criteria for BED except at a lower frequency and/or for less than 3 months - *Bulimia nervosa* (of low frequency and/or limited duration): All of the criteria for BN are met except the binge eating and inappropriate compensatory behaviour occurs at a lower frequency and/or for less than 3 months - *Purging disorder*: Recurrent purging behaviour to influence weight or shape in the absence of binge eating - *Night eating syndrome*: Recurrent episodes of night eating

Psychiatric Co-morbidity

Approximately 55 - 97% of individuals diagnosed with an eating disorder also present with at least one other psychiatric diagnosis[344]. Depression and anxiety disorders are the most common psychiatric illnesses accompanying eating disorders, though substance use and personality disorders are also common. Approximately 45% to 86% of individuals with eating disorders have comorbid depression[258] and approximately 64% have a comorbid anxiety disorder[187]. Personality disorders are present in approximately 58% of individuals with eating disorders[294], particularly Cluster C disorders in AN restrictive subtype (including avoidant, dependent, and obsessive-compulsive personality disorder) and Cluster B (particularly borderline personality disorder) and Cluster C disorders in BN and AN binge-eating/purging subtype.

Epidemiology

It is believed that eating disorders and disordered eating affect a significant number of Australians; however there have only been a small number of epidemiological studies accounting for the new DSM-5 criteria. A recent Australian epidemiological study published by Hay, Girosi and Mond[170] estimated that eating disorders or disordered eating affected 16.3% of the general Australian population. This number was largely accounted for by high numbers of people with BED (6%) and subthreshold BED (7%), although it is worth noting that BED and subthreshold BED rates were reduced by a third if overvaluation was included as a diagnostic criterion. International research reports a lifetime prevalence of 0.1 – 3.6% for AN, 0.9 - 2.6% for BN, 0.5 - 3.0% for BED and 3.4% - 11.5% for OSFED[124,234,326].

Although eating disorders may be present at any age, the two peak risk periods for the onset of eating disorders are in early and late adolescence[178]. Approximately 80 - 85% of individuals diagnosed with AN or BN are female, while the gender distribution is roughly equal for BED[165].

Changes to the diagnostic criteria of eating disorders in the DSM-5 will have an ongoing impact on the epidemiology of eating disorders. The broadening of the diagnostic criteria for threshold eating disorders has led to a reduction in the number of people in the OSFED category compared to the former DSM-IV category, EDNOS, with a concomitant increase in the prevalence of BN and BED[170].

Burden of Disease

Eating disorders are associated with substantial economic and social burden. Eating disorders are among the leading causes of burden of disease and injury in young females in Australia[21]. A 2012 report by Deloitte Access Economics estimated that the cost of eating disorders to the Australian community was roughly AUD$80.6 million[89]. This includes health costs associated with eating disorders, such as inpatient and outpatient service costs, productivity costs, including unemployment, absenteeism, presenteeism, and premature death[89]. The expense of treating a single episode of AN has been reported to come second only to the cost of cardiac artery bypass surgery in the private hospital sector[278].

Aetiology

The aetiology of eating disorders is complex and is not well understood. No single cause of eating disorders has been identified. Like most other psychiatric and health conditions, the conceptualisation of these disorders is likely to involve a combination of factors[80], including psychological, sociocultural and genetic influences.

Research among AN and BN, in particular, has identified personality traits that are present before, during, and after recovery from illness. These include perfectionism, obsessive-compulsiveness, neuroticism, negative emotionality, harm avoidance, low cooperativeness, core low self-esteem, and traits associated with avoidant personality disorder[80,105]. Specific additional personality traits may be associated with each type of eating disorder, including low novelty-seeking and high constraint and persistence in AN, impulsivity and sensation seeking and emotional dysregulation with BN and BED[76].

Sociocultural influences are theorised to play a considerable role in the development of eating disorders, particularly amongst individuals who internalise the Western beauty ideal of thinness. These individuals are at elevated risk of body dissatisfaction, which can lead to negative emotionality and efforts to restrict food intake, which are likely pathways to bulimic symptoms[322].

Advances have been made in clarifying the genetic influences in eating pathology over the past decade. The genes most commonly explored are those hypothesised to play a role in the biological mechanisms of appetite, weight regulation, mood,

reward and neural growth[394]. One recent review collected heritability and genetic contribution estimates from 6 studies[238], and reported heritability estimates ranging from 22-76% for AN and broad AN (missing one DSM-IV criterion), 52-62% for BN and broad BN, and 57% for BED (based on one study). These values reflect the extent that individual genetic differences contribute to eating disorders incidence or symptomatology. At the same time, family studies demonstrate that different eating disorders co-aggregate, such that the lifetime risk of both AN and BN are elevated in relatives of individuals with AN or BN compared with the relatives of controls[394]. This finding suggests that there is a spectrum of eating-related psychopathologies and common familial causal factors that transverse eating disorders diagnosis.

While family and twin studies demonstrate that genetic factors – in conjunction with environmental factors – play an important role in eating disorders[361], candidate gene studies have not yet confirmed the involvement of any particular gene or genetic pathway. This has largely been attributed to low sample sizes and inadequate statistical power. The Anorexia Nervosa Genetics Initiative (ANGI) was recently launched to overcome this challenge. The ANGI study seeks to identify the specific genes associated with AN by collecting blood samples from 25000 individuals with AN around the globe. This study is the largest investigation into the heritable causes of AN to date and will play an important role in resolving the role that genes play in eating disorders.

Risk Factors

Risk factors are characteristics, attributes and exposures that increase the likelihood that an individual will develop a health condition or disorder[20]. Risk factors may be *modifiable*, and amenable to change, or *non-modifiable*, such as fixed characteristics like gender, age and family history. Many risk factors for the development of eating disorders have been proposed and empirically studied. In a recent longitudinal study by Stephen and colleagues[320], low self-esteem, a high BMI and familial economic hardship were significant risk factors for bulimic behaviours in adolescent girls. Other psychosocial factors that put individuals at risk for developing an eating disorder include body dissatisfaction, the internalisation of the thin sociocultural ideal and extreme weight loss behaviours including dieting and disordered eating[80,205]. Most of these risk factors can be considered modifiable, and therefore may be viable targets for health promotion and prevention initiatives.

Protective Factors

In contrast to risk factors, protective factors lower the likelihood of an illness-related outcome. Similar to risk factors, individual protective factors can be grouped into individual, familial and sociocultural factors. Individual protective factors include high self-esteem and positive body image, emotional reasoning, being assertive and self-directed, and having strong problem solving, coping and social skills[123]. Family and sociocultural factors include eating regular meals with the family, belonging to a non-Western culture that does not over-emphasise slimness, and peer and social structures in which weight and shape are not central features[194]. There is a strong need for quality, prospective research to further our understanding of this important area, an arguable challenge given the ethical preclusion of robust study designs involving randomisation and the confounds associated with “real-world” prospective designs.

Table 1. Risk Factors for Eating Disorders

	Common Across All Eating Disorders	Anorexia Nervosa	Bulimia Nervosa	Binge Eating Disorder
Genetics	• No specific genes yet identified • May influence a variety of other risk factors, e.g. BMI, temperament • Shared genetic risk with other psychopathology e.g. depression	• Estimated heritability: 58-76%[357]	• Estimated heritability: 54-83%[357]	• Estimated heritability: 41-57%[357]
Trauma and Life Experiences	• Childhood sexual abuse • Neglect • Full- or sub-threshold post-traumatic stress disorder			
Temperamental and Cognitive	• Low self esteem • Body dissatisfaction • Negative emotionality • Overvaluation of the importance of weight and shape • Life dissatisfaction • Difficulty regulating emotional states • Obsessive compulsive personality disorder traits • Perfectionism • Social anxiety • Internalisation of the thin sociocultural ideal • Vulnerability to media exposure	• Guilt and suppressed anger • Impaired set-shifting	• Impaired set-shifting • Impulsivity • Guilt and covert hostility	• Impulsivity
Family and Childhood Experiences	• Bullying • School adjustment problems and lack of friends • Parental eating behaviour, attitudes, and weight	• Insecure attachment • Early separation anxiety	• Insecure attachment • Early separation anxiety • Parental high expectations	
Biological and Developmental	• Adolescence • Overweight\high BMI • Low stature • Early menarche	• Female	• Female • Type I diabetes • Childhood eating problems • Childhood obesity	• Early adulthood • Childhood obesity • Type I diabetes
Social and Cultural	• Industrialised country • Participation in aesthetic sports (e.g. ballet, gymnastics, synchronised swimming, figure skating) • Exposure of the body in public (elite athletes, modelling) • Critical comments or teasing from others about weight/shape/eating			
Current or Family Psychopathology	• Family history of an eating disorder • Attention-deficit hyperactivity disorder		• Substance use	• Substance use • Parental mood and substance disorders
Premorbid Indicators	• Dieting and unhealthy weight control behaviour • Preoccupation with food, eating, and shape • Eating in secret; binge eating • Desire for a completely empty stomach • Fear of losing control over eating	• Compulsive exercise		

2. Methodology

Key Review Questions

The overarching questions guiding this review of evidence relate to the prevention, early intervention, and treatment of eating disorders. The key questions link to particular populations of interest and intervention points across the spectrum of mental health promotion.

Key Questions

Promotion and Prevention:

#1 What is the evidence for the efficacy of universal prevention interventions for eating disorders?
#2 What is the evidence for the efficacy of selective prevention interventions for eating disorders?

Identification and Early Intervention:

#3 What is the evidence for the efficacy of indicated prevention interventions for eating disorders?

Treatment Standards and Strategies:

#4 What is the evidence for the efficacy of treatments or combinations of treatments for AN in a) young people and b) adults?
#5 What is the evidence for the efficacy of treatments or combinations of treatments for BN in a) young people and b) adults?
#6 What is the evidence for the efficacy of treatments or combinations of treatments for BED in adults?

The scope of the evidence review on the treatment of eating disorders is limited to the diagnoses of AN, BN, and BED. It was not feasible to examine interventions for conditions that fall within the OSFED (formerly EDNOS) spectrum, given the limited availability of studies evaluating OSFED separately from other eating disorders.

Level of Evidence Scheme

Studies differ in their level of methodological quality, with randomised controlled trials (RCTs) considered the most appropriate study design to address questions on efficacy. A level of evidence scheme (outlined in Table 2) was used to organise the study retrieval and selection process, so that studies of very high methodological quality were considered first. Studies from lower levels were used to inform the evidence review process if data from a hierarchically adjacent upper level was absent. The level of evidence scheme adopted *a priori* for this review was developed by the National Health and Medical Research Council. This scheme informed the study retrieval process, such that Level I and II studies were targeted first for retrieval for each key question.

Table 2. Level of Evidence Scheme

Level I	A systematic review of randomised controlled trials
Level II	At least one well-designed randomised controlled trial
Level III-1	A well-designed pseudo-randomised controlled trial
Level III-2	A comparative study with concurrent controls: ● Non-randomised experimental trial ● Cohort study ● Case-control study ● Interrupted time series with a control group[a]
Level III-3	A comparative study without concurrent controls: ● Historical control study ● Two or more single arm study ● Interrupted time series without a parallel control group[a]
Level IV	Case series with either post-test or pre-test and post-test outcomes

[a]Not applicable to a research question that concerns an indicated intervention, defined as a 'screening intervention' by the National Health and Medical Research Council.

Criteria for Inclusion in the Evidence Review

To be included in the evidence review, studies needed to (a) be relevant to at least one key review question; (b) have a publication date of August 2009 or more recent*; (c) report on at least one standardised outcome measure assessing a risk or protective factor, a biomarker of eating disorders, a psychological or psychiatric outcome, or an eating disorder-related outcome; (d) have data that can be reported in a useable form; and (e) have undergone peer-review prior to publication. As stated above, a level of evidence scheme was adopted for each review question such that upper-level studies (e.g. Level I and Level II, see Table 2***) were targeted first for retrieval for each key question. An absence of Level I or Level II studies for a key question would necessitate consideration of evidence at a lower level within the level-of-evidence hierarchy.

Studies on mixed eating disorder samples were excluded, unless they reported on outcome by single-diagnosis subgroups (descriptive data or inferential results) or reported a moderator analysis which examined the influence of diagnosis. Non-English studies and unpublished theses were excluded. Randomised controlled trials contained within systematic reviews were required to meet the same basic inclusion criteria as RCTs retrieved individually, with the difference that these studies could date back to 2000**.

Studies pertaining to Key Questions 4 to 6 were only included if the study focus was on individuals with a primary standardised diagnosis of AN, BN, or BED using accepted nomenclature.

** Randomised controlled trials must have a publication date of August 2009 or more recent, or in the case of systematic reviews or meta-analyses must have an original or updated search date of August 2009 or more recent. These criteria were chosen to update the findings of the first NEDC Evidence Review (that considered studies up until July 2009), and because of the volume of available literature, because non-recent RCTs will be evaluated within recent systematic reviews, and because recent systematic reviews eclipse non-recent systematic reviews.*

***The number of studies presented below reflects only those studies that have met all inclusion criteria. For RCTs contained within systematic reviews, the value stated reflects studies published in 2000 or more recent with a focus (or analysis by) single diagnostic group.*

****Level I evidence refers to systematic reviews with more than one relevant RCT included. In this review, systematic reviews containing only a single relevant RCT are categorised as Level II evidence.*

Literature Search Methodology

To identify relevant systematic reviews and RCTs to address Key Questions 1 to 6, electronic searches for articles published between August 2009 and December 31 2016 were conducted in the databases PsycINFO, EMBASE, SCOPUS and the Cochrane Collaboration Library, and a hand search of the contents of the International Journal of Eating Disorders was conducted from January 2009 to December 31 2016. Medline and EMBASE databases were searched with search filters developed by British Medical Journal, and PsycINFO was searched using the search filter developed for the Wales Health Evidence Bulletins. Search filters used for this review are provided in Appendix A.

The search for systematic reviews retrieved 163 items in Medline, 485 items in PsycINFO, 281 items in EMBASE, 465 items in SCOPUS, and 23 items in the Cochrane Collaboration Database of Systematic Reviews (total = 1417). After de-duplication, 831 items remained. The search for RCTs retrieved 837 items in Medline, 1100 items in PsycINFO, 714 items in EMBASE, 1982 items in SCOPUS, and 1059 items in the Cochrane Collaboration's Central Register of Controlled Trials (total = 5692). After de-duplication, 1527 items remained. Overall, 23 reviews pertaining to treatment, 4 reviews pertaining to prevention, 115 RCTs pertaining to treatment, and 57 RCTs pertaining to prevention were published in 2009 or more recent, and were considered for inclusion and full-text sought.

Data Collection and Analysis

All identified citations were imported into the reference management software *Mendeley*. Data from RCTs meeting inclusion criteria were recorded in evidence tables which are contained in this report (Appendices C-F). Study and sample characteristics that were recorded included primary author, year, country, intervention setting, study design, population, number of participants in total and by intervention arm, length of intervention and follow-ups, inclusion and exclusion criteria, source of study funding, attrition, and outcomes (focusing on within-group and between-group outcome analyses where available). It was outside the scope of this project to quantitatively analyse aggregated data (e.g. compute pooled effect sizes using meta-analysis). Qualitative summaries of outcomes presented by the study authors are reported (i.e. statistically significant within- or between-group change, or other relevant information such as remission rate).

Selection of Studies

The authors scrutinised abstracts and full-text articles, when abstract information was insufficient, to determine whether identified studies met inclusion criteria. The peer-review status of journal sources was checked in Ulrich's Periodical Directory. Characteristics and abbreviated details of included studies are located in Appendix C (systematic review) and Appendix D (RCTs).

Quality Assessment

A reviewer assessed the quality of systematic review methodology using the Overview Quality Assessment Questionnaire (OQAQ). The OQAQ contains 9 items and each item ranges from a score of 0 points ("no"), 1 point ("partially" or "cannot tell") to 2 points ("yes"). The total score is the sum of the item scores, with a maximum possible score of 18. Overall quality is graded as "poor" (meets < 50% criteria), "adequate" (meet ≥ 50% of criteria), or "good" (meets all criteria). Overall the nine included systematic reviews were of adequate quality with an average quality score of 15.0 (standard deviation = 3.2, minimum = 8, maximum = 17). The most common flaws were insufficient measures taken to avoid selection bias and failure to assess the validity and quality of included studies. The critical appraisal of systematic reviews is summarised in Appendix B. It was beyond the scope of this report to assess risk of bias of RCTs.

Summary of Evidence

Each section begins with a brief background on the intervention, followed by a qualitative assessment of key intervention outcomes. An evidence table summarises the body of evidence in each intervention type in respect to the degree that each intervention was evaluated and the magnitude of treatment effects. The discussion section that follows draws upon a wider literature base (e.g. including non-randomised or non-controlled studies where appropriate) to summarise gaps in the current research and future directions.

Methodological Limitations

Due to resource constraints, reporting of evidence is limited to qualitative summary of outcomes reported by the original study authors, primarily whether statistically significant differences in key outcome measures occurred pre- to- post-intervention, or whether statistically significant differences in outcomes were present between interventions or between intervention and control conditions. The identification of a statistically significant difference is partly a function of sample size. Studies with large sample sizes may find a statistically significant difference that is not clinically meaningful; conversely, studies with a small sample size may fail to find a statistically significant difference between groups despite the occurrence of a clinically meaningful difference in outcome. *A priori* power analysis is a statistical safe-guard that researchers can implement at study inception to identify the proportion of participants required to generate a meaningful statistical difference, however, it is often poorly implemented. A limitation of this evidence review is that it summarises only statistically significant differences reported within studies, and it was

beyond the scope of the review to assess the clinical meaningfulness of those differences.

Beyond identifying and describing the levels of evidence for particular interventions, an important extension to the systematic review process is to conduct meta-analysis; this was beyond the scope of the present project. Meta-analysis is a quantitative analysis which involves combining all of the available evidence from multiple trials to draw more reliable conclusions about a given topic. Meta-analysis provides an insightful method for summarising outcomes from systematic reviews, yet a caveat is that it is labour- and resource-intensive.

Ideally, systematic reviews should assess individual studies for risk of bias, however, no specific quality appraisal tool was used for this review due to time and resource limitations. Employing a level-of-evidence scheme goes some way to achieving the goal of summarising evidence with high quality and internal validity, yet is not sufficient in itself to remove sources of bias that may confound study outcomes.

Due to the limited amount of evidence, analytical challenges, and the questionable meaningfulness of interpreting the efficacy of a treatment in more heterogeneous clinical presentations, this review did not evaluate OSFED or sub-threshold eating disorders. In the absence of clearer evidence, the National Institute of Health and Clinical Excellence advise clinicians to follow the guidelines on the treatment of the eating problem that most closely resembles the patient's eating disorder[253]. Additionally, it is acknowledged that there are high-quality treatment studies (particularly among youth with eating disorders) that have been conducted within the eating disorder field that are not considered within this evidence review. Similarly, to address the key review questions, it was necessary to limit study selection to those that had a predominant age of focus (i.e., youth or adults), rather than studies with mixed age groups, therefore there may be additional RCT evidence available that was not included.

Search strings used to ascertain RCTs from academic databases were reasonably comprehensive, and were designed to access RCTs relevant to eating disorders, whether prevention or treatment-related. The search strings were unlikely to have detected studies that evaluated prevention programs for non-eating disorder mental or physical health conditions but included measurement of eating disorder-related variables. For instance, some interventions designed to enhance physical activity or improve nutritional status may assess factors related to eating disorders, yet would not necessarily have been located during database searches. Despite this potential absence of evidence, the most impactful prevention programs for eating disorders are likely to be those that are specially designed and tailored to address eating disorder risk factors.

Finally, methodological issues common to eating disorders prevention and treatment studies limit our interpretation of outcomes. These include small and ethnically homogenous samples which limit generalisability to the broader population; short follow-up periods; restricted opportunities for comparison due to the wide range of measures used; and insufficient evidence in the form of RCTs[387]. For a smaller subset of studies, methodological issues also included high rates of attrition, the use of self-reported data from interviews and surveys and the absence of a waitlist control condition, all of which carry the risk of introducing bias and impeding interpretation of outcomes.

3. Findings: Promotion & Prevention

This chapter considers the Level I and Level II evidence available on health promotion and prevention for eating disorders, and the scope covers universal and selective prevention only.

The Key Questions guiding this chapter are:

#1 What is the evidence for the efficacy of universal prevention interventions for eating disorders?
#2 What is the evidence for the efficacy of selective prevention interventions for eating disorders?

Health promotion and prevention initiatives aim to modify risk factors, enhance protective factors, and/or reducing early warning signs in order to reduce the incidence of disease in a population[123]. Prevention initiatives occur across a spectrum, from universal prevention programs to selective or 'high risk' programs. *Universal prevention* involves promoting healthy development within the whole population in hope that these initiatives will prevent the onset of a condition in both healthy and at risk individuals[123]. Eating disorders have a bimodal pattern of onset with adolescence and early adulthood presenting as peak periods of risk. As such universal prevention programs for eating disorders are typically targeted at adolescent school children or high school-age individuals to coincide with these peak risk periods of risk[160]. An example of universal prevention approaches include media literacy programs delivered to entire schools without restriction to a particular at risk group.

Selective prevention targets a smaller subgroup of individuals who are considered to be high risk for developing a condition, as indicated by the presence of at least one risk factor[23,123]. Similar to universal approaches, selective prevention programs for eating disorders are usually administered around the same peak age risk periods, with participants being selected because they display one or more risk factors[160]. Commonly, female sex is used as the most practical risk identifier for the implementation of such programs[58], however other examples include being overweight, an athlete, dieting and a family history of eating disorders[23,123,377].

Of 2358 items retrieved in the scientific database search, 5 systematic reviews and 38 RCTs pertaining to prevention and published in August 2009 or more recently met inclusion criteria. Studies in this chapter are summarised and discussed according to the predominant intervention approach used, though this method of organising study findings has limitations. For instance, classification of studies was complicated by that fact that many interventions had an atheoretical basis, that intervention content frequently included many and varied prevention strategies, and that some interventions were oriented in multiple theoretical models. However, many of the interventions had a dominant strategy within the intervention content (e.g. psychoeducation, media literacy, etc.), and this created substantive overlap among studies. Organising the literature by intervention strategy was considered the most useful means for organising the presentation of evidence over other alternatives. A serious caveat of this method is that intervention content within individual studies summarised is not "pure", nor is it homogenous within studies that claimed to use a particular approach.

While this review focuses on studies published between 2009 and 2016, studies published prior to this date are important to consider when weighing the evidence for effective interventions. The most validated universal prevention approach identified in the 2009 review was media literacy, which had the support of a moderate evidence base and led to substantial and persistent reduction in risk factors for eating disorders. One large scale Australian study[379] conducted among male and female secondary school students reported preventative effects that persisted up to 30 months post-intervention, including positive changes in self-esteem, weight and shape concern, body satisfaction and dieting. All other universal prevention interventions evaluated in the 2009 review (cognitive behavioural therapy, healthy weight, multicomponent, psychoeducation and self-esteem enhancement) were evaluated in 3 or fewer RCTs and had minimal (or no) beneficial effects.

The most validated **selective prevention** interventions identified in the 2009 review were cognitive behavioural therapy and cognitive dissonance. Both interventions had the support of a moderate evidence base and led to substantial improvements in eating disorders risk factors. Four

RCTs evaluated the computer-based cognitive behavioural therapy program *Student Bodies* delivered to female secondary and college students, and reported reductions in drive for thinness and body dissatisfaction that lasted up to 9 months post-intervention. Six RCTs evaluated cognitive dissonance interventions that were delivered over 3-4 sessions. Compared to no treatment controls, female college students receiving the cognitive dissonance intervention had improvements in restraint, eating pathology, body dissatisfaction and thin-ideal internalization, with some benefits persisting up to one year following the intervention. Compared with media literacy, cognitive dissonance generally led to more durable outcomes. Both media literacy and multicomponent interventions had the support of a moderate evidence base (5 and 4 RCTs respectively) and had a moderate degree of benefit.

A summary comparison of past and present prevention interventions for eating disorders is located in Appendix G.

Universal Prevention

Cognitive Behavioural Therapy

Cognitive behavioural therapy (CBT) programs encourage individuals to adopt helpful, balanced attitudes on body image, eating, and weight, and seek to reduce the importance placed on body shape and weight for defining one's success and self-worth. Cognitive behavioural therapy programs aim to modify thinking styles and behaviours that place an individual at risk for developing an eating disorder. They may cover topics such as challenging unhelpful thinking and attitudes about body shape and weight, the physical and psychological effects of dieting, sociocultural and media pressure to be thin, and balanced nutrition and physical activity.

Two systematic reviews (summarising one RCT each) evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Ciao, Loth and Neumark-Sztainer (2014)[69] identified one RCT (Stewart, Drinkwater, Hainsworth and Fairburn, 2001)[321] that randomised 474 middle- and high-school girls to a CBT-based intervention (*untitled*) or waitlist control. The 6-week interactive classroom intervention was delivered by research staff and covered topics such as sociocultural pressures for thinness, weight and shape comments, body dissatisfaction, self-esteem, dieting and nutrition and coping with stress. Compared with controls, girls receiving the intervention reported greater improvements in dietary restraint, eating and shape concerns and eating pathology post-intervention and at 6-month follow-up.

Watson and colleagues (2016)[369] identified one RCT (Musiat et al., 2014)[249] that randomised 1047 university students to a cognitive-behavioural trait-focused intervention or a control intervention. Students were categorized as being at low- or high-risk for mental disorders based on responses given in an online personality assessment questionnaire. Students were blinded to which intervention they would receive. The active intervention was a transdiagnostic trait-focused online intervention called "PLUS" (Personality and Living of University Students) that consisted of five CBT modules that aimed to help users identify their strengths and build upon their weaknesses. Self-assessments were conducted at baseline, 6- and 12-weeks post-registration. Attrition was high across all groups (baseline: 1047; 6-week follow-up: 520; 12-week follow-up: 401 students). At 12-week follow-up, high-risk students receiving the intervention had significant reductions in depression, anxiety and self-esteem, but no improvements in disordered eating.

Cognitive Dissonance

Cognitive dissonance-based programs target personal beliefs about the importance of being thin and the thin beauty ideal; a significant eating disorder risk factor. The rationale underlying this approach is that belief in the thin beauty ideal can be weakened through activities that encourage the individual to adopt an "anti-thin ideal" stance (e.g, exploring the costs associated with pursuing extreme thinness). The dissonance and psychological discomfort created by holding conflicting views leads to a shift in attitude to restore consistency, with the result being a weakened belief in the importance of the thin beauty ideal.

One RCT evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Kilpela and colleagues (2016)[190] conducted a pilot RCT that evaluated the efficacy of a mixed-gender version of the peer-led ***Body Project.*** Male and female college students (*N*=185) were randomly assigned to two-sessions of the mixed-gender version of the Body Project, waitlist control, or, for females, a female-only version of the Body Project. At follow-up, men receiving the cognitive dissonance intervention had significant improvements in body satisfaction, body fat and muscularity that were sustained at 6-month follow-up, compared with waitlist controls. In contrast, women in both intervention groups exhibited post-intervention improvements in body satisfaction and eating pathology, but neither effect was sustained at either 2- or 6-month follow-up.

Healthy Weight Intervention

Healthy weight interventions encourage participants to make small lifestyle changes in eating and exercise in order to maintain a healthy weight.

One systematic review (summarising 3 RCTs) evaluated this prevention approach and met inclusion criteria.

Level I Evidence

Ciao, Loth and Neumark-Sztainer (2014)[69] identified 3 RCTs that evaluated the school-based healthy weight intervention ***Planet Health***[55]. This intervention applies principles of social cognitive theory to promote behavioural changes in television viewing, physical activity and nutritional choices, alongside brief 'microunits' that focused on activity, fitness and nutrition checks conducted in physical education classes. One study[17] reported greater improvements in unhealthy weight control behaviours (e.g. one item related to purging and use of diet pills respectively) in middle school girls (*N*=480) receiving the intervention than in assessment-only controls. Another study[18] (*N*=1551) reported significant reductions in unhealthy weight control behaviours after two-years of participation in the intervention compared with an environmental-intervention control condition in middle-school girls but no boys. The third study[19] was a large-scale dissemination study that delivered the intervention as part of a 3-year healthy weight program in 45 middle-schools across Massachusetts (*N*=16,369). Cross-sectional data at study end indicated that students in schools with greater exposure to the intervention had lower odds of disordered weight control behaviours.

Level II Evidence

There was no level II evidence available.

Media Literacy

Media literacy programs aim to analyse, discuss, and critically appraise media messages. They explain how images are digitally altered to enhance the thinness of models and encourage critical evaluation of media messages related to thinness. They teach advocacy and activism skills to counter unhelpful media messages.

One systematic review (summarising 3 RCTs) and one RCT evaluated this prevention approach and met inclusion criteria.

Level I Evidence

Watson and colleagues (2016)[369] identified 2 RCTs that compared the interactive, classroom-delivered media literacy intervention ***Media Smart*** a usual-lesson control group. One study by Wilksch and Wade (2009)[379] randomised 548 grade 8 students to the 8-lesson program and reported significant effects in shape and weight concern, dieting, body dissatisfaction, feelings of ineffectiveness and depression in students receiving the intervention compared with controls. These improvements were observed post-intervention and at 6- and 30-month follow-ups. The second study by Wilksch (2013)[376] randomly allocated 51 grade 7 students to *Media Smart* or control and reported a significant effect on feelings of ineffectiveness and weight related peer teasing, but not weight and shape concerns, in students receiving the intervention.

Watson and colleagues identified a third RCT (Wade, Davidson, O'Dea, 2003)[366] that randomised 86 grade 8 private school students to a student-centred media literacy program, a self-esteem program or a control condition. The media literacy program was adapted from the GO GIRLS! Program[103] to be more interactive and include content relevant to both boys and girls. At post-intervention, students receiving the media literacy intervention had lower mean scores on weight concern than the control group.

Level II Evidence

Wilksch and colleagues (2014)[378] randomised 1316 Australian grade 7 and 8 girls and boys to one of 3

school-based eating disorder (***Media Smart; HELPP***) or multicomponent (***Life Smart***) programs or a no-program control group. All 3 programs consisted of 8, 50-min sessions delivered twice a week; were evidence-based and interactive; and avoided psychoeducation about eating disorders and obesity. Risk factors were assessed at baseline, 5-weeks post-program and at 6- and 12-month follow-ups. At 12-month follow-up, girls receiving the Media Smart intervention had half the rate of onset of clinically significant concerns about shape and weight than control girls while boys receiving the Media Smart intervention had significant, sustained improvements in media internalisation compared with control boys. Media Smart was the only program that tested that benefited both obesity and disordered eating risk factors.

Multicomponent

Multicomponent is a label used for the purpose of this review to describe programs that utilise a combination of approaches to target risk factors. For instance, a multicomponent program might incorporate media literacy, CBT, and self-esteem enhancement strategies, as opposed to using one predominant approach.

Three RCTs evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Diedrichs and colleagues (2015)[93] evaluated whether the 90 minute Uadf school-based body image intervention ***Dove Confident Me*** could be successfully delivered by teachers. Male and female British adolescents (N=1707) were cluster randomised to lessons as usual (control), the intervention led by their usual class teachers, or the intervention led by researchers. Intervention content was derived from key concepts and activities in the *Happy Being Me*[37] intervention, and included content addressing body image, societal appearance ideals, media literacy, appearance-related social comparisons and body activism. Teachers received 2-hours of group training covering key concepts prior to delivering the intervention. Multilevel mixed-models showed improvements in body esteem, negative affect, dietary restraint, eating disorder symptoms, awareness of sociocultural pressures and life engagement in students receiving the teacher-led intervention compared to controls. Students receiving the researcher-led intervention improved in life engagement as well. However, benefits were primarily seen in females and effects were small to moderate in size and were not maintained at follow-up.

Wilksch and colleagues (2014)[378] randomised 1316 Australian grade 7 and 8 girls and boys to one of 3 school-based eating disorder (***Media Smart; HELPP***) or multicomponent (***Life Smart***) programs or a no-program control group. All three programs consisted of 8, 50-min sessions delivered twice a week; were evidence-based and interactive; and excluded psychoeducation about eating disorders and obesity. HELPP is a multicomponent eating disorder prevention program that addresses eating disorder risk factors such as internalisation of social appearance ideals and appearance comparison and Life Smart is a multicomponent program that addresses weight gain risk factors by addressing physical activity, sleep, thinking styles and emotion management. Risk factors were assessed at baseline, 5-weeks post-program and at 6- and 12-month follow-ups. At 12-month follow-up, boys receiving the HELPP intervention experience a significant benefit relative to the control group for media internalisation, while boys receiving Life Smart experienced a benefit for body dissatisfaction. Media Smart was the only that program tested that benefited both obesity and disordered eating risk factors.

Raich, Portell, and Paleaz-Fernandez (2010)[281] evaluated the effectiveness of a universal school-based prevention program delivered to female secondary school students. Students (*N*=349) were selected by stratified random sampling, with school type as a stratification base (public or private) and school as the sample unit. Students were classified on the presence or absence of eating disorder risk factors (e.g. early menarche, overweight, dieting, negative attitudes) and allocated to either a full prevention program (learning basic concepts of nutrition, criticism of aesthetic models of beauty emphasising extreme thinness, media literacy), a partial version of the program (without nutritional education), or a no prevention program control group. Both the full and partial prevention programs led to reductions in the perceived pressure to be thin and improved eating attitudes all the participants, regardless of the presence or absence of eating disorder risk factors. The effect size of outcomes was greater for individuals with greater eating disorder risk factors.

Selective Prevention

Cognitive Behavioural Therapy

Cognitive behavioural therapy programs encourage individuals to adopt helpful, balanced attitudes on body image, eating, and weight, and seek to reduce the importance placed on body shape and weight for defining one's success and self-worth. Cognitive behavioural therapy programs aim to modify thinking styles and behaviours that place an individual at risk for developing an eating disorder. They may cover topics such as challenging unhelpful thinking and attitudes about body shape and weight, the physical and psychological effects of dieting, sociocultural and media pressure to be thin, and balanced nutrition and physical activity.

Two systematic reviews (summarising 17 RCTs) evaluated this prevention approach and met inclusion criteria.

Level I Evidence

Watson and colleagues (2016)[369] conducted a systematic review and meta-analyses of universal, selective and indicated prevention strategies. Data from 15 RCTs comparing CBT to a control condition were pooled and analysed. CBT led to significant post-intervention and follow-up (up to 18 months) improvements in body dissatisfaction and bulimic symptoms compared with waitlist control, and improvements in drive for thinness at follow-up compared with waitlist control. The effect size for these improvements was generally small.

Loucas and colleagues (2014)[206] conducted a systematic review of electronic 'e-therapy' interventions for the prevention and treatment of eating disorders. They identified 2 RCTs that investigated the efficacy of the 8-week, computer-based program ***Student Bodies***[316] with women in selective prevention programs (Low, Charanasomboon, Lesser, Reinhelter, Martin, Jones et al., 2006[207]; Jacobi, Volker, Trockel and Taylor, 2012[182]). One study[207] randomised 72 female college students to a control group or one of three versions of the Student Bodies[316] program with either a clinically moderated discussion group, an unmoderated discussion group, or no discussion group. The type of control group was not described. Completers (*N*=61) were followed up 8 to 9 months after post-test assessment. Outcomes assessed included drive for thinness, shape and weight concern, body dissatisfaction, and bulimia concerns. Differences between the intervention groups at post-test and follow-up were very modest with outcomes marginally favouring the condition with the unmoderated online discussion group. Based on this finding, the researchers collapsed the three intervention groups together and compared this amalgamated group to the control group. Compared to control participants, those receiving Student Bodies[316] achieved significantly lower scores and a greater rate of improvement on drive for thinness and body dissatisfaction over the duration of the study. There were no significant differences between the two groups in scores or rate of change on the measure of bulimia concerns. Weight and shape concerns remained stable in the intervention group and increased over time in the control group. The overall study findings are consistent with previous research showing that the program was associated with improvement and a protective effect on eating disorder-related outcomes relative to control, yet indicated that the inclusion of therapist moderation in the online discussion groups conferred no additional benefit on outcome.

The other RCT[182] evaluated whether the ***Student Bodies***[316] program could be successfully transported to a German population. The package was translated and adapted to make it culturally relevant and 100 female college students who wanted to improve their body image were randomly assigned to the intervention or wait-list control conditions. Of the full sample, 78% were assessed at baseline as low-risk and 22% as high-risk based on a validated cut-off on a measure of weight concern. Subgroup analysis was conducted for the high-risk sample. At post-test, the intervention group was superior on weight concern, shape concern, and knowledge about the content of the program. At 3-month follow-up, there were no significant differences between groups, which may have been attributable to the low sample size (intervention, *N*=10; control, *N*=12).

Ciao, Loth and Neumark-Sztainer (2014)[69] identified one RCT (Jacobi, Volker, Trockel and Taylor, 2012[182]) that was included in the systematic review by Loucas and colleagues so will not be discussed further here.

Level II Evidence

There was no level II evidence available.

Cognitive Dissonance

Cognitive dissonance-based programs target personal beliefs about the importance of being thin and the thin beauty ideal; a significant eating

disorder risk factor. The rationale underlying this approach is that belief in the thin beauty ideal can be weakened through activities that encourage the individual to adopt an "anti-thin ideal" stance (e.g, exploring the costs associated with pursuing extreme thinness). The dissonance and psychological discomfort created by holding conflicting views leads to a shift in attitude to restore consistency, with the result being a weakened belief in the importance of the thin beauty ideal.

Three systematic reviews (summarising 12 RCTs) and 4 RCTs evaluated this prevention approach and met inclusion criteria.

Level I Evidence

Watson and colleagues (2016)[369] pooled data from up to 8 RCTs of cognitive dissonance-based interventions and reported moderate-to-large effects on a number of measures. The intervention led to post-intervention improvements in dieting, eating pathology, bulimic symptoms and thin-ideal internalisation compared with waitlist controls; body dissatisfaction, dieting thin-ideal internalisation, eating pathology, bulimic symptoms and negative affect compared with nonspecific controls; body dissatisfaction, dieting, thin internalisation and negative affect compared with psychoeducation and therapeutic writing. At follow-up (on average between 6-18 months), the intervention resulted in improvements in body dissatisfaction and dieting compared with a healthy weight intervention; eating pathology and bulimic symptoms compared with a non-specific control condition; and negative affect, eating pathology and bulimic symptoms compared with a waitlist control condition.

Schlegl and colleagues (2015)[65] identified one study (Serdar, Kelly, Palmberg, Lydecker, Thornton et al., 2014)[311] that randomised 333 female college students with weight or shape concerns to an in-person dissonance-based program, an online dissonance-based program, or an assessment-only control group. The in-person program (developed by Stice and colleagues, 2000)[330] included 3 1-hour sessions containing verbal, written and behavioural exercises that guided participants toward adopting a stance against the thin-ideal. The online program included 3, 1-hour sessions containing identical content to the in-person program, including synchronous moderated discussions that were thought to encourage interaction among participants. Intent-to-treat analyses revealed decreases in body dissatisfaction at-post in participants in both the in-person and online dissonance-based intervention groups as compared with assessment-only controls. The online condition did not differ significantly from the in-person condition, indicating comparable effects across modes of delivery.

Ciao, Loth and Neumark-Sztainer (2014)[69] identified three RCTs that evaluated dissonance-based selective prevention programs. One study[328] randomised 481 adolescent girls with body dissatisfaction to a dissonance-based program (targeting thin ideal internalisation), a healthy weight control program (targeting diet and physical activity) or an expressive writing control condition. The dissonance and healthy weight interventions consisted of 3 weekly 1-hr group sessions with 6–10 participants, while the control condition consisted of 3 weekly 45-min sessions. Participants receiving the dissonance intervention showed significantly greater decreases in thin-ideal internalisation, body dissatisfaction, negative affect, eating disorder symptoms, and psychosocial impairment and lower risk for eating pathology onset through 2- to 3-year follow-up compared with controls. Healthy weight participants showed greater decreases in thin-ideal internalisation, body dissatisfaction, negative affect, eating disorder symptoms, and psychosocial impairment; less increases in weight; and lower risk for eating pathology and obesity onset through 2- to 3-year follow-up compared with controls.

Ciao and colleagues[69] additionally identified 2 RCTs that evaluated dissonance-based programs delivered to college women. One study[31] randomised 90 sorority members to 2, 2-hour sessions of cognitive dissonance or media advocacy delivered by peer facilitators. All participants initially engaged in content addressing the thin-ideal and media enhancement of images, but group programs subsequently diverged to cover content specific to their intervention (media content for the media advocacy group; dissonance-based content for the dissonance-based group). Both interventions led to improvements, but the dissonance-based intervention produced larger improvements in restraint, eating pathology, thin-ideal internalisation, and body dissatisfaction at 8-month follow-up. The second study[28] replicated and extended upon the discussed study using a larger sample of both higher and lower-risk sorority members (*N*=188). Both interventions reduced thin-ideal internalisation, body dissatisfaction, dietary restraint, and bulimic pathology at 8 months, although outcomes differed for higher and lower risk participants. Higher risk participants benefited equally from both interventions, while

only the dissonance-based intervention appeared to benefit lower risk participants.

Level II Evidence

Atkinson and Wade (2015)[15] conducted an RCT evaluating the efficacy of mindfulness-based interventions as a prevention strategy. Nineteen classes of adolescent girls (*N*=347) were randomised to 3 sessions of mindfulness-based intervention, dissonance-based intervention, or classes as usual control. The dissonance-based intervention was based on the ***Body Project*** protocol and guide (2007)[331] and involved voluntary engagement challenging the thin-ideal through facilitated discussions, role- plays, and written tasks. Participants receiving the dissonance-based intervention had significantly greater reductions in sociocultural pressures. There were no significant differences between interventions at follow-up.

Stice, Rohde, Durant, Shaw and Wade (2013)[333] conducted two preliminary trials to assess whether undergraduate peer leaders could effectively deliver a dissonance-based eating disorder prevention program. In the first study, 171 female undergraduates were randomised to a peer-led group, a clinical-led group, or an educational brochure control condition delivered over 4 weekly 1-hour group sessions. The dissonance-based program (the Body Project)[331] involved voluntary engagement in written, verbal and behavioural exercises in which participants critiqued the thin-ideal both in-group and through home exercises. The educational control condition involved reviewing a 2-page brochure discussing themes around body image and eating disorders. Participants in both peer- and clinician-led groups showed significantly greater reductions in all outcomes (thin-ideal internalisation, body dissatisfaction, self-reported dieting, negative affect, and eating disorder symptoms) than those in the educational brochure group, with the strongest effects occurring in the clinician-led group. In the second study, which improved study design by using parallel outcome measures across conditions, 148 female undergraduates were randomised to a peer-led dissonance-based program (with minor modifications to above) or waitlist control group. Here, participants in the peer-led dissonance-based group displayed greater reductions in all outcomes compared to waitlist controls.

An exploratory study conducted by Becker, McDaniel, Bull, Powell and McIntyre (2012)[29] investigate whether dissonance-based prevention or healthy weight interventions could be effectively tailored to sport populations. Female athletes (*N*=157) were first assigned to sport-specific teams, and then further randomised to a peer-led, athlete-modified dissonance-based prevention program or healthy weight intervention. Interventions comprised 3 60-80-minute sessions delivered to small (2-14 member) groups by athlete peers over 3 weeks. The athlete-modified dissonance protocol (based on the 2007 manual by Stice and Presnell)[331] was modified to include information on the female athlete triad and discussion of the sport-specific body image pressures placed on athletes. Both interventions reduced internalisation of the thin-ideal, dietary restraint, bulimic pathology, shape and weight concern, and negative affect at 6-week follow-up, and bulimic pathology, shape concern, and negative affect at 1-year follow-up.

Becker, Wilson, Williams, Kelly, McDaniel and Elmquist (2010)[33] randomised 106 female sorority members to 2 sessions of peer-delivered dissonance-based or healthy weight intervention. Both programs were modified to facilitate peer delivery. At end of treatment, negative affect, thin-ideal internalisation, and bulimic pathology were significantly reduced in dissonance-based participants compared to healthy weight participants. At 14-month follow-up, both interventions resulted in reductions in negative affect, internalisation, body dissatisfaction, dietary restraint, and bulimic pathology, with no significant differences noted between treatment groups.

Healthy Weight Intervention

Healthy weight interventions encourage participants to make small lifestyle changes in eating and exercise in order to maintain a healthy weight.

Two systematic reviews (summarising 8 RCTs) and 2 RCTs evaluated this prevention approach and met inclusion criteria.

Level I Evidence

Watson and colleagues (2016)[369] pooled data from 7 RCTs comparing healthy weight interventions to waitlist control, nonspecific control or active comparisons. Post-intervention improvements in body dissatisfaction were reported in the intervention group compared with waitlist control (3 RCTs) nonspecific control (3 RCTs), and in comparison to a therapeutic writing group (1 RCT). Post-intervention improvements in negative affect and bulimic symptoms were reported for the intervention group compared with therapeutic writing (1 RCT), as well as post-intervention improvements in eating pathology compared with

nonspecific controls. Significant differences at follow-up (on average between 6-18 months) were also reported in body dissatisfaction and dieting compared with waitlist controls (4 RCTs) and body dissatisfaction compared with nonspecific controls (4 RCTs).

Ciao, Loth and Neumark-Sztainer (2014)[69] identified two RCTs that were healthy weight interventions. One study[328] randomised 481 adolescent girls with body dissatisfaction to a dissonance-based program (targeting thin ideal internalisation), a healthy weight control program (targeting diet and physical activity) or an expressive writing control condition. The dissonance and healthy weight interventions consisted of 3 weekly 1-hour group sessions with 6–10 participants, while the control condition consisted of 3 weekly 45-minute sessions. Participants receiving the dissonance intervention showed significantly greater decreases in thin-ideal internalisation, body dissatisfaction, negative affect, eating disorder symptoms, and psychosocial impairment and lower risk for eating pathology onset through 2- to 3-year follow-up compared with controls. Healthy weight participants showed greater decreases in thin-ideal internalisation, body dissatisfaction, negative affect, eating disorder symptoms, and psychosocial impairment; less increases in weight; and lower risk for eating pathology and obesity onset through 2- to 3-year follow-up compared with controls.

The second study[256] used a school-based group-randomised controlled design to evaluate the impact of the weight-improvement program ***New Moves*** in adolescent girls (*N*=356). The program was incorporated principles from both obesity and eating disorders fields to encourage behavioural change. Girls participated in an all-girls physical education class, supplemented with nutrition and self- empowerment components, individual sessions using motivational interviewing, lunch meetings, and parent outreach. The program improved sedentary activity, eating patterns, unhealthy weight control behaviours, and body/self-image, but not BMI, at 9-month follow-up.

Level II Evidence

An exploratory study conducted by Becker, McDaniel, Bull, Powell and McIntyre (2012)[29] investigate whether dissonance-based prevention or healthy weight interventions could be effectively tailored to sport populations. Female athletes (*N*=157) were first assigned to sport-specific teams, and then further randomised to a peer-led, athlete-modified dissonance-based program or athlete-modified healthy weight intervention. Interventions comprised 3, 60-80-minute sessions delivered to small (2-14 member) groups by athlete peers over 3 weeks. The healthy weight protocol (also based on the 2007 manual by Stice and Presnell)[331] was modified to include information on the female athlete triad and discussion of sport-specific thin-ideals and the athlete-specific healthy-ideal. Both interventions reduced internalisation of the thin-ideal, dietary restraint, bulimic pathology, shape and weight concern, and negative affect at 6-week follow-up, and bulimic pathology, shape concern, and negative affect at 1-year follow-up.

Becker, Wilson, Williams, Kelly, McDaniel and Elmquist (2010)[33] randomised 106 female sorority members to two sessions of a peer-delivered dissonance-based program or a health weight program. Both programs were modified to facilitate peer delivery. At end of treatment, negative affect, thin-ideal internalisation, and bulimic pathology were significantly reduced in dissonance-based participants compared to healthy weight participants. At 14-month follow-up, both interventions resulted in reductions in negative affect, internalisation, body dissatisfaction, dietary restraint, and bulimic pathology, with no significant differences noted between treatment groups.

Media Literacy

Media literacy programs aim to analyse, discuss, and critically appraise media messages. They explain how images are digitally altered to enhance the thinness of models and encourage critical evaluation of media messages related to thinness. They teach advocacy and activism skills to counter unhelpful media messages.

One systematic review (summarising 9 RCTs) and one RCT evaluated this prevention approach and met inclusion criteria.

Level I Evidence

Watson and colleagues (2016)[369] pooled data from 9 RCTs comparing media literacy to waitlist control. Media literacy interventions led to improvements in dieting and self-esteem at post-intervention (7 RCTs), and improvements in drive for thinness at follow-up (6 RCTs). Positive findings were identified across numerous media literacy programs, and effects on most outcomes were maintained up to 18-month follow-up.

Level II Evidence

Lopes-Guimera and colleagues (2011)[204] assessed the efficacy of an interactive media-literacy based program on preventing eating disorders in schools. Adolescent girls (*N*=263) from seven schools in Spain were randomised to the full media literacy program, a partial media literacy program, or a no-treatment control condition. The interactive and multimedia full media literacy program was based on a 2008 manual by Raich and colleagues[282], and included a first stage discussing themes around eating and nutrition, and a second stage (that included activity sessions) that worked through themes surrounding the beauty ideal and how to deal with media messages. The partial program included the second media literacy stage only. Outcomes measured were BMI, attitudes towards eating (the Spanish version of the Eating Attitudes Test[63], and scores on the DIET subscale contain within) and the impact of social factors on attitudes towards one's body (Spanish version of the Questionnaire on influences on body shape model-26)[359]. Participants in the full media literacy program had significantly higher improvements in the CIMEC assessment than participants in the partial program, while participants in the partial intervention had significantly greater improvements in on the DIET subscale assessment than controls. Full intervention participants also had a significantly greater reduction in the influences of the beauty ideal compared to controls at 6-month follow-up.

Mindfulness-Based Interventions

Mindfulness is characterised by two key components: attention to present-moment experiences and a state of openness or acceptance towards these experiences. In the context of preventative strategies, mindfulness-based interventions aim to equip participants with a greater capacity to resist reflexive responses when confronted with the thin-ideal and associated sociocultural pressures, as well as reduce the impact of such negative experiences when they do occur.

One RCT evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Atkinson and Wade (2015)[15] conducted an RCT evaluating the efficacy of mindfulness-based interventions as a prevention strategy. Nineteen classes of adolescent girls (*N*=347) were randomised to 3 sessions of mindfulness-based intervention, dissonance-based intervention, or classes as usual control. The mindfulness intervention adapted Mindfulness-Based Cognitive Therapy for depression to issues around body image, through exercise that focused on body-related stimuli both imagined and generated. Participants receiving the mindfulness intervention had significantly greater reductions in weight and shape concern, dietary restraint, thin-ideal internalisation, eating disorder symptoms and psychosocial impairment relative to controls at 6-month follow-up when facilitated by an expert facilitator. There were no significant differences between interventions at follow-up.

Multicomponent

Multicomponent is a label used for the purpose of this review to describe programs that utilise a combination of approaches to target risk factors. For instance, a multicomponent program might incorporate media literacy, CBT, and self-esteem enhancement strategies, as opposed to using one predominant approach.

One systematic review (summarising 12 RCTs) and one RCT evaluated this prevention approach and met inclusion criteria.

Level I Evidence

Watson and colleagues (2016)[369] pooled data from 12 RCTs comparing multicomponent interventions to waitlist control or nonspecific control interventions. Compared with waitlist control, multicomponent interventions led to post-intervention improvements in thin-ideal internalisation and BMI (5 RCTs), and follow-up improvements in body dissatisfaction and drive for thinness (5 RCTs). Multicomponent interventions also led to follow-up improvements in eating pathology when compared with non-specific control interventions (4 RCTs).

Level II Evidence

Tirlea, Truby and Haines (2016)[358] conducted two pragmatic, cluster stepped-wedge RCTs to test the efficacy of a selective prevention intervention on self-esteem, eating disorders induced impairment, body satisfaction and dieting. Primary and secondary school girls from 12 schools in Australia (*N*=122) participated in the 10-week interactive program, ***Girls on the Go!*** The program used an empowerment model to deliver experiential learning content centred on themes of body image,

self-esteem, safety and assertiveness, a healthy mind, physical activity, healthy eating, trust and confidence, and connections. Participation in the intervention led to significant improvements in self-esteem, self-efficacy and dieting behaviours that were sustained through 6-month follow-up.

Psychoeducation

Psychoeducation programs aim to provide education and information on social, cultural, and biological eating disorder risk factors. Topics covered may include physical changes associated with puberty, healthy eating, body image, social pressure for thinness, peer pressure and teasing, and attitudes toward food and meals. Some psychoeducation programs include discussion of the nature of eating disorders. The programs may be designed for different audiences, such as teachers or students. When delivered to a student audience, the facilitator is generally given background information on eating disorders and their prevention.

One systematic review (summarising 12 RCTs) evaluated this prevention approach and met inclusion criteria.

Level I Evidence

Watson and colleagues (2016)[369] pooled data from 12 RCTs evaluating psychoeducation interventions for selected prevention. Compared to waitlist control, psychoeducation interventions led to post-intervention improvements in dieting (3 RCTs) and follow-up improvements in self-esteem (4 RCTs). However, when active comparisons were made, dissonance-based interventions led to greater post-intervention improvements in dieting and eating pathology (8 RCTs), and dieting and body dissatisfaction at follow-up (8 RCTs).

Level II Evidence

There was no level II evidence available.

Summary of Research Findings

Table 3 summarises the universal and selective prevention evidence base as discussed more fully within in this chapter.

Table 3. Summary of Eating Disorder Universal and Selective Prevention Studies

Prevention Approach	Degree to Which Evaluated	Magnitude of Effect	Program Example
Universal prevention			
Cognitive behavioural therapy	Some	Low-Moderate	--
Cognitive dissonance*	Some	Low-Moderate	The Body Project
Healthy weight intervention	Moderate	Moderate	Planet Health
Media literacy	Moderate	Moderate-Substantial	Media Smart
Multicomponent	Moderate	Moderate-Substantial	HELPP
Selective Prevention			
Cognitive behavioural therapy	Substantial	Low-Moderate	Student Bodies
Cognitive dissonance	Substantial	Moderate-Substantial	The Body Project
Healthy weight intervention*	Substantial	Moderate	--
Media literacy	Moderate	Moderate	--
Mindfulness*	Some	Moderate	--
Multicomponent	Moderate	Moderate	--
Psychoeducation	Moderate	Moderate	--

Note: **Degree to which evaluated**: None = no Level I or Level II studies; Some = 1 to 2 Level II studies (RCTs); Moderate = > 2 Level II studies and/or Level I and II evidence available; Substantial = > 2 Level 1 studies. **Magnitude of effect at follow-up for eating disorder risk variables**: None = no beneficial effect; Low = slight beneficial effect; Moderate = moderate beneficial effect; Substantial = substantial and persistent effect. Asterisks indicate interventions that were not evaluated in the previous Evidence Review.

Universal Prevention Approaches

A review of research into prevention initiatives suggests that there are prevention programs that successfully reduce eating disorder risk. Universal eating disorder prevention programs are typically instigated prior to the 2 peak age-of-onset periods for eating disorders – adolescence and early adulthood, and, for convenience and transportability, have been classroom-delivered or computer-delivered through schools and colleges. Two systematic reviews and 12 RCTs evaluated universal prevention approaches and met criteria for inclusion in this review. These studies examined cognitive behavioural therapy, cognitive dissonance, media literacy, multicomponent and healthy weight programs and had a moderate magnitude of effect.

Two RCTs evaluated a **cognitive behavioural** classroom intervention delivered to middle-school, high-school and university students. One study reported greater improvements in dietary restraint, eating and shape concerns and eating pathology post-intervention and at 6-month follow-up compared with controls; while the second study reported significant reductions in depression, anxiety and self-esteem without a concomitant improvement in disordered eating.

Three RCTs evaluated the interactive, classroom-delivered **media literacy** intervention, *Media Smart* delivered to Australian boys and girls. The program led to improvements in shape and weight concerns, dieting, body dissatisfaction, feelings of ineffectiveness and depression.

One **healthy weight** intervention (Planet Health) was evaluated in 3 RCTs and led to improvements in unhealthy weight control behaviours in female-middle-school students, with positive outcomes observed up to 3 years following intervention commencement.

Three RCTs evaluated a **multicomponent** intervention. Two of these programs improved eating attitudes and the perceived pressure to be thin, with stronger effects reported in individuals

with greater eating disorder risk factors. Multicomponent interventions also lowered weight and shape concern in girls and had significant, sustained improvements in media internalisation in boys. One program (the 90-minute school-based workshop Dove *Confident Me,* based on the *Happy Being Me* program) led to post-intervention benefits that were primarily seen in females and were not maintained at follow-up.

One pilot RCT evaluated a mixed-gender version of the peer-led, cognitive-dissonance based program, the ***Body Project.*** The intervention led to improvements in body satisfaction, body fat and muscularity in men that were sustained at 6-month follow-up, while in women, both the mixed-gender and female-only forms of the intervention led to only post-intervention improvements in body satisfaction and eating pathology.

Changes in Universal Prevention Approaches and Outcomes

Interventions that have had an increased level of evaluation and/or magnitude of effect since the previously published (2010) evidence review include multicomponent (improved from no effect to moderate-substantial effect) and cognitive dissonance interventions (newly evaluated in this review).

Cognitive behavioural therapy had a decreased level of evaluation (from moderate to small evidence base).

Interventions that were evaluated in the previous review but did not have sufficient evidence for evaluation in the current review were psychoeducation and self-esteem enhancement. Both of these interventions had only a small magnitude of effect in the original review.

Selective Prevention Approaches

The selective prevention approaches that have had the greatest degree of evaluation are cognitive dissonance and cognitive-behavioural therapy. All other approaches (healthy weight intervention, media literacy and mindfulness) were evaluated in only one to 2 RCTs and were associated with a slight beneficial effect.

Cognitive dissonance was evaluated in 16 RCTs using the protocol developed by Stice and colleagues at University of Texas. The rationale underlying this approach is that endorsement of the thin ideal can be weakened by encouraging adoption of an anti-thin ideal stance; the dissonance and psychological discomfort create by holding conflicting views leads to a shift in attitude to restore consistency. The studies evaluated here were delivered successfully to adolescents, undergraduate female students, female sorority members and female athletes. Cognitive dissonance led to improvements in body dissatisfaction (in both in-person and online forms), sociocultural pressures, thin-ideal internalisation, self-reported dieting, negative affect and eating disorder symptoms. Higher risk participants benefited equally from the dissonance-based intervention and a media advocacy intervention, while only the dissonance-based intervention appeared to benefit lower risk participants.

Seventeen RCTs evaluated cognitive behavioural interventions delivered to students. The systematic review pooled data from 15 RCTs and found significant improvements in body dissatisfaction and bulimic symptoms compared with waitlist control both post-intervention and up to 18-months post-intervention. However, the effect size for these improvements was generally small.

Twelve RCTs (summarised in one systematic review[369]) evaluated psychoeducation interventions. Psychoeducation led to post-intervention improvements in dieting and follow-up improvements in self-esteem compared with waitlist control.

Ten RCTs (9 of 10 were summarised in a recent systematic review[369]) compared a media literacy intervention to waitlist control. In the systematic review and meta-analyses, media literacy was found to improve dieting and self-esteem at post-intervention and drive for thinness at follow-up. One RCT evaluated a multimedia, interactive program delivered to adolescent girls either in full form (including content on eating, nutrition, beauty and media) or partial form (including content on beauty and media only) and compared with a no-treatment control. Participation in the full program led to greater improvements in the CIMEC assessment (measures the environmental influences favouring thinness) and greater reductions in the influence of the beauty ideal than partial or control interventions.

Two RCTs reported positive outcomes from participation in a healthy weight intervention in female athletes and female sorority members. These included reductions in negative affect, internalisation, body dissatisfaction, dietary restraint, weight and shape concerns and bulimic pathology at 12 to 14-month follow-up. A pooled analysis of 7 RCTs featuring healthy weight

interventions reported improvements in body dissatisfaction, negative affect, dieting and bulimic symptoms.

One RCT evaluated a mindfulness-based intervention delivered to adolescent girls. Mindfulness led to reductions in weight and shape concern, dietary restraint, thin-ideal internalisation, eating disorder symptoms and psychosocial impairment relative to controls at 6-month follow-up.

Thirteen RCTs (12 of which were pooled and analysed in a single systematic review) evaluated multicomponent interventions for selective prevention. Multicomponent interventions led to improvements in thin-ideal internalisation and BMI post-intervention, and body dissatisfaction, drive for thinness and eating pathology at follow-up.

Changes in Selective Prevention Approaches and Outcomes

Interventions that have had an increased level of evaluation and/or magnitude of effect since the previously published (2010) evidence review were cognitive dissonance (increased from moderate to substantial body of evidence), psychoeducation, healthy weight interventions and mindfulness interventions (newly evaluated in this review).

Cognitive behavioural therapy had a slight reduction in magnitude of effect (from substantial to low-moderate).

Interventions that were evaluated in the previous review but did not have sufficient evidence for evaluation in the current review were perfectionism-targeted interventions and self-esteem enhancement. The previous review reported a minimal effect in both cases.

4. Findings: Identification & Early Intervention

This chapter considers evidence available on the identification and early intervention of eating disorders, and includes a systematic review of Level I and Level II evidence for indicated prevention – generally understood as a form of early intervention. Early interventions may help to prevent the onset of an illness or alter its course[307], and depend on the early detection of a disorder or its precursors[307].

While this review focuses on studies published between 2009 and 2016, studies published prior to this date are important to consider when weighing the evidence for effective interventions. The most validated indicated prevention approach identified in the 2009 review were cognitive behavioural therapy and cognitive dissonance, which had the support of a moderate evidence base and led to substantial and persistent reduction in risk factors for eating disorders in high risk samples. The specific cognitive behavioural therapy programs evaluated in the 2009 review were *Student Bodies* (computer-based), *My Body, My Life* and *Set Your Body Free*, which led to improvements in shape and weight concern, dietary restraint, bulimic attitudes, self-esteem and drive for thinness across a range of populations, including women in the general community with eating disorder risk factors, female high-school and college students and overweight adolescents with binge eating symptoms. The cognitive dissonance program developed by Stice and colleagues[331] likewise led to reductions in eating disorder symptoms among young women with high body dissatisfaction and thin-ideal internalisation.

A summary comparison of past and present indicated prevention interventions for eating disorders is located in Appendix H.

Background for Early Identification

Full Syndromes

Individuals who are identified and treated early in the course of an eating disorder have a better chance of recovery compared to those with a longer history of illness[319,388]. This is particularly true for adolescents, who have been shown to respond better to treatment when treated early in the course of their illness. One study of adolescents treated with family-based treatment found that when patients were treated early, 50 – 75% achieved weight restoration by the end of family-based treatment and 60 – 90% fully recovered by 5-year follow up[144]. Similarly, another study reported better outcomes in young people with BN when treated early compared to those who were diagnosed and treated at a later stage of their illness[304].

Partial Syndromes

"Partial" eating disorder syndromes are subclinical conditions whereby an individual meets many, but not all diagnostic criteria, for a full syndrome eating disorder[265]. These individuals might have a range of eating disorder disturbances including behavioural (e.g. dieting, fasting, self-induced vomiting, laxative misuse, binge eating), physical (e.g. dizziness, fatigue and digestive problems), and psychological (e.g. extreme shape and weight concern and social withdrawal)[388].

Many rationales have been proposed for identifying individuals with partial eating disorder syndromes although the evidence base is limited. Symptoms of partial eating disorder syndromes are sometimes indistinguishable from the full syndrome, particularly for individuals presenting with symptoms of AN and BED[79], or an elevated risk of other psychopathological disorders such as depression and poor psychosocial development[196,341]. Some partial syndromes may be eating disorders in evolution that have not yet progressed to the full clinical level[265], although the evidence based for this is mixed. Current assessment methods may not adequately detect some cases of full syndrome illness, therefore, it has been suggested that partial syndromes could be an artefact of poor assessment. Australian research that tracked a community sample of nearly 2000 adolescents over 8 years found that the presence of a partial eating disorder syndrome at first assessment was associated with a broad range of ongoing health and social problems in young adulthood, including a higher chance of developing depressive and anxiety symptoms, substance misuse and lower educational attainment[265]. More research is required to examine the morbidity and outcomes of those with partial syndrome eating disorders, and the impact of interventions for this subgroup.

Barriers to Care

Practical Barriers

Practical barriers to help-seeking include under-recognition of eating disorders in primary care, poor eating disorder literacy, and impediments to service access.

Among adults with eating disorders, at least half had their disorder first diagnosed by their primary care physicians[178,368]. However research has shown that general practitioners frequently fail to identify eating disorders[307,312]. Reviews of medical education frequently show a lack of adequate training in their identification and treatment, and hence health care professionals may only detect an eating disorder once substantial medical and psychological consequences have developed[83,368].

This is particularly true of BN and OSFED, which represent the majority of eating disorder cases[124,313]. Individuals with these eating disorders are generally of average to above average weight and are more likely to be missed compared to AN, where low body weight and emaciation are distinctive characteristics[191]. In a vignette study completed by 154 GPs, doctors gave an eating disorder diagnosis to under 70% of cases with clear eating disorder presentations[82]. Even low body mass index (BMI) did not seem to trigger a clear clinical decision for about half of GPs – and the resulting 'wait and see' approach did not yield much clarity.

Eating disorder literacy refers to the knowledge, skills, and beliefs that enable the prevention, identification, and management of eating disorders[241]. Gatekeepers are people who have primary contact with those at risk for eating disorders, and who identify those at risk by observing risk factors, early warning signs and symptoms, or morbidity[241]. Gatekeepers are unlikely to have the capacity to intervene early without specialised training and education to enhance eating disorder literacy. Individuals with eating disorders, their families, and community members, will experience delays in identifying and responding to eating disorders if they have poor eating disorder literacy[241].

Impediments to service access include a lack of service availability, direct and indirect costs (e.g. transport), distance to care, waiting times within services and poor transitions between services[307]. These barriers may be personal or systemically related to the broader health-care system. A survey of young people in the U.K with an eating disorder, for example, found that one third of applicants to specialist services had to wait more than 18 weeks for treatment and another third had to wait up to 6 months to access care. Most of these young people claimed that their eating disorders got significantly worse while waiting for treatment[1]. Similarly a recent RCT found that the early detection of BN and immediate CBT treatment resulted in better outcomes than those whose treatment was delayed[304].

Social and Emotional Barriers

Social and emotional barriers can be major obstacles to help-seeking. Negative attitudes exist in the community toward people with eating disorders (i.e. stigmatisation)[78,243]. This seems strongly connected to eating disorder myths, for instance, views that eating disorders are "self-centred" illnesses and "a choice"[102]. This is despite modern scientific understanding of eating disorders as complex, highly heritable, and biologically-based conditions (*see Chapter 1*). Through stigmatisation, individuals with eating disorders experience shame about their eating problem[102] and have difficulty discussing the problem with others, including general practitioners.

Ambivalence toward accessing care is a typical experience among those with eating disorders, given that the illness can represent a coping structure for dealing with complex emotions and life events. Even when there has been substantial accumulation of morbidity the individual with an eating disorder may continue to deny illness[307].

People with eating disorders may fear the ramifications of help-seeking. Some fear weight gain as a result of treatment. In cases of underweight, treatment aims to restore weight to a healthy BMI range. Individuals who use compensatory behaviours may fear weight gain upon ceasing such behaviours (e.g. self-induced vomiting, laxative and diuretic misuse, excessive exercise for weight control). Some individuals may fear psychiatric hospitalisation or being labelled as "mentally ill" upon disclosing their illness[307].

Sociocultural and media messages about the importance of thinness comprise a significant barrier to help-seeking[283]. Embedded in Western culture is a favourable regard for weight loss, and a corresponding unfavourable regard for weight gain. This milieu means that individuals in the early phases of progression to AN may be complimented on their slimming efforts, which encourages disordered eating and impedes recognition of the illness syndrome.

Screening Tools

If a patient presents to primary care with general psychological distress and medical issues that may arise with disordered eating or obesity, screening for the presence of an eating disorder is appropriate. A 5-question self-report screening tool, known as the "SCOFF" (Table 4) has been validated for use in primary care settings[315]. While the SCOFF is brief and easy to administer, its sensitivity and specificity rates vary across studies (0.5 to 0.8 and 0.7 to 0.9, respectively)[39,242,315], indicating that it may not be an optimal screening device in general populations. Validated structured interviews, such as the Eating Disorder Examination, the Child Eating Disorder Examination, and the Structured Clinical Interview for DSM-V[10,214], may also help specialists identify and diagnose eating disorder.

Table 4. The SCOFF: An Eating Disorder Screening Instrument for Primary Care Settings

5-Item Version	
1.	Do you make yourself *Sick* because you feel uncomfortably full?
2.	Do you worry that you have lost *Control* over what you eat?
3.	Have you lost more than *One* stone (6.35 kilograms) in a 3-month period?
4.	Do you believe yourself *Fat* when others say you are thin?
5.	Would you say that *Food* dominates your life?
With Two Additional BN Items	
6.	Do you ever eat in secret?
7.	Are you satisfied with your eating patterns?

Training Interventions

Gatekeeper training is an important strategy for enhancing early identification and intervention for eating disorders.

Specific groups of gatekeepers that are important to target eating disorder training to include health professionals, education professionals, and fitness professionals[388]. The purpose of training interventions is to equip gatekeepers with the knowledge and skills to identify those at risk and to apply the appropriate management and referral strategy ("eating disorder literacy"). Training interventions may be stand-alone or integrated within tertiary training programs.

Early Intervention

Indicated Prevention

Recognising and detecting early signs of eating disorder illness and providing early intervention, is a critical, but sometimes neglected area of the mental health promotion spectrum[307]. Having established that an eating disorder is associated with serious negative consequences (Chapter 1), the benefits of early intervention for those showing early warning signs are numerous and significant. Potential benefits include reducing the risk of progression to a full syndrome eating disorder[307] resulting in significant cost savings and improved quality of life through mitigation of medical, psychological, occupational, academic, and economic disease burdens[89]. This is particularly so in youth where malnutrition during key developmental phases is associated with increased physical and cognitive impairments.

Indicated prevention is a form of early intervention targeted to those showing early signs of an illness or those individually identified as at very high-risk of developing an illness[323]. With respect to eating disorders, early warning signs may include altered eating or dietary behaviour, such as dieting, binge eating or purging, changes in exercise behaviour such as excessive exercise, or cognitive or attitudinal symptoms, such as poor body image, clinically significant shape and weight concern or depressed mood and/or withdrawal from social contact[323,388]. As highlighted in Chapter 1, individuals with subclinical eating disorder symptoms are at a much higher risk of progressing to a clinical eating disorder, with early signs such as body dissatisfaction and dietary restraint comprising prodromal stages in the subsequent development of an eating disorder. For this population, indicated prevention is an important method of early intervention[326]. The majority of individuals that develop one or more symptoms of an eating disorder will not develop a clinical eating disorder[265], yet the subclinical state may cause significant burden and distress[265], and can place the individual at risk of other mental health issues in

the future[196,341], supporting the importance of interventions targeted to this group.

The key question guiding the remainder of this chapter is:

What is the evidence for the efficacy of indicated prevention interventions for eating disorders?

Of 2350 items retrieved in the scientific database search, 4 systematic reviews and 38 RCTs pertaining to prevention and published in August 2009 or more recently met inclusion criteria.

Studies within this chapter are summarised according to the predominant intervention approach used. This method of organising study findings was deemed the most appropriate in relation to alternatives considered (e.g. organising by setting, target characteristics, age of sample), yet this method of organising the prevention literature has limitations (as discussed in Chapter 3). Characteristics and abbreviated details of included studies are located in Appendix C (systematic review) and Appendix D (RCTs). The availability of program manuals and curriculum is delineated and information to help access available (i.e. published or web-based) programs is included in the reference list.

Acceptance and Commitment Therapy

Acceptance and commitment therapy is a form of mindfulness-based psychotherapy that aims to improve well-being by overcoming negative thoughts and feelings. Applied to eating disorders, acceptance and commitment therapy encourages individuals to face their emotionally-challenging beliefs and impulses and connect with their own unique values and ideals.

One RCT evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Lewis-Smith and colleagues (2016)[197] identified one RCT (Pearson, 2012)[267] that randomised 73 women with body dissatisfaction to a 1-day Acceptance and Commitment Therapy (ACT) workshop or waitlist control. The workshop targeted body dissatisfaction and disordered eating attitude by progressing through 6, hour-long modules that encompassed each of the 6 classic ACT treatment modules. The intervention group exhibited significant reductions in body-related anxiety and significant increases in acceptance at the two-week follow-up, when compared to the wait-list control condition.

Cognitive Behavioural Therapy

Cognitive behavioural therapy programs encourage individuals to adopt helpful, balanced attitudes on body image, eating, and weight, and seek to reduce the importance placed on body shape and weight for defining one's success and self-worth. Cognitive behavioural therapy programs aim to modify thinking styles and behaviours that place an individual at risk for developing an eating disorder. They may cover topics such as challenging unhelpful thinking and attitudes about body shape and weight, the physical and psychological effects of dieting, sociocultural and media pressure to be thin, and balanced nutrition and physical activity.

Four systematic reviews (summarising 13 RCTs) evaluated this prevention approach and met inclusion criteria.

Level I Evidence

Schlegl and colleagues (2015)[65] identified an Australia-based study (Gollings and Paxton, 2006)[138] that compared face-to-face versus computer-based delivery of the 8-week prevention program, ***Set Your Body Free***[137]. Women from the general community who responded to notices to participate in a program to reduce body dissatisfaction were screened for inclusion. Women with shape concern higher than the community norm and who met other eligibility criteria (*N*=40) were randomised to the 2 intervention conditions. At post-test, both conditions showed significant improvement on all outcome measures, ranging from several eating-related outcome measures to indices of general psychological functioning. Both conditions maintained these improvements to the 2-month follow-up, with the exception of scores on the dietary restraint measure, which showed further improvement. There were no differences between groups in terms of rate of change on any of the outcomes. Consideration of effect size statistics showed that participation in the face-to-face format produced somewhat greater improvement on dietary restraint and extreme weight loss behaviours.

Another Australian study identified by Schlegl and colleagues[65] (Paxton, McLean, Gollings, Faulkner,

and Wertheim, 2007)[266] extended the earlier pilot study findings by comparing the face-to-face and computer- based versions of ***Set Your Body Free***[137] to a control condition and by incorporating a longer follow-up. General community women with elevated body image concern or bulimic symptoms (aged 18 to 35 years) (*N*=116) were randomised to the face-to-face or computer- based intervention format, or wait-list control, for 8 weeks. Body mass index and a range of eating-related and general psychological outcome measures were administered, including thin ideal internalisation, body shape concern, tendency to compare one's body to others, bulimic symptoms, dietary restraint, depression, and self-esteem. There were significant differences in pre-post change scores favouring the 2 intervention groups over control. Outcome on most variables was superior for the face-to-face format relative to the computer-based format, tested in terms of the statistical significance of the difference in change scores. Six-month follow-up data indicated that gains were maintained across the 2 intervention groups. There was no effect of the interventions on BMI kg/m2 at any time point. The study findings suggested that receiving the Set Your Body Free intervention was associated with a significant degree of improvement on a range of eating-related and general psychological outcomes relative to not receiving any intervention, that greater improvement accompanied receipt of the program in a face-to-face format, and that benefits were maintained up to 6 months later.

Schlegl and colleagues[65] identified one study (Zabinski, Wilfley, Calfas, Winzelberg, and Taylor, 2004)[392] that evaluated the efficacy of a computer-based "chat room" to reduce eating disorder risk factors among women who were screened as at high risk for an eating disorder. The program, ***Cognitive Behaviour Therapy for Binge Eating and Bulimia Nervosa: A Comprehensive Treatment Manual*** was adapted for online delivery. Sixty at-risk women were randomly assigned to the prevention program or to wait-list control for 8 weeks with a baseline, post-test, and 10-week follow-up assessment. Those that received the prevention program experienced significantly greater improvement over time in global eating disorder psychopathology, eating concern, weight concern, and self-esteem, relative to untreated participants, and both groups experienced a significant reduction in shape concern and a marginal but significant increase in BMI kg/m2. Large effect sizes were apparent on most measures of eating pathology at follow-up, providing evidence for the efficacious nature of the online intervention among women at high-risk of an eating disorder and persistence of benefit to at least 10 week follow-up.

Schlegl and colleagues[65] identified another Australian-based study (Heinicke, Paxton, McLean, and Wertheim, 2007)[172] that evaluated the computer-based program ***My Body, My Life*** (unpublished protocol) among 83 female secondary school students who self-identified as having body image or eating problems. The recruitment strategy occurred through school counsellors to approximate a naturalistic, real-world dissemination approach. Students were randomised to the intervention or wait-list control for 6 weeks and evaluated at 2- and 6-month follow-ups. At post-test, there was a substantially greater degree of improvement across most outcome measures favouring the intervention group relative to control. Greater improvements on eating-related psychopathology and symptoms were observed in the intervention condition, as well as media-related vulnerabilities, such as internalisation of the media ideal and perceived media pressures. Gains in the intervention group were maintained to 2-month and 6-month follow-up, with the only exceptions being continued significant improvement on body shape, extreme weight loss behaviours, and peer body comparison tendencies at 2 months, and continued improvement on perceived media pressures at 6 months. The trial findings support the use and durability of this preventative intervention among female secondary school students at risk for eating disorders, and a strength of the trial was that it used an efficacy design but incorporated effectiveness study elements.

Loucas and colleagues (search date 2014)[206] conducted a systematic review of electronic 'e-therapy' interventions for the prevention and treatment of eating disorders. They identified 7 RCTs that investigated the efficacy of the computer-based CBT program ***Student Bodies***[316] in high-risk participants (Celio, Winzelberg, Wilfey, Eppstein, Springer et al., 2000[391]; Winzelberg, Eppstein, Eldredge, Wilfey, Dasmahapatra et al., 2000[384]; Zabinski, Pung, Wilfey, Eppstein, Winzelberg et al., 2001[391]; Taylor, Bryson, Luce, Cunning, Doyle et al., 2006[348]; Doyle, Goldschmidt, Huang, Winzelberg, Taylor et al., 2008[98]; Jones, Luce, Osborne, Taylor, Cunning et al., 2008[185]; Jacobi, Volker, Trockel and Taylor, 2012[182]). Loucas and colleagues identified an RCT[64] that randomised 76 female participants to the computer-based program ***Student Bodies***[316], the classroom delivered psychoeducational program ***Body Traps*** (discussed in the *Psychoeducation* section of this report), or waitlist control. Assessments were conducted at

baseline, post-treatment and 4-month follow-up. Participants in the ***Student Bodies***[316] intervention had significant reductions in weight and shape concerns and disordered eating attitudes at post-treatment as well as follow-up, as compared with control group participants.

Loucas and colleagues reported on an RCT[384] that randomised 60 female university students to an 8-week CBT intervention or waitlist control. Participants interacted with an online discussion group throughout the intervention that allowed them to receive emotional support and discuss their reactions to the software. Assessments of body image and distorted eating attitudes were conducted at baseline, post-intervention and 3-month follow-up. There were significant improvements in body satisfaction and drive for thinness between intervention and control groups at follow-up, but not at the post-intervention assessment. The discussion group was found to provide only a moderate level of social support to participants.

In another study[391], 56 high-risk female college students were randomised to an 8-week CBT intervention or wait-list control. Assessments were conducted at baseline, post-intervention and 10-week follow-up. There were high levels of compliance and feelings of perceived support by participants. Body weight and shape preoccupations improved in both groups, but to a greater extent in the intervention group than control. Effect sizes indicate that the intervention had a moderate impact. However, group by time interactions were non-significant in all cases, which may have been due to high variability in participants or inadequate sample size.

Another study[348] randomised 480 weight-concerned female college students to an 8-week CBT intervention or waitlist control. The study aimed to extend previous research by recruiting a larger sample, replicating the effectiveness of the program among college women, evaluating long-term impact, and evaluating whether the program could extend survival as a non-eating disorder case. There were significant differences between conditions favouring the treatment group on weight concern, global eating disorder psychopathology, drive for thinness, and bulimic attitudes at post-test, and these differences were maintained to 12-month follow-up (with the exception of scores on the bulimia measure). There were no significant differences between groups at 12-month follow-up on BMI kg/m2 or depressive symptoms. The rate of onset of new cases of eating disorders was equivalent across conditions throughout the follow-up period, with 43 overall reported as developing a subclinical or clinical eating disorder.

Loucas and colleagues reported on an RCT[182] that randomised 126 German women with sub-threshold eating disorder syndromes to the 8-week intervention or waitlist control. Assessments were conducted at baseline, post-treatment and 6-month follow-up. Up to 30% of participants had sub-threshold AN, BN or BED, with the remainder showing behavioural symptoms of eating disorder (though not one of these 3 specific symptoms), which the authors considered to be a strength of the study. Compared to controls, participants subject to the intervention had higher rates of complete symptom reduction (45.1% vs. 26.9%) as well as a 67% greater reduction in combined rates of subjective and objective binges, and 86% greater reduction in purging episodes. Moderate to high effect sizes were found for attitudes and eating disorder symptoms, respectively, between baseline and follow-up in participants exposed to the intervention as compared to controls. These results are comparable or greater than those noted in previous studies with high-risk subjects.

Loucas and colleagues identified one study[98] that randomised 83 overweight adolescents aged 12 to 17 years to a 16-week program of usual care or the computer-based program ***Student Bodies 2*** (unpublished program), an adaptation of the original version that was designed to help overweight adolescents lose weight (focus of initial 8 weeks) and to promote positive body image (focus of latter 8 weeks). Usual care involved basic handouts on nutrition and physical activity with no behavioural weight loss strategies. The improvement in BMI kg/m2 was significantly greater for those in the intervention condition from pre- to post-test, but there were no differences between conditions from pre- to follow-up, with a trend for both conditions of increased BMI kg/m2 between post-test and follow-up. There was a significant pre-post increase in dietary restraint for the intervention condition but not the control condition, and both groups reported a significant decrease in shape concern between baseline and follow-up, though this reduction was significantly larger in the usual care condition. There were no other differences on remaining outcomes of eating concern, weight concern, and binge eating and vomiting frequency. The authors concluded that the program was “modestly effective for weight control in the short term and that eating disorder risk factors were not significantly affected either positively or negatively”.

In another RCT[185] of ***Student Bodies 2***, 105 secondary school students were randomised to 16 weeks of intervention or wait-list control. The intervention group showed significantly greater improvement at post-test and 5-month follow-up compared to control on BMI kg/m2 objective binge episodes, and subjective binge episodes, though the control group evidenced reductions also. Completers in the intervention group showed a significant reduction in shape concern and weight concern from baseline to follow-up. There were no significant between-group differences across post-test and follow- up on objective overeating episodes, dietary sugar and fat intake, and depressive symptoms. Adherence to the program was a major issue in the study, with 27% using the program for 8 weeks or more, 42% using the program for 1-7 weeks, and 31% never logging on, yet testing revealed no apparent relationship between adherence and outcome.

Koskina, Campbell and Schmidt (search date 2012)[192] identified one study (Delinksy and Wilson, 2006)[88] that focused on one component of a CBT approach to evaluate whether this strategy reduced eating disorder risk factors. The authors compared a mirror-based exposure treatment (unpublished protocol) consisting of 3 face-to-face individual sessions. The control group received 3 sessions of non-directive supportive counselling. The sample comprised female college students with extreme shape and weight concerns. Across post-test and 4-week follow-up, the experimental group improved at a greater rate than the control group on body image avoidance, weight/shape concerns, dieting, depression, and self-esteem, and they engaged in significantly less body checking, had less concern with shape and weight, were less depressed, and had higher self- esteem. There was no intervention effect on body dissatisfaction. The findings suggested that mirror-based exposure can substantially improve body image cognitions and related behaviours and that these improvements are maintained for at least 4 weeks.

Watson and colleagues (2016)[369] identified one study (Saekow et al., 2015)[297] that randomised 65, 18-25 year old females screened positive for a subthreshold DSM-5 eating disorder to a 10-week, online intervention, ***Student Bodies- Eating Disorders*** or waitlist control. The intervention significantly reduced eating-related psychopathology, weight concerns and psychosocial impairment in intervention participants compared with controls.

Ciao, Loth and Neumark-Sztainer (2014)[69] identified 2 RCT (Jones, Luce, Osborne, Taylor, Cunning et al., 2008[185]; Taylor, Bryson, Luce, Cunning, Doyle et al., 2006[348]) that was included in the systematic review by Loucas and colleagues so will not be discussed further here.

Level II Evidence

There was no level II evidence available.

Cognitive Dissonance

Cognitive dissonance-based programs target personal beliefs about the importance of being thin and the thin beauty ideal; a significant eating disorder risk factor. The rationale underlying this approach is that belief in the thin beauty ideal can be weakened through activities that encourage the individual to adopt an "anti-thin ideal" stance (e.g. exploring the costs associated with pursuing extreme thinness). The dissonance and psychological discomfort created by holding conflicting views leads to a shift in attitude to restore consistency, with the result being a weakened belief in the importance of the thin beauty ideal.

Two systematic reviews (summarising 1 RCT each) and 6 RCTs evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Loucas and colleagues (search date 2014)[206] reported on one RCT (Stice, Rohde, Durant and Shaw, 2012)[332] that evaluated the newly developed, internet-based dissonance-based eating disorder prevention program ***eBody Project,*** which was prototyped from the in-person group ***Body Project***[331] intervention. Female college students with body dissatisfaction (*N*=107) were randomised to the internet intervention, group intervention, educational video condition, or educational brochure condition. The interventions were facilitated by trained female psychology students who had at least a bachelor's degree. Participants in the internet (*eBody*) condition completed 6 modules, which included written and behavioural activities designed to critique the thin-ideal, over 3 weeks. Participants in the group intervention engaged in verbal, written and behavioural exercises in which they critiqued the thin ideal in 4 1-hour weekly group sessions. Participants in the educational video and brochure conditions viewed educational video and written material,

respectively. Compared to brochure controls, participants in the *eBody* intervention showed moderate reduction in thin-ideal internalisation and eating disorder symptoms, and significantly greater reductions in body dissatisfaction, self-reported dieting, and negative affect relative to educational brochure controls. Effect sizes for the *eBody* intervention were similar to those previously observed for group versions of this intervention.

Schlegl and colleagues[65] identified one RCT (Stice, Durant, Rohde and Shaw, 2014)[325] that extended the earlier pilot study findings[332] to report the effects of the ***eBody Project*** at 1- and 2-year follow-up, using interview and survey data from the original pool of participants. Compared to the two control conditions, participants in the *eBody* intervention group showed reductions in eating disorder risk factors and symptoms at 1- and 2-year follow-up, although reductions were greater for participants receiving the group therapy intervention. However, the *eBody* intervention produced weight gain prevention effects that were larger than both control conditions as well as the group therapy condition.

Atkinson and Wade (2014)[14] performed a preliminary RCT to assess the feasibility of a pilot mindfulness-based intervention in reducing eating disorder risk in young women. Forty-four young adult females with body image concerns were randomised to receive 3 weekly 1-hour sessions of mindfulness-based or dissonance-based intervention, or to assessment-only control. The dissonance program was based on Stice *et al.*'s original dissonance protocol[338], and aimed to facilitate non-judgemental metacognitive awareness and acceptance regarding body image concerns. Participants receiving the dissonance intervention were not significantly different than controls on any measure .

Rohde, Auslander, Shaw, Raineri, Gau and Stice (2014)[293] conducted 2 pilot trials to evaluate a new dissonance-based eating disorder prevention program for middle school girls (Study 1: *N*=81; Study 2: *N*=52) with body dissatisfaction. Both trials compared the dissonance intervention ***MS Body Project*** with an educational brochure control at pre- and post-test, with the addition of a 3-month follow-up stage in the second trial. The dissonance intervention was adapted to middle school students from the program by Stice and colleagues, ***the Body Project*** (2006)[338], in which participants with body dissatisfaction voluntarily critique the thin idea. Participants receiving the intervention showed significantly greater pre- to post-test reductions in pressure to be thin (trial 1) and negative affect (trial 2), but all other variables tested (thin-ideal internalisation, body dissatisfaction, dieting and self-reported eating disorder symptoms) were non-significant. There were no significant group differences at 3-month follow-up, suggesting limited persistence of treatment effects.

Stice, Butryn, Rohde, Shaw and Marti (2013)[324] conducted an effectiveness trial to test whether an enhanced dissonance-based prevention program could produce larger effects when delivered by college clinicians than previous trials involving high school clinicians with less relevant experience and training. Young women recruited from several universities in the US (*N*=408) were randomised to an improved version of the dissonance intervention ***the Body Project***[331] or an educational brochure control condition. There was a significant decrease in thin-ideal internalisation, body dissatisfaction, negative affect and eating disorder symptoms and a significant increase in psychosocial functioning from pre- to post-test and follow-up compared to brochure-only controls. There were no significant group differences for BMI, health care or mental health care utilization or unhealthy weight transitions.

Stice, Rohde, Shaw and Gau (2011)[335] conducted an efficacy trial to test whether a dissonance-based eating disorder prevention program produces long-term effects when recruitment and delivery are performed by high school clinicians in real-world conditions. Female high school students with body image concerns (*N*=306) were randomised to 4 weekly 1-hour group dissonance sessions based on ***the Body Project*** manual by Stice and Presnall)[331] or an educational brochure control condition. Participants receiving the dissonance-based intervention had a significantly greater decrease in body dissatisfaction at 2-year follow-up and a significantly greater decrease in eating disorder symptoms at 3-year follow-up.

McMillan, Stice and Rohde (2011)[231] conducted a randomised trial to evaluate the mechanisms theorised to produce dissonance-based intervention effects. This study was based on and sought to extend the findings of Green, Scott, Diyankova, Gasser and Pederson (2005)[149], in which a maximised (high dissonance) condition was compared to a minimised (low dissonance) condition. Female college students (*N*=124) were randomised to a high- or low-dissonance version of a dissonance-based program or a wait-list control condition, using a modified protocol with subjects at high risk of eating disorder, 4 full sessions of dissonance intervention and a repeated measures

design to assess differential change in outcomes over follow-up. The high dissonance condition was designed to increase dissonance-inducing factors (by increasing effort required, public accountability and the perception that participation was voluntary) while the low dissonance condition was designed to reduce dissonance-inducing factors (by reducing the factors above). Relative to controls, participants in the high dissonance condition displayed significantly greater reductions in thin-ideal internalisation, body dissatisfaction, dieting and eating disorder symptoms by post-test, while those in the low dissonance condition showed significantly greater reductions in the first 3 outcomes by post-test, with most of these effects persisting to 3-month follow-up. Relative to low dissonance participants, high dissonance participants displayed significantly greater reductions in eating disorder symptoms at post-test, but this effect was not significant by 3-month follow-up.

Stice, Rohde, Gau and Shaw (2009)[334] assessed the effectiveness of a dissonance-based prevention program delivered under 'real world' conditions. Adolescent girls with body image concerns (*N*=306) from 3 school districts in the Northwest US were randomised to receive 4 weekly 1-hour group sessions of the dissonance intervention, or education brochure control. School staff (nurses, counsellors and teachers) recruited participants and delivered the intervention which aimed to decrease thin-ideal internalisation. Compared with educational brochure controls, participants receiving the intervention had greater decreases in thin-ideal internalisation, body dissatisfaction, dieting attempts and eating disorder symptoms from pre- to post-test, with the effects for body dissatisfaction, dieting and eating disorder symptoms persisting though 1-year follow-up.

Health Education

Health education aims to improve the health-related behaviours and decisions of individuals. The health education program that was evaluated in this review was based on the "Hey-Durham" manual for high school students. Curriculum topics include domestic basic information on nutrition, body image and identifying signs of depression and suicide.

Two RCTs evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Tanofsky-Kraff and colleagues (2016)[345] randomised 88 adolescent girls with loss-of-control eating to 12 weekly 1.5 hour group sessions of an interpersonal psychotherapy program or a standard-of-care health education group program. The health education program was based upon the Hey-Durham manual[43] for high-school students. The percentage of daily energy needs consumed by snack-foods increased for those receiving the health education intervention and decreased for those receiving the IPT intervention by 1-year follow-up. Girls receiving the health education intervention also experienced improvements in pre-meal state depressive state at 6-month but not 1-year follow-up. None of the changes observed in the study were considered to be clinically significant.

An RCT conducted by Tanofsky-Kraff and colleagues (2014)[346] compared the efficacy of health education to interpersonal psychotherapy in 113 adolescent girls at high risk of obesity and eating disorder. Both programs involved an individual 1.5-hour meeting with each participant followed by 12 consecutive weekly 90-minute group sessions. The health education program was based on the Hey-Durham manual for high-school students[43]. Assessments were conducted at end of treatment, 6- and 12-month follow-up. Both treatment groups experienced decreases in age-adjusted BMI, percentage of body fat, depression and anxiety symptoms and the frequency of loss-of-control eating through all follow-ups, with no significant group differences. However, at 12-month follow-up, interpersonal psychotherapy had the additional benefit of a larger reduction in objective binge eating compared with participants in the health education group.

Healthy Weight Intervention

The specific healthy weight intervention program that has been tested in prevention research was developed at the University of Texas. The program was originally developed as a placebo control, however, it was found to have an active intervention effect. The aim of the program is to promote positive body image by teaching individuals healthy weight-control skills. The rationale is that achieving and maintaining a healthy body weight will lead to body satisfaction.

Two RCTs evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Stice, Rhode, Shaw and Marti (2012)[336] conducted an efficacy trial of the *Healthy Weight* 2 group-based prevention program targeting both eating disorders and obesity. This program is an extension of the 3-hour ***Healthy Weight***[328] prevention program which promotes lasting healthy improvements to physical activity and diet. The modifications to the ***Healthy Weight 2*** program included improvements to dietary intake based on nutrition science principles (e.g. replacing high-energy dense foods with low energy-dense foods; reducing portion sizes; eating complex carbohydrates, etc.), physical activity (e.g. weekly exercise; more active daily routines; being creative about how to exercise), and program length (from 3 to 4 hours). Female college students with body image concerns (*N*=398) were randomised to healthy weight intervention or educational brochure control condition. At end of treatment, participants receiving the intervention showed significantly greater reductions in body dissatisfaction and eating disorder symptoms and greater increases in physical activity compared with brochure-only controls. At 6-month follow-up, intervention participants had significantly greater reductions in BMI and self-reported dieting than control participants. Moderator analyses indicated that participants with initially higher eating disorder symptoms had a stronger response to treatment (greater reduction in eating disorder symptoms and BMI).

A second report by Stice and colleagues (2013)[337] evaluated the effects of the ***Healthy Weight*** 2 prevention program, referring to the same participants and study described above, at 1- and 2-year follow-ups. Participants receiving the intervention showed significantly lower eating disorder symptoms and body dissatisfaction at both 1- and 2-year follow-up compared with controls. At 2-year follow-up, intervention participants had a clinically-significant 60% reduction in eating disorder onset, with a large effect size. As with the preceding study, participants with initially higher eating disorder symptoms had a stronger response to treatment.

Interpersonal Psychotherapy

Interpersonal psychotherapy is based on interpersonal theory, and aims to target interpersonal issues that are theorised to contribute to the development and maintenance of eating disorders. Interpersonal psychotherapy addresses 4 theoretical interpersonal problem areas of grief, interpersonal disputes, role transitions, and interpersonal deficits.

Two RCTs evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Tanofsky-Kraff and colleagues (2016)[345] randomised 88 adolescent girls with loss-of-control eating to 12 weekly 1.5 hour group sessions of an interpersonal psychotherapy program or a standard-of-care health education group program. The IPT program was adapted from two IPT manuals (*IPT-Adolescent Skills Training for the prevention of depression*[184] and *Group IPT for binge eating disorder*[373]), and taught girls to identify connections among their relationships, mood and eating in order to reduce loss of control eating induced by negative affect. The health education program was based upon the Hey-Durham manual[43] for high-school students. The percentage of daily energy needs consumed by snack-foods increased for those receiving the health education intervention and decreased for those receiving the IPT intervention by 1-year follow-up. Girls receiving the health education intervention also experienced improvements in pre-meal state depressive state at 6-month but not 1-year follow-up. None of the changes observed in the study were considered to be clinically significant.

A second RCT conducted by Tanofsky-Kraff and colleagues (2014)[346] compared the efficacy of health education to interpersonal psychotherapy in 113 adolescent girls at high risk of obesity and eating disorder. Both programs involved an individual 1.5-hour meeting with each participant followed by 12 consecutive weekly 90-minute group sessions. Interpersonal psychotherapy was adapted from Interpersonal Psychotherapy-Adolescent Skills Training for the prevention of depression[390] and group Interpersonal Psychotherapy for binge-eating disorder. Assessments were conducted at end of treatment, 6- and 12-month follow-up. Both treatment groups experienced decreases in age-adjusted BMI, percentage of body fat, depression and anxiety symptoms and the frequency of loss-of-control eating through all follow-ups, with no significant group differences. However, at 12-month follow-up, interpersonal psychotherapy had the additional benefit of a larger reduction in objective binge

eating compared with participants in the health education group.

Mindfulness-Based Interventions

Mindfulness is characterised by 2 key components: attention to present-moment experiences and a state of openness or acceptance towards these experiences. In the context of preventative strategies, mindfulness-based interventions aim to equip participants with a greater capacity to resist reflexive responses when confronted with the thin-ideal and associated sociocultural pressures, as well as reduce the impact of such negative experiences when they do occur.

One RCT evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Atkinson and Wade (2014)[14] performed a preliminary RCT to assess the feasibility of a pilot mindfulness-based intervention in reducing eating disorder risk in young women. Forty-four young adult females with body image concerns were randomised to receive 3 weekly, 1-hour sessions of mindfulness-based or dissonance-based intervention, or to assessment-only control. The mindfulness program contained exercises adapted from the mindfulness-based cognitive therapy program for depression[380], and applied key aspects of mindfulness and acceptance-based practices to issues of body image. Participants receiving the mindfulness intervention had significantly greater improvements in weight and shape concern, dietary restraint, thin ideal internalisation and eating disorder symptoms at end of treatment compared to controls, although most of these improvements were not maintained at follow-up.

Motivational Enhancement Therapy

Individuals with eating disorders are often reluctant to engage in treatment and alter their behaviours. They generally have strong positive expectations about the benefits of thinness and overvalue body shape and weight in defining self-worth. They may fear that treatment will lead to weight gain by disrupting attempts at dietary restriction. Motivational Enhancement Therapy is a brief, person-cantered therapy that uses motivational interviewing techniques to engage the client and that focuses on improving an individual's motivation to change.

One systematic review (summarising one RCT) evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Loucas and colleagues identified one RCT (Hotzel, von Brachel, Schmidt, Rieger, Kosfelder, et al., 2014)[177] that randomised 212 women with AN or BN symptoms to an internet-based, motivational enhancement therapy intervention ***ESS-KIMO*** *(unpublished program)* or waitlist control. Assessments were conducted at baseline and post-intervention. The individualised intervention comprised 6 weekly, 45-minute sessions that engaged the participants to evaluate and reflect on the positive and negative aspects of their eating disorder then complete writing tasks related to the current session's topic. Relative to control group participants, participants who had received the intervention reported a stronger increase in motivation to change problematic behaviours and cognitions, as well as significantly greater improvements in a range of eating disorder characteristics. Specifically, participants in the intervention group displayed larger reductions in restrained eating and larger increases in self-esteem and in the perceived burden of their eating disorder.

Psychoeducation

Psychoeducation programs aim to provide education and information on social, cultural, and biological eating disorder risk factors. Topics covered may include physical changes associated with puberty, healthy eating, body image, social pressure for thinness, peer pressure and teasing, and attitudes toward food and meals. Some psychoeducation programs include discussion of the nature of eating disorders. The programs may be designed for different audiences, such as teachers or students. When delivered to a student audience, the facilitator is generally given background information on eating disorders and their prevention.

One systematic review (summarising one RCT) and one RCT evaluated this prevention approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Aardoom and colleagues (2016)[2] randomised 354 participants aged 16 years or older with self-reported ED symptoms to a version of the internet-based psychoeducation intervention ***Featback*** or waitlist control. Featback is a psychoeducation and automated self-monitoring and feedback system, and participants either received (1) Featback-only; (2) Featback supplemented with low-intensity (weekly) digital therapist support; or (3) Featback supplemented with high-intensity (3 times a week) digital therapist support. Post-intervention improvements in bulimic psychopathology and symptoms of depression and anxiety, and 3-month follow-up improvements in ED-related quality of life and symptoms of depression and anxiety, were observed in participants receiving Featback (any version) compared with waitlist controls. Participants receiving the high-intensity therapist support showed greater improvement in ED-related quality of life at post-intervention and 6-month follow-up than participants receiving low-intensity therapist support. There were no other significant differences between the three versions of the intervention.

Loucas and colleagues identified one RCT (Franko, Villapiano, Davidson, Hamilton, Mintz et al., 2005)[129] that compared a 2-session CD-ROM prevention program, ***Food, Mood, and Attitude***[181] to a control group. Participants were 240 female college students, randomised to intervention according to high- or low-risk status, determined by an eating disorder screening measure. Significant time by group by risk status interactions were found on outcomes related to internalisation of the thin ideal, shape concern, and weight concern, indicating greater improvement in intervention participants relative to control participants. However, improvement with the intervention appeared to be limited to high-risk participants only. Women that received the prevention program were more likely than women that participated in the control condition to reduce overeating and inappropriate use of compensatory methods (self-induced vomiting, or laxative or diuretic use). The findings suggest that the program was effective in modifying eating disorder risk factors among those at high-risk, but not at low-risk, for eating disorders with a prevention approach that required minimal time commitment from participants.

Summary of Research Findings

Table 4 summarises the indicated prevention evidence base as discussed more fully within this chapter.

Table 4. Summary of Eating Disorder Indicated Prevention Studies

Prevention Approach	Degree to Which Evaluated	Magnitude of Effect	Program Example
Acceptance and commitment therapy*	Some	Moderate	--
Cognitive-behavioural therapy	Substantial	Substantial	Set Your Body Free
Cognitive dissonance	Moderate	Moderate	The Body Project
Health education*	Some	Low-Moderate	--
Healthy weight intervention	Some	Moderate	Healthy Weight
Interpersonal psychotherapy*	Some	Low-Moderate	--
Mindfulness*	Some	Low	--
Motivational enhancement therapy*	Some	Low	ESS-KIMO
Psychoeducation	Some	Low-Moderate	Food, Mood and Attitude

Note: **Degree to which evaluated**: None = no Level I or Level II studies; Some = 1 to 2 Level II studies (RCTs); Moderate = > 2 Level II studies and/or Level I and II evidence available; Substantial = > 2 Level 1 studies. **Magnitude of effect at follow-up for eating disorder risk variables**: None = no beneficial effect; Low = slight beneficial effect; Moderate = moderate beneficial effect; Substantial = substantial and persistent effect. CBT = Cognitive behavioural therapy. Asterisks indicate interventions that were not evaluated in the previous Evidence Review.

Cognitive-behavioural therapy and **cognitive dissonance** programs have had a substantial degree of evaluation in high-risk samples and the data suggest durability of impact beyond program termination.

Cognitive behavioural therapy programs that have been evaluated include the United States-developed computer-based prevention program, *Students Bodies,* and 2 Australian-developed programs, *My Body, My Life*, and *Set Your Body Free*. Cognitive behavioural therapy programs have been trialled in face-to-face and computer-based formats, and among a range of populations, including female high school students, university age females, and women in the general community who have clinically elevated shape and weight concern and/or self-identified body image or eating problems. Randomised controlled trials have shown a reduction of hypothesised risk factors for eating disorders including shape and weight concern, dietary restraint, bulimic attitudes, self-esteem, body dissatisfaction and drive for thinness. Cognitive behavioural therapy programs delivered face-to-face are associated with a better outcomes on a range of eating disorder-related behaviours than when delivered in a computer-based format. Cognitive behavioural therapy has shown a beneficial effect on risk and protective factors up to one year post-intervention.

Stice's *Body Project* was the primary **cognitive dissonance** intervention evaluated in the 8 RCTs in this review. Cognitive dissonance programs have been trialled in face-to-face and computer-based formats, and among a range of populations, including female middle school, high school and university students, and women in the general community who have clinically elevated shape and weight concern and/or self-identified body image or eating problems. Cognitive dissonance led to improvements across a wide range of measures, including body satisfaction, thin-ideal internalisation, self-reported dieting and negative affect across most trials. Improvements were evident upwards of 3 years following the intervention.

The remaining programs all had a minimal evaluation in the literature, with one to 2 RCTs per intervention. **Health education** led to decreases in age-adjusted BMI, percentage of body fat, depression and anxiety symptoms and the frequency of loss-of-control eating up to 12 months follow-up. One trial evaluated a group-based **healthy weight intervention** (*Healthy Weight 2)* targeting prevention of both eating disorders and obesity. This program led to significant reductions in BMI and self-reported dieting in female college students at 6-month follow-up, and this response was greater in participants that initially had higher eating disorder symptoms.

Two studies evaluated the efficacy of **interpersonal psychotherapy** in adolescent girls at high risk of obesity or eating disorders. One study reported a decrease in age-adjusted BMI, percentage of body fat, depression and anxiety symptoms and the frequency of loss-of-control eating to 12-month follow-up, while the other study reported clinically non-significant study outcomes.

One study of a **mindfulness** based intervention reported significant improvements in weight and shape concern, dietary restraint, thin ideal internalisation and eating disorder symptoms at end of treatment compared to assessment-only controls, although most of these improvements were not maintained at follow-up.

An internet-based **motivational enhancement therapy** intervention (*ESS-KIMO*) was evaluated in one study of women with AN or BN symptoms. Compared with waitlist controls, participants receiving the intervention had greater improvements in motivation to change problematic behaviours and cognitions, restrained eating, self-esteem and in the perceived burden of their eating disorder.

Two studies reported improvements in eating disorder risk factors in participants receiving **psychoeducation**. Compared with controls, participants receiving psychoeducation experienced improvements in overeating and use of compensatory behaviours (in a study of *high-risk* female college students), as well as bulimic psychopathology and symptoms of depression, anxiety and ED-related quality of life.

One pilot study evaluated the impact of a 1-day **acceptance and commitment therapy** workshop on body dissatisfaction in women with pre-existing body dissatisfaction and/or disordered eating. Women receiving the intervention exhibited significant reductions in body-related anxiety and significant increases in acceptance compared with a waitlist control group.

Changes in Indicated Prevention Approaches and Outcomes

Interventions that have been newly evaluated since the previously published (2010) evidence review were acceptance and commitment therapy, health education, interpersonal psychotherapy, mindfulness and motivational enhancement therapy.

Interventions that had a shift in their level of evaluation include cognitive behavioural therapy (increased from moderate to substantial evidence base), cognitive dissonance (decreased from substantial to moderate magnitude of effect) and psychoeducation and healthy weight interventions (decreased from moderate to small evidence base).

Interventions that were evaluated in the previous review but did not have sufficient evidence for evaluation in the current review were media literacy, mental health literacy, multicomponent, perfectionism and yoga and meditation. The previous review reported no effect or minimal effect in each case.

5. Findings: Treatment Standards & Strategies

This chapter considers the Level I and Level II evidence available on the treatment and management of eating disorders in youth and adults. The information presented in the chapter pertains to the following key questions guiding the evidence review:

#4 What is the evidence for the efficacy of treatments or combinations of treatments for AN in a) young people and b) adults?
#5 What is the evidence for the efficacy of treatments or combinations of treatments for BN in a) young people and b) adults?
#6 What is the evidence for the efficacy of treatments or combinations of treatments for BED in adults?

It is important to note that the stringent evidence level requirement means that some treatment approaches that may be used by individuals with eating disorders will not be contained within the scope of evidence summarised. Just because a particular approach has not been subjected to rigorous testing with randomised controlled methodology does not mean it is inferior or ineffective; it simply means that there is no method for knowing whether the treatment approach produces better, equivalent, or worse outcomes to no treatment or an active treatment comparator. In other words, the treatment approach lacks evidence.

Treatment approaches included within this review appear in alphabetical order, within categories defined by type of eating disorder and age of population. Summaries of combined (multimodal) treatment approaches follow monotherapy approaches. Characteristics and abbreviated details of included studies are located in Appendix E (systematic reviews) and Appendix F (RCTs).

For the purpose of providing evidence for the present evidence review, only pooled analyses summarising outcomes on a single age group (young adults or adults), diagnosis and treatment approach were included and not pooled analyses on any of these terms. For systematic reviews or meta-analyses that pooled data across age group, diagnosis or treatment, full-text for the referenced RCTs were sought and further information was extracted from the original article as required.

Of 2350 items retrieved in the scientific database search, 24 systematic reviews and 93 RCTs pertaining to treatment and published in August 2009 or more recently met inclusion criteria.

While this review focuses on studies published between 2009 and 2016, studies published prior to this date are important to consider when weighing the evidence for effective interventions. In the 2009 review, family-based therapy was the most studied treatment for young people with **anorexia nervosa**, and was associated with persistent positive outcomes on physical and psychological indicators (although studies had small sample sizes and were not compared with active). For adults with anorexia nervosa, the evidence base was limited and complicated by small sample sizes, high treatment drop-out rates and a general lack of comparison of active treatment approaches. Interventions that may be helpful (although requiring additional high-quality research) include cognitive analytic therapy, cognitive behavioural therapy, interpersonal psychotherapy, focal psychoanalytic psychotherapy and family interventions that focus on reducing eating disorder symptoms.

Evidence for treatments for young people with bulimia nervosa was also very limited, and included only a single RCT. This study found that family-based therapy was associated with a greater proportion of remitted patients up to 6-months following treatment compared with supportive psychotherapy, although findings were based on a small sample that included a number of partial-threshold participants. Among adults with **bulimia nervosa**, cognitive behavioural therapy was associated with robust beneficial effects on behavioural symptoms and related psychopathology, and was effective when delivered by a therapist as well as a guided self-help format.

No studies in the prior review evaluated interventions targeted specifically for young people with **binge eating disorder**. However, a number of interventions were trialled and found to be effective in treating adults with binge eating disorder. Among these, cognitive behavioural

therapy produced consistent beneficial effects on binge eating, eating disorders and general indices of psychopathology and binge eating abstinence. Other interventions that had moderate beneficial effects and the support of a moderate evidence base included cognitive behavioural therapy guided self-help and pure self-help, antidepressant medications and obesity medications.

A summary comparison of past and present treatment interventions for eating disorders is located in Appendix H.

Anorexia Nervosa in Young People

Cognitive Behavioural Therapy

Cognitive behavioural therapy programs encourage individuals to adopt helpful, balanced attitudes on body image, eating, and weight, and seek to reduce the importance placed on body shape and weight for defining one's success and self-worth. Cognitive behavioural therapy programs aim to modify thinking styles and behaviours that place an individual at risk for developing an eating disorder. They may cover topics such as challenging unhelpful thinking and attitudes about body shape and weight, the physical and psychological effects of dieting, sociocultural and media pressure to be thin, and balanced nutrition and physical activity.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available

Level II Evidence

Galsworthy-Francis and Allan (search date2014)[130] identified one RCT (Gowers and colleagues, 2007)[140] that compared 2 specialist CBT treatments – specialised outpatient treatment and inpatient psychiatric treatment – to treatment-as-usual in the general community. Adolescents were randomised (*N*=170) to the 3 conditions. The inpatient treatment was a 6-week program and the 2 outpatient treatments were 6-month programs, though only the specialised outpatient program was manualised. Outcomes included food intake, menstruation, mental state, psychosexual adjustment, socioeconomic status, BMI kg/m2, weight for height, global eating disorder psychopathology, and secondary measures of psychopathology. Participants were followed up at one and 2 years. An intention- to-treat analysis showed that on average participants in the study improved to one year, and that improvement continued to occur to the 2- year follow-up, however there were no significant differences between the groups on the main outcomes at either follow-up. A good outcome was defined according to Morgan-Russell criteria and included weight above 85% of that expected, resumption of menses, and binge-eating and purging no more than once per month. At one year, 18% in treatment-as-usual, 15% in specialised outpatient, and 21% in inpatient treatment had a good outcome. At 2 years, 36% in treatment-as-usual, 51% in specialised outpatient, and 30% allocated to inpatient treatment had a good outcome.

Complementary Therapies

Complementary and alternative medicines refer to a range of non-mainstream practices used alongside conventional medicine (complementary therapies) or in place of it (alternative therapies). While the use of complementary and alternative medicine therapies is known to be high among individuals with mental conditions overall, the prevalence of use among people with eating disorders is unknown. The systematic review below is the first to systematically evaluate the role of complementary and alternative medicine therapies for eating disorders.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Fogarty, Smith and Hay (updated search date 2015)[126] identified one study (Janas-Kozik et al., 2010)[183] that assessed the effect of complementary bright light therapy on depressive symptoms in 24 girls with restrictive AN. All girls received CBT, and half were randomly assigned to additional treatment with bright light therapy. Both groups experienced improvements in depressive symptoms, but this improvement was significantly greater for individuals receiving the adjunct bright light therapy. Groups did not differ in respect to BMI change.

Family-Based Treatment (Maudsley Therapy)

Family-based therapy is a treatment program for AN in young people that originated from the Maudsley Hospital in London. Family-based therapy is markedly different from traditional family therapy. The primary focus is on weight gain by empowering the family to take control over refeeding. It has 3 phases of (1) refeeding/weight restoration; (2) handing control over eating back to the adolescent; and (3) addressing adolescent and other issues.

One systematic review (summarising 4 RCTs) and 5 RCTs evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Couturier, Kimber and Szatmarim (2013)[75] performed a systematic review and meta-analysis that identified 2 RCTs that evaluated Family-Based treatment for young adults. One of these met strict inclusion criteria (Lock, le Grange, Agras, Moye, Bryson et al., 2010)[203] while another RCT meeting partial inclusion criteria (lacking mention of allocation concealment, assessor blinding and intent-to-treat analysis) (Ball & Mitchell, 2004[25]). These 2 RCTs were combined and analysed using a subgroup analysis of family-based treatment versus alternate treatment at post-treatment and 6-12 month follow-up. Alternate treatment was adolescent-focused individual therapy[203], and CBT [25]. Sample sizes ranged from 21-121 subjects, ranging in age from 11-23 years. In all cases, remission was the primary outcome variable. There was no significant difference between family-based treatment and individual treatments at post-intervention. However, family-based treatment was superior to individual treatments at 6-12 month follow-up. One potential explanation for the significant difference at follow-up, proposed by the authors, contends that individuals participating in family-based treatment continue to receive therapeutic support through their families following the completion of treatment, while those on individualised programs do not.

Hay (search date 2012)[163] identified 6 RCTs that evaluated family-based treatment for young adults [133,147,200,203,285]. Quality was assessed based on allocation concealment, assessor blinding and intention-to treat analyses: 2 of these 6 studies included all 3 criteria[133,200]. One RCT (Lock, Le Grange, Agras, Moye, Bryson et al., 2010)[203] was included in the systematic review by Couturier and colleagues (2013)[75] and is not discussed further here. Another RCT (Le Grange, Lock, Agras, Moye, Bryson et al., 2012)[147] examined moderators and mediators of remission in 121 young adults with AN receiving either family-based treatment or adolescent-focused therapy. The authors found that subjects with greater eating related psychopathology at baseline benefited more from family-based treatment than adolescent-focused therapy. Another study (Godart, Berthoz, Curt, Perdereau, Rein et al., 2012)[133] compared treatment outcomes (using the Morgan Russell Scale) for 60 adolescent female outpatients with severe AN receiving treatment as usual or family therapy plus treatment as usual. Participants receiving family therapy alongside treatment as usual had significantly better outcomes (Morgan-Russell scores and BMI) at 18-month follow-up compared to participants receiving treatment as usual-only. Another study (Rhodes, Baillee, Brown, and Madden, 2008)[285] examined whether family-based treatment could be enhanced by the addition of parent-to-parent consultation among 20 adolescent outpatients with AN. Evaluation at endpoint revealed no differences between the conditions on the youth percent ideal body weight or parental self-efficacy. Another RCT (Lock, Agras, Bryson & Kraemer, 2005)[200] compared short- and long-term family-based treatment amongst 86 adolescents with AN, and found no significant differences between short- and long-term treatment groups.

Sala, Heard and Black (search date 2015)[302] identified two RCTs[147,203] that evaluated family-based treatment for adolescents with AN. Since these studies were included in the systematic reviews by Hay[163] and Couturier and colleagues (2013)[75], respectively, they are not discussed further here.

Level II Evidence

An RCT conducted by Le Grange and colleagues (2016)[145] compared the relative efficacy of family-based treatment and parent-focused treatment for adolescents with AN. Adolescents (*N*=107) aged 12-18 years were randomised to 18 sessions of manualised therapy over 6 months. Family-based treatment included the entire family and progressed through 3 phases that focused on supporting parents in their efforts to assist their child (phase 1, sessions 1-12), transitioning control over eating to the adolescent (phase 2, sessions 13-16); and introducing adolescent developmental tasks once most ED symptoms have resolved (phase 3, sessions 17-18). Parent-focused treatment led to significantly higher rates of remission than family-based treatment at end-of-

treatment, but not 6- or 12-month follow-up. There were no significant differences at any time point in EDE scores or weight.

Agras and colleagues (2014)[7] conducted a two-group trial called Research in Anorexia Nervosa (RIAN) that compared manualised family-based treatment with manualised systematic family therapy. Adolescents of both sexes (*N*=164) meeting DSM-IV criteria for AN (except for amenorrhea) were randomised to 16, one-hour sessions of either therapy for 9 months. The percentage of ideal body weight was used the primary outcome variable, and was assessed at baseline, end of treatment, 6-month follow-up and 1-year follow-up. There were no significant differences between treatment groups for the primary outcome, eating disorders symptoms or comorbid psychiatric disorders at the end of treatment or follow-up. However, participants receiving family-based treatment achieved faster weight gain earlier in treatment and spent fewer days in hospital (incurring lower treatment costs) compared with participants receiving systematic family therapy.

A study by Accurso and colleagues (2014)[3] investigated the relationship between weight gain and overall change in psychological symptoms across two treatments for adolescent AN. Anorexia nervosa patients (*N*=121) were randomised to one year of family-based treatment or individual adolescent supportive psychotherapy. Family-based therapy was provided in 24 one-hour sessions and adolescent-focused therapy was provided in 32, 45-minute sessions (24 hours total in each). Psychological symptoms were assessed at baseline, end of treatment, 6-month and 12-month follow-up. Participants in both therapies showed improvements in psychological symptoms across all time points, with depressive symptoms and dietary restraint having the greatest improvement. Weight gain was a significant predictor of eating disorder pathology, with earlier weight gain leading to greater improvements in symptomatology than later weight gain. No significant differences were found between treatment groups on any psychological measure.

Accurso and colleagues (2015)[4] conducted a study comparing outcomes for medically stable adolescent AN patients receiving family-based treatment in a research trial compared to specialised outpatient clinical care. The authors sought to clarify how differences inherent to a research or clinical setting impacted patient outcome. The primary outcome measure was the time to reach ≥95% of expected body weight (time to weight restoration) in each context, measured up to 12 months post-baseline. There was no significant difference between mode of treatment delivery, although a significant interaction between the time to weight restoration and treatment mode indicated that patients receiving treatment as part of a research trial achieved weight restoration sooner than those receiving treatment in a clinical context.

Hormone Replacement Therapy

Hormone replacement therapy is based on the theory that specific hormone imbalances contribute to eating disorders. This treatment approach therefore aims to improve hormonal functioning.

One systematic review (summarising 3 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

De Vos and colleagues (2014)[365] reported on 3 RCTs that evaluated hormonal medications for AN in young people. One study[175] randomised 15 AN inpatients to 28 days of recombinant human growth hormone or placebo. Patients receiving hormone achieved medical and cardiovascular stability more rapidly than those receiving placebo. A second study[340] prescribed triphasic oral contraceptive or placebo to adolescent females for 13 28-day cycles. Medication did not have a significant impact on lumbosacral spine or hip bone mineral density. The third study[237] randomised 110 girls with AN and 40 normal-weight controls to hormone therapy or placebo for 18 months. Prescriptions varied depending on the participants age (girls <15 years received low-dose oral ethinyl-estradiol while girls >15 years received 17β-estradiol. Spine and hip bone mineral density increased over time in girls with AN receiving hormone therapy compared with girls with AN receiving placebo.

Level II Evidence

There was no level II evidence available.

Individual Adolescent Supportive Psychotherapy

Adolescent-focused individual therapy is a psychodynamically informed individual psychotherapy focusing on enhancing autonomy, self-efficacy, individuation, and assertiveness. This

intervention typically includes parent meetings to support individual treatment.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

A study by Accurso and colleagues (2014)[3] investigated the relationship between weight gain and overall change in psychological symptoms across 2 treatments for adolescent AN. Anorexia nervosa patients (*N*=121) were randomised to one year of family-based treatment or individual adolescent supportive psychotherapy. Family-based therapy was provided in 24 one-hour sessions and adolescent-focused therapy was provided in 32, 45-minute sessions (24 hours total in each). Psychological symptoms were assessed at baseline, end of treatment, 6-month and 12-month follow-up. Participants in both therapies showed improvements in psychological symptoms across all time points, with depressive symptoms and dietary restraint having the greatest improvement. Weight gain was a significant predictor of eating disorder pathology, with earlier weight gain leading to greater improvements in symptomatology than later weight gain. No significant differences were found between treatment groups on any measure.

Inpatient Treatment for Medical Stabilisation

Treatment is aimed at medically stabilising AN patients and may include a number of components. The single study reviewed here managed patients in a specialist program using a lenient behavioural approach that included a hospital-based school, a daily adolescent group program (including creative, psychoeducation and psychological skill building components) and a second daily physiotherapy program.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Madden and colleagues[211] randomised 82 adolescents with a DSM-IV diagnosis of AN and medical instability to shorter hospitalisation for medical stabilisation or longer hospitalisation for weight restoration (to 90% of expected body weight for gender, weight and height). All patients received 20 sessions of out-patient, manualised FBT following hospitalisation. The weight restoration group used significantly more total hospital days and post-protocol FBT sessions than the medical stabilisation group. Individuals in the medical stabilisation group who had higher eating psychopathology and compulsive features reported better clinical outcomes.

Parent-focused Treatment

Parent-focused treatment is an adaptation of family-based treatment that differs, primarily, in not requiring adolescents to participate in treatment sessions. Sessions are conducted without any interaction with the adolescent and their siblings, and interaction with the therapist is limited to an introduction in the first session and a farewell in the final session. Family meals are excluded from parent-focused treatment.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

An RCT conducted by Le Grange and colleagues (2016)[145] compared the relative efficacy of family-based treatment and parent-focused treatment for adolescents with AN. Adolescents (*N*=107) aged 12-18 years were randomised to 18 sessions of manualised therapy over 6 months. Parent-focused treatment is an adaptation of FBT that differs from FBT primarily in the exclusion of the adolescent from the greater part of the treatment sessions (including the family meal). Parent-focused treatment led to significantly higher rates of remission than family-based treatment at end-of-treatment, but not 6- or 12-month follow-up. There were no significant differences at any time point in EDE scores or weight.

Physical Therapy

Physical therapy refers to a suite of physical activity and exercise interventions (aerobic exercise, yoga, tai chi, dance, weight training, etc.) that aim to improve physical measures (e.g. muscle strength, BMI) or psychological measures (e.g. mood, quality of life).

Two systematic reviews (summarising 3 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Moola and colleagues (search date 2012)[245] identified 2 RCTs[356,362] that assessed the efficacy of exercise training interventions for patients with AN. One of these (del Valle et al., 2010)[362] was included in the systematic review by Vancampfort and colleagues so will not be discussed further here. The other RCT (Thien, Thomas, Markin and Birmingham, 2000)[356] randomised 16 AN patients (12 after drop-outs) aged 17-45 to a graded exercise protocol or a limited-exercise control condition for 3 months. In the graded exercise protocol, the level of activity was dependent on the patient's percent of ideal body weight and involved gradual incorporation of stretching exercises, isometric exercise and cardiovascular exercises. There was no significant difference between patients in the exercise or control groups in BMI, body fat or quality life at the 3-month assessment.

Level II Evidence

Vancampfort and colleagues (search date 2013)[364] identified one RCT (del Valle, Perez, Santana-Sosa, Fiuza-Luces, Bustamante-Ara et al., 2010)[362] that randomised 22 young adults (<16 years) with restrictive AN to strength training with care as usual or care as usual only. Participants in the intervention group completed 2, 60-70-minute training sessions per week for 12 weeks. Training sessions included warm-up and cool-down stretching periods and strength exercises. Control group participants were required to maintain their level of physical activity during the study period. The training intervention was well-tolerated by participants and did not have any adverse effects on participant health, weight or BMI. Muscular strength improved significantly on a single measure, the seated lateral row test. The training intervention did not result in improvements in any other strength test, nor quality of life or functional measures.

Refeeding

Anorexia nervosa is characterised by a fear of fat and weight gain, and consequently, individuals with AN have great difficulty in engaging in regular, normal intake of food. Refeeding is used to reverse starvation and assist weight gain.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level I Evidence

One RCT (O'Connor, Nicholls, Hudson and Singhal, 2016[259]) evaluated whether refeeding adolescents with AN with a higher energy intake than traditional recommendations would lead to improved outcomes without adverse effects. Participants (*N*=36) were randomised to receive 10 days of low- or high-energy refeeding. Both meal plans provided a similar percentage of energy intake from macronutrients. On average, the low-energy group consumed 16 kcal/kg/day while the high-energy group consumed 38 kcal/kg/day (in comparison, the National Institute of Clinical Excellence recommends 5 kcal/kg/day[254]). Compared with controls, individuals receiving the higher energy diet had significantly greater weight gain but did not differ in QTc intervals and other outcomes. The higher energy group did not experience an increase in complications associated with refeeding when compared with the low energy group.

Specialised Outpatient Treatment

Outpatient clinical services delivered by eating disorder specialists are commonly regarded as the best first approach to treating individuals with AN. Outpatient therapies may take many forms but are generally less intensive and immersive than inpatient (hospital) programs.

One systematic review (summarising one RCT) and one RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Galsworthy-Francis and Allan (search date2014)[130] identified one RCT (Gowers and colleagues, 2007)[140] that compared 2 specialist treatments – specialised outpatient treatment and inpatient psychiatric treatment – to treatment-as-usual in the general community. Adolescents were randomised (*N*= 170) to the 3 conditions. The inpatient treatment was a 6-week program and the 2 outpatient treatments were 6-month programs, though only the specialised outpatient program was manualised. The outpatient program included

an initial motivational interview followed by 12 sessions of CBT, 4-8 sessions of parental counselling, 4 sessions of dietary therapy and 4 sessions of multimodal feedback monitoring. Participants were followed up at one, 2 and 5 years (the 5 year follow-up was reported in a separate publication[141]). A good outcome was defined according to Morgan- Russell criteria and included weight above 85% of that expected, resumption of menses, and binge-eating and purging no more than once per month. There was a significant improvement in all groups at each time point, with 19% achieving a good outcome at one year, 33% at 2 years, and 64% at 5 years. There was no significant difference in treatment effectiveness across groups at any time point, once baseline characteristics had been accounted for.

Accurso and colleagues (2015)[4] conducted a study comparing outcomes for medically stable adolescent AN patients receiving family-based treatment in a research trial compared to specialised outpatient clinical care. The authors sought to clarify how differences inherent to a research or clinical setting impacted patient outcome. The primary outcome measure was the time to reach ≥95% of expected body weight (time to weight restoration) in each context, measured up to 12 months post-baseline. There was no significant difference between mode of treatment delivery, although a significant interaction between the time to weight restoration and treatment mode indicated that patients receiving treatment as part of a research trial achieved weight restoration sooner than those receiving treatment in a clinical context.

Systemic Family Therapy

Systemic family therapy is a form of family therapy that places the focus on the family system, rather than the individual. Difficulties are attributed to the relationships and interactions between individuals rather than the individual themselves, and therapy targets the families patterns of beliefs and behaviours. There is no family meal in systematic family therapy and no specific emphasis on normalisation of eating behaviour or weight.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Agras and colleagues (2014)[7] conducted a 2-group trial called Research in Anorexia Nervosa (RIAN) that compared manualised family-based treatment with manualised systematic family therapy. Adolescents of both sexes (*N*=164) meeting DSM-IV criteria for AN (except for amenorrhea) were randomised to 16 one-hour sessions of either therapy for 9 months. The percentage of ideal body weight was used the primary outcome variable, and was assessed at baseline, end of treatment, 6-month follow-up and 1-year follow-up. Remission rates at end of treatment/follow-up were 33.1/40.7% for family-based treatment and 25.3/39% for systematic family therapy. There were no significant differences between treatment groups for the primary outcome, eating disorders symptoms or comorbid psychiatric disorders at the end of treatment or follow-up. However, participants receiving family-based treatment achieved faster weight gain earlier in treatment and spent fewer days in hospital (incurring lower treatment costs) compared with participants receiving systematic family therapy.

Anorexia Nervosa in Adults

Cognitive Analytic Therapy

Cognitive analytic therapy combines elements of cognitive therapy and brief, psychodynamic therapy. Individuals are helped to gain insight into how AN fits into their experiences of their life and their early relationships and are supported to manage emotions and relationships. According to this model, these methods theoretically help individuals to relinquish the need for AN behaviours. Cognitive analytic therapy places an important emphasis on therapeutic relationship processes.

One systematic review (summarising 4 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Hay and colleagues (updated search date 2014)[169] conducted a systematic review of individual psychological therapies for AN. They identified 4 RCTs[86,202,228,395] conducted in 2000 or more recent comprising older adolescents or adults, with sample sizes ranging from 46 to 242 and treatment duration ranging from 2 to 10 months. Heterogeneity was high across studies and analyses reflect findings from a single study or pooled data from at most 2 studies. One trial (Dare, Eisler,

Russell, Treasure and Dodge, 2001[86], also identified in a systematic review by Hay, Touyz and Sud[166]) compared cognitive analytic therapy, focal psychoanalytic therapy, family based treatment, and low-dose "routine" treatment among 84 outpatient women with AN. No differences were found across the 3 treatments at endpoint of one year, but all were more effective than routine treatment. At endpoint, focal psychoanalytic therapy and family therapy, but not cognitive-analytic therapy, were associated with a better outcome compared to routine treatment. Outcome was defined multidimensionally in terms of weight, menarchal status, and bulimic symptomatology. Approximately one third of the patients in the specialist treatments no longer met criteria for AN at the end of one year, as they had achieved weight restoration to 85% or greater of that expected, yet two thirds were still very underweight. Approximately 95% were still very underweight in routine treatment. The differences in outcomes between routine treatment and the specialist therapies was most pronounced for family therapy and focal psychoanalytic therapy, and less so for cognitive analytic therapy. Participants in the study showed significant improvement on nutritional, menstrual, psychosexual, and socioeconomic outcomes

Level II Evidence

There was no level II evidence available.

Cognitive Behavioural Therapy

Cognitive behavioural therapy (CBT) programs aim to alter unhelpful thinking processes and behaviours that maintain eating disorders. Cognitive behavioural therapy is grounded in cognitive behavioural theory. Cognitive behavioural therapy involves cognitive restructuring to challenge unhelpful thoughts and aims to reduce beliefs about the importance of shape, weight, eating and their control for defining one's self worth. Cognitive behavioural therapy programs directly address eating disorder behaviours such as excessive dietary restriction, laxative and diuretic misuse, purging, and over-exercising. They may address additional factors implicated in eating disorder problems such as self-esteem, perfectionism, interpersonal functioning, and emotion regulation.

Three systematic reviews (summarising 4 RCTs) and 2 RCTs evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Galsworthy-Francis and Allan (search date2014)[130] and Hay, Touyz and Sud (search date 2011)[166] both identified one RCT (Pike, Walsh, Vitousek, Wilson and Bauer, 2003)[273] involving individuals who had undergone inpatient weight restoration. This study compared a 1-year program of CBT versus nutritional counselling among 33 outpatients with AN who were within one week of successful completion of inpatient hospitalisation. The authors found a benefit of CBT compared with nutritional counselling in terms of relapse risk reduction (22% relapsed with CBT versus 73% with nutritional counselling). Significantly more patients in CBT met criteria for a good outcome (eating and weight concerns within one standard deviation of a comparison group without eating disorders and absence of binge eating or purging behaviours) than patients that received nutritional counselling.

Galsworthy-Francis and Allan identified a second RCT[228] that randomised 56 women with AN or EDNOS-AN to CBT, interpersonal psychotherapy, and specialist (formerly nonspecific) supportive clinical management. The authors reported no raw data for separate eating disorder diagnoses; however they did conduct a moderator analysis examining full/partial diagnosis for one treatment outcome, a global AN rating, and reported no impact of diagnosis. On this outcome, specialist supportive clinical management was superior to CBT and interpersonal psychotherapy, and CBT and interpersonal psychotherapy did not significantly differ from one another, in the full sample. Approximately 59% (33 of 56) met the strict criteria for AN. In the intention-to-treat full sample (i.e., including partial AN), a good outcome was attained by 0% in interpersonal psychotherapy, 5% in CBT, and 25% in specialist supportive clinical management, and a poor outcome was attained by 67% in interpersonal psychotherapy, 53% in CBT, and 38% in specialist supportive clinical management at the end of the 20-week treatment phase. Global outcome was categorised in terms of weight, BMI, physical measures, and eating disorder psychopathology.

Level II Evidence

Fichter, Quadflieg and Lindner (2013)[120] conducted an RCT aimed to evaluate the longer-term efficacy of internet-based CBT for relapse prevention. Women with AN (*N*=210) were randomised to receive internet-based CBT for relapse prevention following discharge from inpatient treatment, or a control group which received no further care following discharge from inpatient treatment. Participants in the relapse prevention group received 9 monthly online CBT-based sessions,

monthly chat sessions, automatic messages to support the program, and access to an electronic message board for peer support. At the end of relapse prevention intervention, participants who completed the full 9-month program had significantly higher weight compared to partial completers and controls at the end of intervention, as well as higher scores on the Morgan Russell nutritional status and mental state subscales.

In a study by Touyz and colleagues (2013)[360], 63 participants with severe and enduring (≥7 years) AN were randomised to receive 30 out-patient sessions of CBT or specialist supportive clinical management over 8 months. Both treatments were modified for severe and enduring AN (CBT-AN: see Pike et al., 2003[273]; modified specialist supportive clinical management: see McIntosh et al., 2006[229]). Both groups experienced significant changes on all primary and secondary measures (addressing physical, psychological, and eating disorder-specific symptoms) of outcome at end of treatment, 6- and 12-month follow-ups. At baseline, specialist supportive clinical management participants reported higher levels of depression and poorer social adjustment than CBT participants. There were no differences between treatment groups at end of treatment on any measure. At 12-month follow-up, CBT participants had lower eating disorder symptom scores and higher readiness for recovery.

Hay and colleagues (updated search date 2014)[169] conducted a systematic review of individual psychological therapies for AN, and identified one RCT (Zipfel, Wild, Grob, Friedrich, Teufel et al., 2014)[395] that was considered to be of high quality, with sufficient statistical power and low risk of bias. This multicentre trial, referred to as the Anorexia Nervosa Treatment of Outpatients (ANTOP) study, randomly allocated 242 adult females with AN to 10 months of weekly treatment with either manualised focal psychodynamic therapy, manualised, enhanced CBT, or optimised treatment as usual. The full study protocol has been published elsewhere[372]. A framework of medical care was developed for all study participants, which included at least 5 sessions of specialist assessment, monthly GP visits and face-to-face treatment with doctors specialising in AN. Focal psychodynamic therapy was delivered in 3 treatment phases: the first phase focused on therapeutic alliance, pro-anorectic behaviour and ego-syntonic beliefs and self-esteem; the second phase focused on the association between interpersonal relationships and disordered eating behaviour; and the final phase focused on the transfer from treatment to everyday life. Enhanced CBT involved several psycho-education modules, as well as homework and exercises reviewed each session. Optimised treatment as usual involved usual outpatient psychotherapy from an eating disorder specialist therapist. All study groups displayed an increase in BMI between baseline and post-treatment, followed by a further increase at 12-month follow-up, however no significant BMI differences were found between groups at either time point. Analysis of recovery rates at 12-month follow-up indicated significantly higher full recovery rates in patients assigned to focal psychodynamic therapy (36%) compared to optimised treatment as usual (13%).

Balestrieri, Oriani, Simoncini and Bellantuono (Search date 2012)[24] identified one RCT[42] that evaluated CBT + placebo or olanzapine for patients with AN. Since this study was included in the systematic review by Dold and colleagues[95] it is not discussed further here. Similarly, Hay, Claudino, Touyz and Elbaky (search updated 2014) identified one RCT[228] that was included in the systematic review by Galsworthy-Francis and Allan[130] and is not discussed further here.

Cognitive Interpersonal Therapy (MANTRA)

MANTRA (Maudsley model of Anorexia Nervosa Treatment for Adults) is a novel, empirically-based and biologically-informed cognitive interpersonal treatment for adult AN. It addresses both intra- and interpersonal maintaining factors, is manualised and modularised, includes a clear hierarchy of procedures, and is tailored to individual needs. Family members may be involved as appropriate. MANTRA is centred on a user-friendly workbook-style patient manual that is used flexibly and collaboratively, with patient and therapist deciding together which parts may be relevant.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Schmidt and colleagues (2015)[308] randomised 142 outpatients with AN to 20-30 weekly sessions (depending on clinical severity) of MANTRA therapy or specialist supportive clinical management. Patients were evaluated at baseline and 6- and 12-month follow-ups. The primary outcome was BMI at 12 months, while secondary outcomes included

eating disorder symptomatology, other psychopathology, neurocognitive and social cognition, and acceptability. While both treatments produced significant improvements in BMI, eating disorder symptomatology, distress levels and clinical impairment over time, there were no significant differences between groups at either follow-up. In a follow-up investigation conducted 24 months later (Schmidt and colleagues, 2016)[309] BMI, ED symptomatology, distress levels, and clinical impairment were still improved or had improved further in both groups, with no significant differences between groups.

Cognitive Remediation Therapy

Cognitive remediation therapy for AN is a brief, manualised intervention that addresses the thought process behind eating disorder rather than the eating disorder features themselves. It consists of cognitive flexibility and 'bigger picture' cognitive exercises that aim to increase cognitive flexibility. Cognitive remediation therapy is considered to be a low-intensity intervention that may be used with newly admitted AN inpatients in the acute stages of their disorder, and may be used as a stepping stone to further psychological treatment[349].

One systematic review (summarising 3 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Dahlgren and Ro (search date 2013)[198] identified 3 RCTs that investigated cognitive remediation therapy for adults with AN, (Brockmeyer, Ingenerf, Walther, Wild, Hartman et al., 2014[385], Lock, Agras, Fitzpatrick, Bryson, Jo et al., 2013[201], Steinglass, Albano, Simpson, Wang, Zhou et al., 2014[317]). One RCT[385] randomised 40 inpatients to tailored, manual-based cognitive remediation therapy or nonspecific neurocognitive therapy for 30 sessions, 21 computer-assisted and 9 face-to-face. All participants completed computer-assisted homework assignments. The cognitive remediation therapy focused solely on set-shifting and the nonspecific neurocognitive therapy focused on attention, memory and deductive reasoning. Performance was assessed on a computer-based task-switching paradigm at baseline and post-intervention in all participants. At post-intervention, participants in the cognitive remediation therapy group significantly outperformed participants in the nonspecific neurocognitive therapy group on in cognitive set shifting, with medium between-groups effect sizes found.

Another RCT[201] examined the feasibility of using cognitive remediation therapy with newly admitted outpatients with the aim of increasing treatment acceptance and reducing participant-driven attrition. Cognitive remediation therapy, which focuses on cognitive processes and improving cognitive flexibility was theorised by the study's authors to have the potential to be more acceptable to AN patients than traditional interventions that focus on weight-gain and/or eating-related thoughts. This study randomised 46 outpatients to 8 sessions of cognitive remediation therapy or CBT over 2 months, followed by 16 sessions of CBT over 4 months. Drop-out rates were lower in the cognitive remediation therapy group (13%) than the CBT group (33%), although this difference was not statistically significant. The cognitive remediation therapy group displayed significantly greater improvements in neurocognitive measures than the CBT group, with medium to large effect sizes. There were no significant group differences in weight gain or eating-related psychopathology.

A third RCT[317] randomised 32 adult (16+) weight-restored inpatients with AN to 12 sessions of cognitive remediation therapy or exposure and response prevention for AN. Exposure and response prevention for AN is a newly developed CBT approach that targets maladaptive eating behaviour by addressing eating-related anxiety. Caloric intake during a test meal session was compared to intake at baseline and used as the primary outcome measure. There was a significant group difference in caloric intake between baseline and post-treatment: intake increased from 352 to 401 kcal post-treatment for exposure and response prevention for AN participants, and decreased from 501 to 424 kcal for cognitive remediation therapy participants. Changes in anxiety scores were significantly associated with changes in caloric intake at test, but the association between anxiety and treatment group was non-significant.

Tchanturia, Lounes and Holttum (Search updated in 2014)[349] identified 3 RCTs[44,201,317] that investigated cognitive remediation therapy for AN in adult patients. These studies were included in the systematic review by Dahlgren and Ro[198] and therefore are not discussed here. Hay, Claudino, Touyz and Elbaky (search updated in 2014)[169] identified one RCT[202] that was included in the systematic review by Dahlgren and Ro[198] and is not discussed further here.

Level II Evidence

There was no level II evidence available.

Complementary Therapies

Complementary and alternative medicines refer to a range of non-mainstream practices used alongside conventional medicine (complementary therapies) or in place of it (alternative therapies). While the use of complementary and alternative therapies are known to be high among individuals with mental conditions overall, the prevalence of use among people with eating disorders is unknown. The systematic review below is the first to systematically evaluate the role of complementary and alternative therapies for eating disorders.

One systematic review (summarising 2 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Fogarty, Smith and Hay (updated search date 2015)[126] identified 2 studies that assessed the efficacy of complementary therapies for adults with AN. One study[314] randomised 26 medically stable young adults with AN to acupuncture or acupressure plus massage for 6 weeks (twice weekly for the first 3 weeks; once weekly for the final 3 weeks). Patients viewed both interventions positively and experienced calmness in both groups. Patients in the acupressure plus massage group also demonstrated reduced eating concerns. The second study[162] randomised 19 women (stratified by treatment centre – inpatient and outpatient) were randomised to massage treatment or treatment as usual. Women in the massage group reported decreased stress, anxiety and body dissatisfaction, and increased dopamine and norephinephrine levels, compared with controls.

Level II Evidence

There was no level II evidence available.

Exposure and Response Prevention

Exposure and response prevention is a form of CBT that engages patients to confront, rather than avoid, their fears, thereby reducing anxiety over time. It is the treatment of choice for anxiety disorders and has been trialled, with mixed results, for BN. Exposure and response prevention for AN is a newly developed approach that targets maladaptive eating behaviour by addressing eating-related anxiety.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Both Dahlgren and Ro (search date 2013)[198] and Tchanturia, Lounes and Holttum (search updated in 2014)[349] identified one RCT[317] that randomised 32 adult (16+) weight-restored inpatients with AN to 12 sessions of cognitive remediation therapy or exposure and response prevention for AN. Caloric intake during a test meal session was compared to intake at baseline and used as the primary outcome measure. There was a significant group difference in caloric intake between baseline and post-treatment. Intake increased from 352 to 401 kcal post-treatment for exposure and response prevention participants, and decreased from 501 to 424 kcal for cognitive remediation therapy participants. Changes in anxiety scores were significantly associated with changes in caloric intake at test, but the association between anxiety and treatment group was non-significant.

Family-Based Treatment (Maudsley Therapy)

Family-based treatment is a treatment program for AN that originated from the Maudsley Hospital in London. Family-based therapy is markedly different from traditional family therapy. The primary focus is on weight gain by empowering the family to take control over refeeding. It has 3 phases of (1) refeeding/weight restoration; (2) handing control over eating back to the individual; and (3) addressing developmental issues.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Hay and colleagues (updated search date 2014)[169] identified one trial (Dare, Eisler, Russell, Treasure and Dodge, 2001)[86] that examined the efficacy of family-based treatment among adults with AN. The trial compared family-based treatment to cognitive-analytic therapy, focal psychoanalytic

therapy, and low- dose "routine" treatment among 84 outpatient women with AN. No differences were found across all 4 treatments on Morgan-Russell clinical ratings at 1-year endpoint. At endpoint, approximately one third of patients in the 3 specialised treatments had a body weight greater than 85% ideal body weight, compared to 5% of those in routine treatment. At endpoint, family therapy and focal psychoanalytic therapy but not cognitive analytic therapy, were associated with higher weight, and higher recovery and improvement rates, compared to routine treatment.

Interpersonal Psychotherapy

Interpersonal psychotherapy is based on interpersonal theory, and aims to target interpersonal issues that are theorised to contribute to the development and maintenance of eating disorders. Interpersonal psychotherapy addresses four theoretical interpersonal problem areas of grief, interpersonal disputes, role transitions, and interpersonal deficits.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level II evidence available.

Level II Evidence

Hay and colleagues (updated search date 2014)[169] identified one RCT (McIntosh, Jordan, Carter, Luty, McKenzie et al., 2005)[228] that compared CBT, interpersonal psychotherapy, and specialist supportive clinical management among 56 women with AN or EDNOS-AN. The authors reported no raw data for separate eating disorder diagnoses; however they did conduct a moderator analysis examining full/partial diagnosis for one treatment outcome, a global AN rating, and reported no impact of diagnosis. On this outcome, specialist supportive clinical management was superior to interpersonal psychotherapy and CBT, and interpersonal psychotherapy and CBT did not significantly differ from one another (in the full sample). Approximately 59% (33 of 56) met the strict criteria for AN. In the intention- to-treat full sample (i.e. including partial AN), a good outcome was attained by 0% in interpersonal psychotherapy, 5% in CBT, and 25% in specialist supportive clinical management, and a poor outcome was attained by 67% in interpersonal psychotherapy, 53% in CBT, and 38% in specialist supportive clinical management at the end of the 20-week treatment phase. Global outcome was categorised in terms of weight, BMI, physical measures, and eating disorder psychopathology.

Medication

Antidepressant Medication

Serotonergic neurotransmission abnormalities have been theorised to contribute to eating disorders. Antidepressant medication seeks to improve serotonergic neurotransmission.

One systematic review (summarising 2 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Balestrieri and colleagues (Search date 2012)[24] identified 2 RCTs that assessed the efficacy of antidepressants with restrictive-type AN patients (Kaye, Nagata, Weltzin, Hsu, Sokok et al., 2001[188]; Fassino, Leombruni, Daga, Brustolin, Migliaretti et al., 2002[116]). In one study[188], 35 AN patients who had completed inpatient weight regain were randomised to fluoxetine (maximum= 60 mg/day) or placebo, and then observed as outpatients for one year. There were no significant differences between patients in terms of weight gain, depression, or eating disorder-related obsessions and compulsions at the end of the study. In the other study[116] (also identified in a systematic review by Hay, Touyz and Sud, 2012[166]), 52 anorectic outpatients who had not been under psychopharmacological therapy during the preceding month were randomised to citalopram (10mg/day for first 6 days; 20mg/day thereafter) or wait list control for 12 weeks. Depression, obsessive compulsive features, impulsiveness and anger improved significantly in the citalopram group compared to controls post-treatment. There was no significant difference in weight gain between groups.

Level II Evidence

There was no level II evidence available.

Antipsychotic Medication

Clinical observations in diverse patient groups suggest that antipsychotic medication can promote weight gain, alleviate agitation, and reduce delusional, overvalued cognitions, leading to investigations into their utility in treating eating disorders.

Three systematic reviews (summarising 6 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Dold and colleagues (search date 2014)[95] identified 3 studies (Attia, Kaplan, Walsh, Gershkovich, Yilmaz, et al., 2011[16], Bissada, Tasca, Barber, and Bradwejn, 2008[38] and Garcia, Fassino, Daga, Favaro, Santonastaso and colleagues, 2007[42]) that examined the efficacy of antipsychotic medication. One study[16] randomised 23 subjects to olanzapine or matched placebo for 8 weeks in a double-blind pilot study. All subjects received medication management sessions to enhance compliance. Olanzapine treatment was well-tolerated overall. Body mass index was significantly greater at the end of treatment for subjects receiving olanzapine compared to placebo. While psychological symptoms improved in both groups, there was no significant difference between treated and untreated subjects. In a second study[38], 34 individuals with AN were randomised to either day hospitalisation and olanzapine (2.5 – 10.0 mg/day) or day hospital and placebo. At 13 weeks patients taking olanzapine achieved faster weight gain, earlier achievement of target weight and a reduction in obsessive symptoms. In a third study[42], 20 AN outpatients were randomised to CBT + nutritional rehabilitation, adjunct antipsychotic medication (olanzapine; 2.5-5 mg/day) or pill placebo. At the 12-week study endpoint, BMI kg/m2 significantly increased in both treatment groups, with no significant between-group difference.

Lebow and colleagues (search date 2011)[195] identified 6 RCTs[16,38,41,42,244,295] that investigated the efficacy of atypical antipsychotics in improving BMI, eating disorder symptoms, anxiety and depression in either adults or adolescents. Three of these[16,38,42] were included in the systematic review by Dold and colleagues, above, and so will only be referred to here in the context of the secondary outcomes analysed by Lebow and colleagues. The remaining two studies [244,295] had sample sizes ranging from 15 to 35 adult females, and treatment duration ranging from 50 days to 3 months. One study (Ruggiero, Laini, Mauri, Ferrari, Clemente et al., 2001)[295] examined a 3-month trial of amisulpride (an atypical antipsychotic) among 35 inpatients who were being treated with a nutritional- and psychoeducation-based weight restoration intervention. Secondary outcomes analyses conducted by Lebow and colleagues found that atypical antipsychotics had no effect on drive for thinness[42,244] or body dissatisfaction[42,244] compared to placebo; led to an increase in anxiety[16,38] and overall eating disorder symptoms[16,42] compared with placebo or active control; and led to a reduction in levels of depression compared with placebo or active control[16,38].

Balestrieri and colleagues (Search date 2012)[24] identified 3 RCTs[16,38,244] that investigated the efficacy of antipsychotic medication for patients with AN. Two of these studies[16,38] were included in the systematic reviews by Dold and colleagues[95] and one of these studies[244] was included in the systematic review by Lebow and colleagues[195]. Hay, Touyz and Sud (search date 2011)[166] identified 2 RCTs[38,244] that evaluated antipsychotic treatments for AN; however, as these were included in the systematic review s by Dold[95] and Lebow[195] and colleagues, respectively, these studies will not be described further here.

Level II Evidence

There was no level II evidence available.

Anxiolytic Medication

Anxiolytics are psychoactive compounds that inhibit anxiety. The anxiolytic that was evaluated here was the short-acting benzodiazepine Alprazolam that produces its anxiolytic, sedating and muscle relaxing effects via inhibition of the gamma-aminobutyric acid neurotransmitter system. Higher levels of pre-meal anxiety are affiliated with lower caloric intake. The authors of the included study present the first causal investigation of the role of anxiety in food avoidance in patients with AN.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Steinglass, Kaplan, Liu, Wang and Walsh (2014)[318] investigated the putative role pre-meal anxiety in caloric intake by administering the benzodiazepine alprazolam to 20 adult patients with AN. All participants received 0.75mg alprazolam on one test day and a placebo on another test day, with the order of medication administration randomised and separated by one week. There was no significant difference in caloric intake between alprazolam and placebo, and alprazolam was found to induce fatigue without anticipated reductions in anxiety.

Endocannabinoid Agonist Medication

The endocannabinoid system plays a central function in modulating appetitive behaviours and has well described orexigenic effects. The cannabinoid system is also involved in metabolic processes controlling energy homeostasis through interactions with molecular targets (such as leptin) involved in peripheral fat metabolism. The cannabinoid CB1 receptor accounts for most of the psychotropic effects of 9-tetrahydrocannabinol (THC). Several studies have evaluated CB1 in AN induced by causes other than AN (e.g. alongside cancer or aids), but limited attention has been given to its potential as a treatment for AN. The study reviewed here administered the synthetic cannabinoid dronabinol, and comprises the first RCT of the effects of this medication on patients with AN.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Andries, Frystyk, Flyvbjerg and Stoving (2013)[12] conducted a prospective, double blind cross-over study that investigated the effects of treatment with the synthetic cannabinoid agonist dronabinol on body weight and eating disorder-related psychopathological personality traits in women with severe and enduring AN. Twenty-five women with severe and enduring AN (≥5 years) were randomised to receive dronabinol followed by placebo or placebo followed by dronabinol, alongside standard therapeutic care. Dronabinol was given in 2 doses (2.5mg) daily for 4 weeks, following or followed by the preceding placebo phase by a 4-week wash-out period. The mean change in body weight was the primary outcome measure. Participants gained significantly more weight during dronabinol treatment (0.73kg) than during placebo without significant psychotropic adverse effects.

Hormone Replacement Therapy

Hormone replacement therapy aims to improve hormonal functioning that may be cause or consequence of specific hormone imbalances. Anorexia nervosa is associated with low bone mineral density, and in many cases, significant, permanent, bone loss. The potential mechanisms of bone loss in anorexic women include nutritionally mediated changes in gonadal steroid hormones. Hormone replacement therapies (including human growth factor, testosterone and anabolic agents) are commonly used in the treatment of osteoporosis to increase bone growth.

Two systematic reviews (summarising 4 RCTs) and one RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

De Vos and colleagues (2014) identified 3 RCTs that assessed the efficacy of hormonal medication for treating adult AN. One of these studies[236] was included in the systematic review by Hay and colleagues (2012)[166] and will not be described further here. The other 2 studies (Fazeli et al., 2010[118]; Grinspoon, Thomas, Miller, Herzog & Klibanski, 2002[157]) evaluated recombinant human growth factor. One study[118] administered recombinant human growth hormone (rhGH) or placebo to patients for 12 weeks. This study reported a decrease in fat mass in patients receiving rhGH compared with placebo with no increase in levels of insulin-like growth factor 1 (rh-IGF-1), indicating that the dosage of rhGH was not sufficient to improve growth hormone levels in individuals with AN. The second study[157] administered one of 4 treatments (rh-IGF-1, oral contraceptive, both or neither) to osteopenic women for 9 months. Bone density improved in women receiving rh-IGF-1 compared with women not receiving rh-IGF-1.

Level II Evidence

Fazeli and colleagues (2014)[119] randomised 21 women to receive either daily teriparatide (20 µg) or placebo for 6 months. Administration of teriparatide was well tolerated by all subjects and yielded significantly higher spinal bone mineral density at end of treatment than placebo. After 3 months of teriparatide treatment, serum levels of the bone formation marker P1NP were significantly higher than participants receiving placebo and levels remained high over the entire 6-month study.

Hay, Touyz and Sud (search date 2011)[166] identified one RCT that randomised 77 adult patients with AN to 12 months of weekly residronate (35 mg weekly), low-dose transdermal testosterone replacement therapy, combination therapy or double placebo. Bone mineral density was measured using dual-energy x-ray absorptiometry. Residronate significantly increased bone mineral density at the spine (the primary end point) and hip compared with placebo over the 12 month

treatment. Testosterone increased lean body mass but did not affect bone mineral density. There were few side effects associated with either therapy.

Psychodynamic or Psychoanalytic Therapy

In focal psychodynamic psychotherapy, the therapist takes a non-directive stance and does not offer direct advice on eating behaviour or symptom management. The therapy focuses on addressing conscious and unconscious meanings of the illness in terms of early life experiences, places importance on the therapeutic relationship, and seeks to enable the individual to gain insight into the illness to theoretically allow resolution of the illness.

One systematic review (summarising 2 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Hay and colleagues (updated search date 2014)[169] conducted a systematic review of individual psychological therapies for AN, and identified only one RCT (Zipfel, Wild, Grob, Friedrich, Teufel et al., 2014)[395] that was considered to be of high quality, with sufficient statistical power and low risk of bias. This multicentre trial, referred to as the Anorexia Nervosa Treatment of Outpatients (ANTOP) study, randomly allocated 242 adult females with AN to 10 months of weekly treatment with either manualised focal psychodynamic therapy, manualised, enhanced cognitive behavioural therapy, or optimised treatment as usual. The full study protocol has been published elsewhere[372]. A framework of medical care was developed for all study participants, which included at least 5 sessions of specialist assessment, monthly GP visits and face-to-face treatment with doctors specialising in AN focal psychodynamic therapy was delivered in 3 treatment phases. The first phase focused on therapeutic alliance, pro-anorectic behaviour and ego-syntonic beliefs and self-esteem. The second phase focused on the association between interpersonal relationships and disordered eating behaviour; and the final phase focused on the transfer from treatment to everyday life. Enhanced CBT involved several psycho-education modules, as well as homework and exercises reviewed each session. Optimised treatment as usual involved usual outpatient psychotherapy from an eating disorder specialist therapist. All study groups displayed an increase in BMI between baseline and post-treatment, followed by a further increase at 12-month follow-up, however no significant BMI differences were found between groups at either time point. Analysis of recovery rates at 12-month follow-up indicated significantly higher full recovery rates in patients assigned to focal psychodynamic therapy (36%) compared to optimised treatment as usual (13%).

Hay and colleagues identified another trial (Dare, Eisler, Russell, Treasure and Dodge, 2001)[86] that compared focal psychoanalytic therapy, cognitive-analytic therapy, family-based treatment (Maudsley therapy), and low-dose "routine" treatment among 84 outpatient women with AN. No differences were found across the 4 treatments on Morgan-Russell clinical ratings, but the 3 specialised treatments were more effective than routine treatment on weight gain at the 1-year endpoint. At endpoint, focal psychoanalytic therapy and family therapy, but not cognitive-analytic therapy, was associated with a better outcome compared to routine treatment. Outcome was defined multidimensionally in terms of weight, menarchal status, and bulimic symptomatology.

Level II Evidence

There was no level II evidence available.

Repetitive Transcranial Magnetic Stimulation

Repetitive transcranial magnetic stimulation (rTMS) has been investigated for its potential capacity to regulate the feeding suppression area in the frontal lobe. It is based on preliminary scientific evidence that blood flow in the frontal area is higher before eating and lower after eating in individuals with BN compared to control, which is hypothesised to lead to difficulty controlling appetite and food intake. Research has shown that rTMS may help to regulate serotonergic neurotransmission, which is thought to be dysfunctional in individuals with eating disorders.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

McClelland and colleagues (2016)[218] conducted a double-blind parallel-group RCT to investigate the effects of one session of sham-controlled, high-frequency, repetitive transcranial magnetic

stimulation (rTMS) applied to the left dorsolateral prefrontal cortex of 49 males and females with a current DSM-5 AN diagnosis. After controlling for pre-rTMS scores, individuals who had received the intervention experienced a reduction in core symptoms of AN post-treatment and 24 hours later, relative to those receiving sham stimulation.

Specialist (formerly nonspecific) Supportive Clinical Management

Specialist supportive clinical management includes clinical management such as education, care, and support, and supportive psychotherapy in which the therapist provides a supportive therapeutic environment offering praise, reassurance, and advice in order to encourage adherence to treatment. The nutritional status of the individual is an important concern within this approach, and the individual is given advice, information, and encouragement to adopt normal eating behaviours and to restore weight.

Three RCTs evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Hay and colleagues (updated search date 2014)[169] identified one RCT (McIntosh, Jordan, Carter, Luty, McKenzie et al., 2005)[228] that compared specialist supportive clinical management, CBT, and interpersonal psychotherapy among 56 women with AN or EDNOS-AN. The authors reported no raw data for separate eating disorder diagnoses; however they did conduct a moderator analysis examining full/partial diagnosis for one treatment outcome, a global AN rating, and reported no impact of diagnosis. On this outcome, specialist supportive clinical management was superior to interpersonal psychotherapy and CBT, and interpersonal psychotherapy and CBT did not significantly differ from one another, in the full sample. Approximately 59% (33 of 56) met the strict criteria for AN. In the intention-to-treat full sample (i.e., including partial AN), a good outcome was attained by 0% in interpersonal psychotherapy, 5% in CBT, and 25% in specialist supportive clinical management, and a poor outcome was attained by 67% in interpersonal psychotherapy, 53% in CBT, and 38% in specialist supportive clinical management at the end of the 20- week treatment phase. Global outcome was categorised in terms of weight, BMI, physical measures, and eating disorder psychopathology.

In a study by Touyz and colleagues (2013)[360], 63 participants with severe and enduring (≥7 years) AN were randomised to receive 30 out-patient sessions of CBT or specialist supportive clinical management over 8 months. Both treatments were modified for severe and enduring AN (CBT-AN: see Pike et al., 2003[273]; modified specialist supportive clinical management: see McIntosh et al., 2006[229]). Both groups experienced significant changes on all primary and secondary measures (addressing physical, psychological, and eating disorder-specific symptoms) of outcome at end of treatment, 6- and 12-month follow-ups. At baseline, specialist supportive clinical management participants reported higher levels of depression and poorer social adjustment than CBT participants. There were no differences between treatment groups at end of treatment on any measure. At 12-month follow-up, CBT participants had lower eating disorder symptom scores and higher readiness for recovery.

Schmidt and colleagues (2015)[308] randomised 142 outpatients with AN to 20-30 weekly sessions (depending on clinical severity) of MANTRA therapy or specialist supportive clinical management. Patients were evaluated at baseline and 6- and 12-month follow-ups. The primary outcome was BMI at 12 months, while secondary outcomes included eating disorder symptomatology, other psychopathology, neurocognitive and social cognition, and acceptability. While both treatments produced significant improvements in BMI, eating disorder symptomatology, distress levels and clinical impairment over time, there were no significant differences between groups at either follow-up. In a further follow-up investigation conducted at 24 months (Schmidt and colleagues, 2016)[309] BMI, ED symptomatology, distress levels, and clinical impairment were still improved or had improved further in both groups, with no significant differences between groups.

Combination Therapies

Combined Cognitive Behavioural Therapy and Antipsychotic Medication

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level II evidence available.

Level II Evidence

Dold and colleagues (search date 2014)[95] identified one RCT (Brambilla, Garcia, Fassino, Daga, Favaro and colleagues, 2007)[42] that evaluated CBT + placebo or olanzapine (2.5 mg for 1 month, 5 mg for 2 months) among 30 patients with AN for 3 months. Both groups experienced a significant improvement in BMI kg/m2, global eating disorder psychopathology, eating-related obsessiveness, direct aggressiveness and depression, although the group receiving olanzapine experienced significantly greater improvement on direct aggressiveness and depression. The CBT + placebo group did not experience significant improvement on eating-related compulsions and persistence, but the CBT + olanzapine group did. There were no significant improvements within groups or between-group differences on drive for thinness, interoceptive awareness, bulimic attitudes and behaviours, body dissatisfaction, perfectionism, interpersonal distrust, asceticism, impulse regulation, and social insecurity.

Combined Nutritional Rehabilitation and Cognitive Behavioural Therapy

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level II evidence available.

Level II Evidence

Lebow and colleagues (search date 2011)[195] and Balestrieri and colleagues (search date 2012)[24] both identified one RCT (Brambilla, Garcia, Fassino, Daga, Favaro, Santonastaso et al., 2007)[42] that randomised 20 outpatients with AN to a 12-week program of nutritional rehabilitation and CBT + either antipsychotic medication (olanzapine; 2.5-5 mg/ day) or pill placebo. Both groups experienced a significant improvement in BMI kg/m2 and there were no significant between-group differences. There were no significant changes to leptin or ghrelin levels by time, no between-condition differences, and no significant condition × treatment interactions.

Combined Nutritional Rehabilitation, Cognitive Behavioural Therapy, and Antipsychotic Medication

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Lebow and colleagues (search date 2011)[195] and Balestrieri and colleagues (search date 2012)[24] both identified one RCT (Brambilla, Garcia, Fassino, Daga, Favaro, Santonastaso et al., 2007)[42] that randomised 20 outpatients with AN to a 12-week program of nutritional rehabilitation and CBT with either antipsychotic medication (olanzapine; 2.5 mg for 1 month; 6 mg for 2 months) or pill placebo for 3 months. Over the duration of treatment, BMI kg/m2, global eating disorder psychopathology, and eating-related obsessiveness improved significantly for both groups, with no between-group differences. Only the olanzapine group improved significantly on eating-related compulsive symptoms and persistence. There was a significantly greater improvement in 'direct aggressiveness' and depression among olanzapine treated patients, though both groups experienced significant improvement. There were no significant improvements within groups or between-group differences on drive for thinness, interoceptive awareness, bulimic attitudes and behaviours, body dissatisfaction, perfectionism, interpersonal distrust, asceticism, impulse regulation, and social insecurity. There were no significant changes to leptin or ghrelin levels by time, no between-condition differences, and no significant condition × treatment interactions.

Bulimia Nervosa in Young People

Cognitive Behavioural Therapy

Cognitive behavioural therapy programs aim to alter unhelpful thinking processes and behaviours that maintain eating disorders. Cognitive behavioural therapy is grounded in cognitive behavioural theory. Cognitive behavioural therapy involves cognitive restructuring to challenge unhelpful thoughts and aims to reduce beliefs about the importance of shape, weight, eating and their control for defining one's self worth. Cognitive behavioural therapy programs directly address unhelpful behaviours that maintain eating disorders

such as excessive dietary restriction, laxative and diuretic misuse, purging, and over-exercising. They may address additional factors implicated in eating disorder problems such as self-esteem, perfectionism, interpersonal functioning, and emotion regulation.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

One two-site RCT (Le Grange, Lock, Agras, Bryson and Booil, 2015)[148] randomised 130 male and female participants to18 outpatient sessions of FBT-BN, CBT-A (CBT adapted for adolescents) or non-specific supportive psychotherapy (SPT) delivered over 6 months. Participants receiving FBT-BN had significantly greater rates of abstinence than participants receiving CBT-A at the end of treatment and 6-month follow-up, but not 12-month follow-up.

Family-Based Treatment (Maudsley Therapy)

Family-based therapy for BN is an adapted version of the family-based treatment program devised for adolescents with AN. The first phase involves empowering family members to modify disordered eating, including binge eating, purging, dietary restriction, and any other extreme weight control methods. The second phase involves handing over control of eating issues back to the adolescent and the final phase focuses on addressing adolescent and other issues.

Two systematic reviews (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Both Couturier, Kimber and Szatmari (2013)[75] and Hay (search date 2012) identified one RCT (le Grange, Crosby, Rathouz and Leventhal, 2007)[143] that compared family-based treatment to supportive psychotherapy for 6 months (20 visits) on an outpatient basis among 80 young people aged 12 to 19 years. The family-based treatment adapted for BN has been manualised in the book, ***Treating Bulimia in Adolescents: A Family-Based Approach***[146]. Individuals met criteria for full- (*N*=37, 46%) or sub-threshold BN (*N*=43, 54%). The trial is included in this review because it examined diagnosis as a moderator of outcome and therefore contains findings applicable to full-threshold BN. Diagnosis was investigated as a moderator of one variable, remission rate (defined as no objective binge episodes, subjective binge episodes, or compensatory behaviour for the previous four weeks), therefore information pertinent to this outcome only is described. The remission rate was significantly higher for those treated with family-based treatment compared to those treated with supportive psychotherapy at endpoint (39% versus 18%) and 6-month follow- up (29% versus 10%). There was no significant difference in remission rates between those with full- or sub-threshold BN, suggesting that both diagnostic groups improved to a greater extent if treated with family-based treatment rather than supportive psychotherapy.

Bulimia Nervosa in Adults

Cognitive Behavioural Therapy

Cognitive behavioural therapy programs aim to alter unhelpful thinking processes and behaviours that maintain eating disorders. Cognitive behavioural therapy is grounded in cognitive behavioural theory. Cognitive behavioural therapy involves cognitive restructuring to challenge unhelpful thoughts and aims to reduce beliefs about the importance of shape, weight, eating and their control for defining one's self worth. Cognitive behavioural therapy programs directly address unhelpful behaviours that maintain eating disorders such as excessive dietary restriction, laxative and diuretic misuse, purging, and over-exercising. They may address additional factors implicated in eating disorder problems such as self-esteem, perfectionism, interpersonal functioning, and emotion regulation.

Four systematic reviews (summarising 9 RCTs) and 2 RCTs evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Polnay, James, Hodges, Murray, Munro and Lawrie (search updated in 2013)[276] identified 2 RCTs (Sundgot-Borgen et al., 2002[343] and Chen et al., 2003[67]) that evaluated CBT for adults with BN. One

study[343] randomised 48 normal weight female bulimic patients aged 18-29 years to CBT, nutritional advice, a physical exercise program or waiting list control. Seventeen healthy female control subjects were also included. There were no significant differences between subjects receiving nutritional counselling or CBT. Physical exercise was more effective than CBT in reducing pursuit of thinness, change in body composition, aerobic fitness and frequency of bingeing, purging, and laxative abuse. The second study randomised 60 female BN patients, aged 18 or over, to individually delivered CBT or group CBT over 4.5 months. Patients in both groups had access to a self-help book (Fairburn, 1995)[109], and treatment was based on a CBT manual by Fairburn (1993)[113]. Individual CBT sessions were 60-minute long while group CBT sessions were 90-minute long. Both forms of therapy were effective at reducing primary and secondary BN symptoms, but subjects in the individual CBT group had significantly higher levels of abstinence from bulimic behaviours post-treatment compared to subjects in the group CBT groups. There were no significant differences in abstinence at 6-month follow-up, or in any other measures.

Koskina, Campbell and Schmidt (search date 2012)[192] identified one RCT (McIntosh, Carter, Bulik, Frampton and Joyce, 2011)[227] that randomised 135 women with purging BN to 8 sessions of individual CBT followed by either relaxation training or one of 2 exposure with response prevention therapies (pre-binge or pre-purge cues). No significant differences were noted between CBT and either exposure therapy at the end of treatment, at 12-month follow-up or 3-month follow-up. However, of those participants who attended the 5-year follow-up (85% of original sample), binging abstinence rates were significantly higher in participants who had received exposure therapy than relaxation therapy, with no difference between the 2 forms of exposure therapy, and rates of purging were lower for participants in the exposure therapy groups than relaxation therapy group. The authors advise cautious interpretation of these findings. The absence of differences in the first 3 years followed by significant differences in the 5th year follow-up may reflect chance improvements during the 5th year, or a possible long-term inoculation against BN symptoms following treatment, although the ultimate mechanism remains speculative.

Hay and colleagues (search updated to August 2009)[167] pooled data (when applicable) from relevant RCTs, and reported a significant relative risk ratio favouring CBT over wait-list or no-treatment on abstinence (100% binge free) rate (5 RCTs pooled, *N*=204), bulimic symptoms (9 RCTs pooled, *N*=323), and depression symptoms (6 RCTs pooled, *N*=223), and no significant differences on psychosocial/interpersonal functioning (one RCT, *N*=38), proportion completing study period (9 RCTs pooled, *N*=331), or weight (one RCT, *N*=80). Comparisons of CBT versus any other psychotherapy revealed significant differences favouring CBT on abstinence rate (7 RCTs pooled, *N*=484) and no differences on bulimic symptoms (8 RCTs pooled, *N*=514), depression symptoms (7 RCTs pooled, *N*=242), general psychiatric symptoms (5 RCTs pooled, *N*=165), psychosocial/interpersonal functioning (4 RCTs pooled, *N*=330), proportion who dropped out due to adverse events (2 RCTs pooled, *N*=73), proportion completing study period (8 RCTs pooled, *N*=523), and weight/BMI (5 RCTs pooled, *N*=190). Comparisons of CBT versus a component of CBT only revealed a significant difference favouring CBT on abstinence rate (4 RCTs pooled, *N*=168), and bulimic symptoms (2 RCTs pooled, *N*=80), and no significant differences on binge eating (one RCT, *N*=30), depression (one RCT, *N*=33), weight/BMI (one RCT, *N*=39), general psychiatric symptoms (one RCT, *N*=50), proportion completing study period (4 RCTs pooled, *N*=148), and social adjustment (one RCT, *N*=50). Comparisons of CBT versus CBT augmented with exposure and response prevention revealed no significant differences on abstinence rate (3 RCTs pooled, *N*=168), bulimic symptoms (4 RCTs pooled, *N*=149), proportion completing study period (4 RCTs pooled, *N*=193), and depression symptoms (4 RCTs pooled, *N*=145).

Level II Evidence

ter Huurne and colleagues (2015)[179] randomised 44 women with BN to receive the web-based CBT program "Look at your eating"[180] or waitlist control. The intervention was delivered as a 2-part program that aimed to analyse eating attitudes and behaviours (part 1) and contribute to behavioural change (part 2). Participants completed the sessions in their own time and were considered completers after submitting 10 assignments and participating in at least 21 sessions. eating disorder psychopathology improved over time for both groups, with no significant between-group differences found on any measure.

Poulsen and colleagues (2014)[277] randomised 70 adult patients with BN to 20 sessions of CBT over 5 months or 2 years of weekly psychoanalytic psychotherapy. After 5 months, patients in both treatments had improved but a significantly greater improvement in binging and purging episodes was

observed in the CBT group compared with the psychoanalytic psychotherapy group (42% and 6%, respectively). A similar difference was noted at the 2-year assessment (44% and 15%). General and eating disorders psychopathology were substantially improved at the end of treatment for either treatment, but these changes occurred more rapidly in the CBT group.

Hay (search date 2012)[163] identified one RCT (Fairburn, Cooper, Doll, O'Connor, Bohn, Hawker, and colleagues, 2009)[111] randomised 154 adult outpatients with BN (*N*=57) or EDNOS (*N*=97) to 3 conditions, enhanced CBT (focused), enhanced CBT (broad) and delayed treatment control. The 20-week study aimed to compare the 2 CBT treatments for outpatients, one which focuses on eating disorder features only and the other which also focuses on mood intolerance, clinical perfectionism, low self- esteem or interpersonal difficulties. At endpoint, 53% of patients receiving CBT had a global eating disorder psychopathology score less than one standard deviation about the community mean, and 61% at follow-up. The enhanced approach has been manualised in the book, Cognitive Behaviour Therapy and eating disorders[107].

Cognitive Behavioural Therapy Guided Self-Help

This approach refers to CBT delivered in a self-help format during which short, usually weekly sessions are held with a therapist who monitors and supports implementation of the program.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Allen and Dalton (search date 2009)[9] identified one RCT (Durand and King, 2003)[101] that randomised 34 BN patients to GP-managed cognitive behavioural therapy guided self-help or specialist clinical management. The self-help manual used was the published book, ***Bulimia Nervosa and Binge-Eating: A Guide to Recovery***[74]. There were significant improvements over time (baseline to 6 months post-baseline to 9 months post- baseline) for both groups on bulimic symptom severity, eating disorder psychopathology, and depression, with no between-group differences. There were no significant differences between groups on objective binge episodes at any time point or in degree of improvement over time.

Exposure Therapy

Exposure therapy is a clinical intervention that aims to reduce conditioned responses to negative or positive stimuli using graded exposures. Exposure therapy is based on principles of Pavlovian conditioning and has historically been targeted at anxiety disorders, with the premise that anxiety and avoidance are often controlled by specific environmental cues. In the treatment of BN, exposure therapy involves food exposure with the intention of reducing binging and purging.

One systematic review (summarising 2 RCTs) and one RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Koskina, Campbell and Schmidt (search date 2012)[192] identified 2 RCTs[54,227] that assessed the long-term efficacy of exposure therapy in patients with BN. One study (Carter, McIntosh, Joyce, Sullivan and Bulik, 2003)[54] evaluated the efficacy of exposure-based versus non exposure-based behavioural treatments versus cognitive behavioural therapy for BN at a 3-year follow-up. Of those participants (*N*=113) that completed the original treatment trial and participated in 3-year follow-up, 85% had no current BN diagnosis and 69% had no current eating disorder diagnosis of any sort. There were no significant differences between cognitive behavioural therapy and behavioural therapy and cognitive behavioural therapy alone.

Another study (McIntosh, Carter, Bulik, Frampton and Joyce, 2011)[227] randomised 135 women with purging BN to 8 sessions of individual CBT followed by either relaxation training or one of 2 exposure with response prevention therapies (pre-binge or pre-purge cues). No significant differences were noted between CBT and either exposure therapy at the end of treatment, 3-month follow-up or 12-month follow-up. However, of those participants who attended the 5-year follow-up (85% of original sample), binging abstinence rates were significantly higher in participants who had received either exposure therapy than relaxation therapy, with no difference between the 2 forms of exposure therapy, and rates of purging were lower for participants in the exposure therapy groups than relaxation therapy group. The authors advise cautious interpretation of these findings. The

absence of differences in the first 3 years followed by significant differences in the 5th year follow-up may reflect chance improvements during the 5th year, or a possible long-term inoculation against BN symptoms following treatment, although the ultimate mechanism remains at this stage speculative.

Level II Evidence

Diaz-Ferrer and colleagues (2015)[92] compared the efficacy of 2 body exposure techniques in improving body image in women with BN. Twenty-nine women with BN and high body dissatisfaction were randomised to receive 6 sessions of pure or guided exposure over 3 weeks. The pure guided exposure group was required to examine their bodies in a large mirror while attending to their emotions and verbalising their thoughts. The guided exposure group was required to observe their bodies, under identical conditions to the pure exposure group, but verbalise their thoughts as neutrally and objectively as possible. Cognitive, affective and neuroendocrine (cortisol levels) measures were collected as primary outcome variables. Both exposure therapies resulted in significant decreases in subjective bodily discomfort experienced at the start of each successive session as well as reductions in salivary cortisol levels from the start to end of treatment. However, the pure exposure group showed greater feelings of satisfaction with their bodies than the guided exposure group.

Healthy Weight Program

This program promotes and encourages the adoption of healthy weight control behaviours, such as a healthy, nutritious diet and exercise. The program aims to induce a slight negative energy balance, so that a slim, but healthy physique can be acquired through health-promoting methods, which is thought to lead to better body image. Although the program uses cognitive-behavioural methods, it has different foci to evaluated CBT programs, in that it promotes caloric restriction, rather than challenging attempts to restrain dietary intake, and it does not seek to challenge a participant's belief in the value and importance of obtaining a slim physical ideal.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level II evidence available.

Level II Evidence

Hay (search date 2012)[163] identified one RCT (Burton and Stice, 2006)[50] that randomised 85 females with full- (48%) or sub-threshold BN (52%) to a 6-session healthy weight intervention delivered in a group format or wait-list control. They tested diagnostic threshold as a moderator variable and reported no differences between groups on primary outcomes, hence, results of this study are reported. The intervention group demonstrated a reduction in BMI kg/m2 over the duration of the study (pre-treatment, mid-treatment, post-treatment, 3-month follow-up), whereas the control group experienced a slight increase. Examination of the data across the time points showed that the intervention group experienced a significantly greater reduction in BMI kg/m2 relative to the control group between pre-treatment and post-treatment, specifically. There were larger reductions in bulimic symptoms (binge-eating and compensatory behaviours) for the intervention participants across the 4 waves of data collection relative to controls, although both groups experienced significant reductions over time. Remission was defined as the absence of binge-eating and purging within the previous month. At post-treatment, 16% of intervention participants versus 2% of control participants were remitted, and at 3-month follow-up, 35% of intervention participants versus 10% of control participants were remitted.

Medication

Antidepressant Medication

Serotonergic neurotransmission abnormalities have been theorised to contribute to eating disorders. In BN, concentrations of serotonin in the cerebrospinal fluid are reduced. Antidepressant medication seeks to improve serotonergic neurotransmission.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Milano and colleagues (2013)[235] compared the efficacy of 3 different selective serotonin reuptake inhibitors (SSRIs) in the treatment of BN. Sixty adult female outpatients were randomised to receive 60mg fluoxetine, 200mg fluvoxamine or 100mg sertraline per day for 10 weeks. At end of

treatment, bulimic and purging episodes were significantly reduced in patients treated with fluoxetine (75% decrease in bulimic episodes and 68% decrease in purging episodes) and fluvoxamine (59% decrease in bulimic episodes and 62% decrease in purging episodes, respectively) but not sertraline. Side effects, including irritation, anxiety, insomnia, headache and sedation, were reported in all treatment groups but did not affect participation.

Nutritional Management

Nutritional management focuses on normalising eating patterns. Although this approach is a component of other treatment approaches, such as CBT, it was investigated on its own as dietary restraint is considered a primary pathway to disordered eating, and the single most important factor that maintains the restraint-binge eating-purging cycle often seen in BN. Education is provided on metabolic requirements, the biological and psychological effects of starvation, the importance of regular eating, the macronutrient composition of food and appropriate quantity for consumption, advice on meal preparation and planning, and individuals are encouraged to eat feared foods.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Polnay, James, Hodges, Murray, Munro and Lawrie (search updated in 2013)[276] identified one RCT (Sundgot-Borgen et al., 2002[343]) that randomised 48 normal weight female bulimic patients aged 18-29 years to CBT, nutritional advice, a physical exercise program or waiting list control. Seventeen healthy female control subjects were also included. There were no significant differences between subjects receiving nutritional counselling or CBT. Physical exercise was more effective than CBT in reducing pursuit of thinness, change in body composition, aerobic fitness and frequency of bingeing, purging, and laxative abuse.

Physical Exercise

Physical exercise can improve symptoms of depression and anxiety disorders and both aerobic and anaerobic exercise have been consistently related to improved self-esteem or self-concept. Physical exercise has also been shown to reduce overeating or bulimic binge eating in obese patients. The study reviewed here compares the effects of physical exercise to cognitive behavioural therapy in bulimic patients.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Polnay, James, Hodges, Murray, Munro and Lawrie (search updated in 2013)[276] identified one RCT (Sundgot-Borgen et al., 2002[343]) that randomised 48 normal weight female bulimic patients aged 18-29 years to CBT, nutritional advice, a physical exercise program or waiting list control. Seventeen healthy female control subjects were also included. There were no significant differences between subjects receiving nutritional counselling or CBT. Physical exercise was more effective than CBT in reducing pursuit of thinness, change in body composition, aerobic fitness and frequency of bingeing, purging, and laxative abuse.

Repetitive Transcranial Magnetic Stimulation

Repetitive transcranial magnetic stimulation (rTMS) has been investigated for its potential capacity to regulate the feeding suppression area in the frontal lobe. It is based on preliminary scientific evidence that blood flow in the frontal area is higher before eating and lower after eating in individuals with BN compared to control, which is hypothesised to lead to difficulty controlling appetite and food intake. Research has shown that rTMS may help to regulate serotonergic neurotransmission, which is thought to be dysfunctional in individuals with eating disorders.

One systematic review (summarising one RCT) and one RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Gay and colleagues (2016)[132] randomised 47 selective serotonin reuptake inhibitor (SSRI)-resistant women with BN to a two-week program of high-frequency rTMS or sham rTMS. Treatment was delivered over 10 sessions, each consisting of 20 , 5-second, 10 Hz trains of stimulation with 55-second intervals between trains. Primary outcomes (number of binges) and secondary outcomes (binge episode features, number of binge-free days, craving before a binge, mood and number of vomiting episodes) were evaluated for the 15 day period following program completion. There were no significant differences between real and sham rTMS on any measure.

McClelland and colleagues (2013)[217] identified one RCT (Walpoth, Hoertnagl, Mangweth-Matzek, Kemmler, Hinterhölzel and Conca, 2008)[367] that investigated the efficacy of rTMS for regulating abnormal eating behaviour in adults with BN. Fourteen female participants first completed a one-week course of sham treatment which was intended to exclude participants who were highly susceptible to placebo, followed by randomisation into active or sham treatment groups for 3 weeks. For the active treatment group, high-frequency stimulation was delivered once daily for 3 weeks (weekdays only) by trained psychiatrists, while sham treatment mimicked active treatment using a specially designed sham coil. The average number of binges per day declined significantly between baseline and post-treatment, and scores on depression and obsessive-compulsive questionnaires improved. However, there were no significant differences between sham and treatment groups. Further research with higher number of patients is required to elucidate the role that rTMS may play in BN symptomatology.

Combination Therapies

Combined Cognitive Behavioural Therapy and Interpersonal Psychotherapy

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Hay (search date 2012)[163] identified one RCT (Nevonen and Broberg, 2006)[257] that randomly assigned 86 outpatients with BN to sequenced CBT (10 sessions) followed by interpersonal psychotherapy (13 sessions) in an individual or group format. The programs were Swedish adaptations of the CBT manual, Cognitive Behaviour Therapy for Binge Eating and Bulimia Nervosa: A Comprehensive Treatment Manual[113], and the interpersonal psychotherapy manual, Interpersonal Psychotherapy for Group[375]. Both conditions experienced a significant improvement on binge days per week, compensation days per week, dietary restraint, weight phobia, interpersonal problems, general psychopathology, and depression over the duration of the study and 1-year follow-up. The intention-to-treat analysis revealed no significant differences in remission and recovery rates. Among completers, group differences favouring the individual format were found on binge eating and compensatory behaviours. Moderate to large effects on some primary outcomes were maintained to 2-year follow-up.

Combined Cognitive Behavioural Therapy and Refeeding by Cyclic Enteral Nutrition

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Rigaud, Brayer, Roblot, Brindisi and Verges (2011)[287] evaluated whether tube feeding plus CBT produced greater reductions in binge purge episodes than CBT alone. The authors randomised 67 adult patients with BN to either CBT or CBT plus tube feeding. Cognitive behavioural therapy was delivered in 16 sessions over 4 months and followed protocol described by Wilson et al (2002)[381]. All patients participated in self-help groups and diet counselling. Abstinence from binging-eating/vomiting was the primary outcome, and was found to be significantly higher in patients receiving tube feeding plus CBT compared with patients receiving CBT alone, at end of treatment (81% vs 29%) as well as 12-month follow-up (68% vs 27%). Further, the addition of tube feeding to CBT produced greater improvements in biological markers, depressive state, anxiety and quality life.

Binge Eating Disorder in Adults

Behavioural Weight Loss

Behavioural weight loss interventions aim to assist individuals to make lifestyle changes in eating and exercise habits. Strict dieting and an ideal weight goal are discouraged – instead the emphasis is on healthy and balanced eating, a pattern of moderate and consistent dietary restraint, and an achievable, realistic, healthy weight range.

One systematic review (summarising 2 RCTs) and 2 RCTs evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Hay (search date 2012)[163] identified 2 RCTs[248,382] that evaluated behavioural weight loss for adults with BED. The first study (Munsch, Biedert, Meyer, Michael, Schlup, Tuch, and associates, 2007)[248] randomised 90 outpatients with BED to group behavioural weight loss or group CBT for 16 weeks. The CBT program used was Cognitive Behaviour Therapy for Binge Eating and Bulimia Nervosa: A Comprehensive Treatment Manual[113] and the behavioural weight loss program was an existing Swiss-German manual. Behavioural weight loss was superior to CBT on BMI kg/m2 at endpoint, although the difference was not clinically significant. There were no differences between conditions on objective binge days and BED diagnostic status at endpoint. There were no significant differences on abstinence from binge eating, objective binge days, and BED diagnosis at 12-month follow-up. In the completer group, behavioural weight loss was superior to CBT on BMI kg/m2, objective binge days and BED diagnosis at endpoint. There was no significant difference between completer groups on BMI kg/m2 at follow-up. The second study (Wilson, Wilfley, Agras and Bryson, 2010)[382] randomised 245 male and female adults with BED to 10 sessions of CBT guided self-help or 20 sessions of behavioural weight loss or interpersonal psychotherapy over 6 months. The manualised CBT guided self-help was therapist-guided and based on Fairburn's book *Overcoming Binge Eating*[109]; behavioural weight loss was based on an adaptation of the *National Institutes of Diabetes and Digestive and Kidney Disease's Diabetes Prevention Program's* manual[353]; and interpersonal psychotherapy was based on the treatment manual adapted for BN by Fairburn (1997)[108]. There was no significant group difference in binge eating, specific eating disorder psychopathology of body weight, shape, and eating concern or general psychopathology at post-treatment. At the 2-year follow-up, however, subjects in the 'specialty therapy' CBT guided self-help and interpersonal psychotherapy groups displayed significantly greater remission from binge eating than subjects in the behavioural weight loss group.

Level II Evidence

Grilo, White, Wilson, Gueorguieva and Masheb (2012)[151] examined rapid response to treatment in obese people with BED. Ninety adult participants were randomised to receive 16 60-minute group sessions of CBT or behavioural weight loss over 24 weeks. Patients were considered rapid responders if they had ≥70% reduction in binge eating by week 4. Rapid response was observed in a subset of all patients (67% of CBT patients and 47% of behavioural weight loss patients) but only predicted further improvements in patients receiving behavioural weight loss. Specifically, patients receiving CBT had similar levels of binge eating and eating disorder psychopathology irrespective of whether they were rapid responders or not, while patients receiving behavioural weight loss were significantly more likely to achieve binge-eating remission if they were rapid responders.

Hilbert, Hildebrandt, Agras, Wilfey and Wilson (2015)[174] examined the short- and long-term effects of rapid response across 3 different treatments for BED. Adults with BED (*N*=205) were randomised to receive manualised behavioural weight loss, CBT guided self-help or interpersonal psychotherapy over 24 weeks. Rapid response was defined as a ≥70% reduction in binge eating by the fourth week of treatment. The behavioural weight loss program was based on the National Institutes of Health Diabetes Prevention Program's manual (2002)[255]; the CBT guided self-help was based on Fairburn's book *Overcoming Binge Eating* (1995)[109]; and the interpersonal psychotherapy program was an adaptation of a program by Wilfley and colleagues (1998) [374]. The number of binge eating episodes in the preceding month were assessed using the eating disorder examination at 6-, 12-, 18- and 24-month follow-up, and remission was defined as full abstinence from objective binge episodes in the month preceding each assessment. By the 4th week of treatment, 71% of study participants displayed a rapid response to treatment, although there were no differences between treatment groups. Across all time points, the mean differences in remission rates between rapid and non-rapid responders were 27.3% in CBT guided self-help, 13.4% in

behavioural weight loss and 1.3% in interpersonal psychotherapy. Rapid responders had significantly higher rates of remission in patients receiving CBT guided self-help (at 6-, 12- and 18-month follow-up), but not in interpersonal psychotherapy or behavioural weight loss.

Behavioural Weight Loss Guided Self-Help

This approach refers to behavioural weight loss delivered in a self-help format during which short, usually weekly sessions are held with a therapist who monitors and supports implementation of the program.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Hay (search date 2012) identified one RCT (Grilo and Masheb, 2005)[153] that randomised 90 outpatients with BED to 3 conditions, behavioural weight loss guided self-help, CBT guided self-help or control. The CBT guided self-help manual used was Overcoming Binge Eating[109] and the behavioural weight loss guided self-help manual was the Lifestyle, Exercise, Attitudes, Relationships, and Nutrition (LEARN) program[46]. The 12-week trial found that CBT guided self-help was superior to behavioural weight loss guided self-help and attention control in relation to binge abstinence at endpoint. Cognitive behavioural therapy guided self-help was superior to behavioural weight loss guided self-help on objective binge eating, hunger, and cognitive restraint, while behavioural weight loss guided self-help was superior to control therapy on hunger and cognitive restraint. Intention-to-treat remission rates were 46% for CBT guided self-help, 18% for behavioural weight loss guided self-help, and 13% for control.

Cognitive Behavioural Therapy

Cognitive behavioural therapy (CBT) programs aim to alter unhelpful thinking processes and behaviours that maintain eating disorders. Cognitive behavioural therapy is grounded in cognitive behavioural theory. Cognitive behavioural therapy involves cognitive restructuring to challenge unhelpful thoughts and aims to reduce beliefs about the importance of shape, weight, eating and their control for defining one's self worth. Cognitive behavioural therapy programs directly address unhelpful behaviours that maintain eating disorders such as excessive dietary restriction, laxative and diuretic misuse, purging, and over-exercising. They may address additional factors implicated in eating disorder problems such as self-esteem, perfectionism, interpersonal functioning, and emotion regulation.

Three systematic reviews (summarising 9 RCTs) and 3 RCTs evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Koskina, Campbell and Schmidt (search date 2012)[192] identified one RCT (Riva, Baccheta, Cesa, Conti and Molinari, 2003)[291] that randomised 36 adult female BED patients to one of 3 treatment conditions or wait-list control for 6-weeks. The nutritional treatment group maintained a low calorie diet, participated in physical training and participated in 5 weekly dietician-led nutritional groups. The CBT group received the nutritional treatment in addition to a number of group and individual CBT sessions targeted at improving assertiveness, motivation to change, eating behaviour and self-esteem. The experiential cognitive therapy group received the nutritional treatment in addition to a number of experiential cognitive therapy sessions targeted at improving assertiveness and motivation to change, and virtual reality sessions targeted at assessing and modifying food-related anxiety and the subjects body experience. The CBT intervention was based on manuals by Fairburn (1985)[106]; the experiential cognitive therapy intervention was based on detailed protocols set out by Riva (2000)[290]; and the virtual reality intervention was based on the Virtual Reality for Body Image Modification virtual environment used in preliminary studies[288]. Eating control, binging frequency, weight loss and self-esteem levels improved from baseline to post-treatment in all treatment groups, but not waitlist control; depressive symptoms improved in experiential cognitive therapy and CBT treatment groups only; while a complete remission in depressive symptoms was experienced by the experiential cognitive therapy group alone. At 6-month follow-up, body satisfaction and self-esteem scores were significantly higher in the experiential cognitive therapy group compared to the other treatment groups.

Hay (search date 2012)[163] identified 7 RCTs that evaluated CBT for adults with BED[94,248,347]. The first

study (Tasca, Ritchie, Conrad, Balfour, Gayton, Lybanon et al., 2006)[347] randomised 135 adult outpatients with BED to group CBT, group psychodynamic interpersonal psychotherapy, or wait-list control (unpublished treatment manuals). After the 16-week treatment, patients treated with group CBT and group psychodynamic interpersonal psychotherapy showed significantly greater improvement on binge days, interpersonal problems and restraint, relative to wait-list control. Group CBT only showed significant improvement on hunger relative to control, and group psychodynamic interpersonal psychotherapy only showed significantly greater improvement on depression relative to control. No significant differences between the treatment groups compared to wait-list control were observed on the outcomes of BMI kg/m2 and self-esteem. From pre- to post-treatment there were no significant differences between the group CBT and the group psychodynamic interpersonal psychotherapy on the outcomes of BMI kg/m2, days binged, depression, self-esteem, interpersonal problems, restraint, and hunger. There were significant improvements in follow-up measures in days binged and hunger within the active treatments and no between-treatment differences. There was no significant change in BMI kg/m2 from pre-treatment to 12-month follow-up within active treatments. There was a significant reduction in depression from pre-treatment to 6-month follow-up within treatments. The psychodynamic interpersonal psychotherapy group had greater improvement in self-esteem from pre-treatment to 6-month follow-up.

The second study (Munsch, Biedert, Meyer, Michael, Schlup, Tuch, et al., 2007)[248] randomised 80 overweight patients with BED to group CBT or group behavioural weight loss for 16 weeks. The CBT program used was Cognitive Behaviour Therapy for Binge Eating and Bulimia Nervosa: A Comprehensive Treatment Manual[113] and the behavioural weight loss program was an existing Swiss-German manual. An intent-to- treat endpoint analysis identified CBT as superior to behavioural weight loss on abstinence from binge eating. There were no significant differences between the 2 conditions in relation to objective binge days and BED diagnosis. At 12-month follow-up there were no significant differences between CBT and behavioural weight loss on abstinence from binge eating, BMI kg/m2, objective binge days, and BED diagnosis in intent-to-treat. The completer analysis showed that CBT was superior to behavioural weight loss on abstinence from binge eating, BMI kg/m2, objective binge days, and BED diagnosis.

The third study (Dingemans, Spinhoven, and van Furth, 2007)[94] randomised 52 outpatients with BED to CBT or wait-list control to identify mediators and predictors of treatment outcomes. The CBT manual used was not specified. At the 10-week study endpoint, CBT-treated patients were superior on global eating disorder psychopathology, dietary restraint, eating concern, weight concern, general psychopathology, depression, a specific coping style, and binge abstinence during the previous 28 days compared to wait-list control. There were no significant differences between groups over time on subjective eating episodes, objective eating episodes, and other specific coping styles. One year follow-up of CBT and the former wait-list control group who were subsequently offered CBT showed significant improvement on objective binge eating episodes, subjective binge eating episodes, objective overeating, BMI kg/m2, dietary restraint, eating concern, shape concern, psychological symptoms, and changes in coping strategies.

The fourth study (Schlup, Munsch, Meyer, Margraf, and Wilhelm, 2009)[306] randomised 36 female outpatients with BED to a short-term group CBT followed by 5 booster sessions or wait-list control. The CBT program was adapted to a short-term group format from the manual, Cognitive Behavioural Therapy for Binge Eating and Bulimia Nervosa: A Comprehensive Treatment Manual[113]. At 8-week endpoint, a significantly larger pre- post difference was observed in the group CBT with booster sessions on binge eating abstinence, objective binge episodes, and eating concern. No significant differences were observed on BMI kg/m2, subjective binge episodes, weight concern, shape concern, restraint, depression, anxiety, self-efficacy, and life satisfaction. Twelve-month follow-up outcomes of group CBT with booster sessions revealed significant improvements on binge eating abstinence, objective binge eating episodes, BMI kg/m2, subjective binge episodes, weight concern, shape concern, eating concern, restraint, depression and life satisfaction. No significant improvements were observed on anxiety or self-efficacy. Rate of abstinence from binge eating (in the previous 28 days) was higher at endpoint among those treated with CBT and booster sessions at 39% compared to 0% for wait-list control. Schlup concluded that short-term CBT with booster sessions was an efficacious treatment for BED in the short- and long-term.

The fifth RCT (Peterson, Mitchell, Crow, Crosby and Wonderlich, 2009)[271] identified by Hay[163] randomised 259 adults with BED to 20 weeks of therapist-led CBT, therapist-assisted CBT, CBT self-help group treatment or waitlist control. The CBT

manual was not specified. An intent-to-treat analysis identified significantly different rates of abstinence from binge eating post-treatment (end of treatment: therapist-led group, 52%; therapist-assisted group, 33%; self-help group, 18%; waiting list group, 10%; at the 6-month follow-up: therapist-led group, 43%; therapist-assisted group, 23%; self-help group, 19%; at the 12-month follow-up, therapist-led group, 21%; therapist- assisted group, 27%; self-help group, 25%). Abstinence rates were significantly higher in the therapist-led and therapist-assisted groups compared to waitlist controls. Therapist-led CBT also led to greater reductions in binge eating frequency, and lower attrition compared to group self-help treatment.

Another RCT (Castelnuovo, Manzoni, Villa, Cesa and Molinari, 2011)[61] identified by Hay[163] randomised 60 adult women with BED and obesity to CBT or Brief Strategic Therapy (BST) in an inpatient and telephone-based outpatient program for 7 months. This study was based on a comprehensive 2-phase stepped down program designed by the study authors called STRATOB (Systemic and STRATegic psychotherapy for OBesity), which had, as its core features, the inpatient intensive treatment and the continuity of care at home using a low-level of telecare (mobile phones). Cognitive behavioural therapy was based on methods described by Cooper and Fairburn (1990)[73], and BST was based on the brief strategic approach described by Nardone and Portelli (2005)[252]. There was no significant difference between CBT and BST at discharge; however, subjects in the BST group had significantly greater remission from binge episodes at 6 months compared to subjects in the CBT group.

Hay[163] identified another RCT (Grilo, Masheb, Wilson, Gueorguieva and White, 2011) that randomised 125 obese patients with BED to manualised group CBT, behavioural weight loss or CBT + behavioural weight loss. At 12-month follow-up, CBT produced significantly greater reductions in binge eating than behavioural weight loss (51% vs 36%), while behavioural weight loss produced significantly greater percent BMI loss during treatment. Cognitive behavioural therapy + behavioural weight loss also produced a decrease in BMI but this loss was attributable to the significant effects of the component. Remission from binge eating was associated with significantly greater percent of BMI loss.

Level II Evidence

Brownley and colleagues (2016)[47] conducted a systematic review and meta-analysis of pharmacologic and psychological treatment options for adults with binge-eating disorder. They identified one RCT (Peterson et al., 2001)[272] that randomised 51 women with BED to one of three group CBT delivery models. Therapist-led CBT included psychologist-delivered psychoeducational information and group discussion; partial self-help included a short psychoeducational video and therapist-led discussion; and structured self-help included a psychoeducational video and a group-moderated discussion. Binge eating and associated symptoms were improved at the end-of treatment and at up to 1-year follow-up, with no significant differences between groups.

ter Huurne and colleagues (2015)[179] randomised 85 women with BED to receive the web-based CBT program "Look at your eating"[180] or waitlist control. The intervention was delivered as a 2-part program that aimed to analyse eating attitudes and behaviours (part 1) and contribute to behavioural change (part 2). Participants completed the sessions in their own time and were considered completers after submitting 10 assignments and participating in at least 21 sessions. Eating disorder psychopathology improved over time for both groups, but body dissatisfaction and physical health were significantly higher in web-based CBT participants compared with waitlist controls.

An RCT by Hilbert and colleagues (2012)[173] evaluated the long-term efficacy of psychological treatments for BED. Ninety adults with BED were randomised to receive manualised outpatient group CBT or interpersonal psychotherapy. Both treatments consisted of 20 weekly 90-minute group sessions plus 3 individual sessions, with long-term follow up assessments conducted 4 years following end of treatment. Both treatments groups displayed substantial, long-term treatment efficacy at follow-up, with 64% of patients exhibiting a full recovery from binge eating and 58% exhibiting a clinically significant improvement in eating disorder psychopathology. There were no significant differences between treatment groups on any measure at any single time point, indicating that interpersonal psychotherapy is a viable treatment alternative to the more commonly administered CBT for BED.

Grilo, White, Wilson, Gueorguieva and Masheb (2012)[151] examined rapid response to treatment in obese people with BED. Ninety adult participants were randomised to receive 16 60-minute group sessions of CBT or behavioural weight loss over 24 weeks. Patients were considered rapid responders if they had ≥70% reduction in binge eating by week 4. Rapid response was observed in a subset of all

patients (67% of CBT patients and 47% of behavioural weight loss patients) but only predicted further improvements in patients receiving behavioural weight loss. Specifically, patients receiving CBT had similar levels of binge eating and eating disorder psychopathology irrespective of whether they were rapid responders or not, while patients receiving behavioural weight loss were significantly more likely to achieve binge-eating remission if they were rapid responders.

Cognitive Behavioural Therapy Guided Self-Help

This approach refers to CBT delivered in a self-help format during which short, usually weekly sessions are held with a therapist who monitors and supports implementation of the program.

Three systematic reviews (summarising 4 RCTs) and one RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Hay (search date 2012)[163] identified 2 RCTs[153,382] that evaluated CBT guided self-help for adults patients with BED. One study (Grilo and Masheb, 2005)[153] randomised 90 outpatients with BED to behavioural weight loss guided self-help, CBT guided self-help, and attention control. The self-help manual used was Overcoming Binge Eating[109]. At 12-week endpoint, CBT guided self-help was superior to both control and behavioural weight loss guided self-help on binge abstinence. CBT guided self-help was superior to attention control on eating concern, hunger, cognitive restraint, and self-esteem. Cognitive behavioural therapy guided self-help was superior to behavioural weight loss guided self-help on objective binge eating, hunger, and cognitive restraint. The second study (Wilson, Wilfley, Agras and Bryson, 2010)[382] randomised 245 male and female adults with BED to 10 sessions of CBT guided self-help or 20 sessions of behavioural weight loss or interpersonal psychotherapy over 6 months. The manualised CBT guided self-help was therapist-guided and based on Fairburn's book ***Overcoming Binge Eating***[109]; behavioural weight loss was based on an adaptation of the *National Institutes of Diabetes and Digestive and Kidney Disease's Diabetes Prevention Program's* manual[353]; and interpersonal psychotherapy was based on the treatment manual adapted for BN by Fairburn (1997)[108]. There was no significant group difference in binge eating, specific eating disorder psychopathology of body weight, shape, and eating concern or general psychopathology at post-treatment. At the 2-year follow-up, however, subjects in the 'specialty therapy' CBT guided self-help and interpersonal psychotherapy groups displayed significantly greater remission from binge eating than subjects in the behavioural weight loss group.

Hay and colleagues (search updated to August 2009)[167] reported on one RCT[56] (*N*=58) that compared CBT guided self-help to wait-list control as well as pure self-help CBT. Comparisons favoured CBT guided self-help to waitlist control on remission rate, bulimic symptoms, general psychiatric symptom severity, but there were no statistically significant differences between groups on overall drop-out rate and weight/BMI. Comparisons favoured CBT guided self-help to CBT pure self-help on overall drop-out rate, but there were no statistically significant differences for remission rate, bulimic symptoms, depression symptoms, general psychiatric symptoms, and weight/BMI.

Level II Evidence

Hilbert, Hildebrandt, Agras, Wilfey and Wilson (2015)[174] examined the short- and long-term effects of rapid response across 3 different treatments for BED. Adults with BED (*N*=205) were randomised to receive manualised behavioural weight loss, CBT guided self-help or interpersonal psychotherapy over 24 weeks. Rapid response was defined as a ≥70% reduction in binge eating by the fourth week of treatment. The behavioural weight loss program was based on the National Institutes of Health Diabetes Prevention Program's manual (2002)[255]; the CBT guided self-help was based on Fairburn's book *Overcoming Binge Eating* (1995)[109]; and the interpersonal psychotherapy program was an adaptation of a program by Wilfley and colleagues (1998) [374]. The number of binge eating episodes in the preceding month were assessed using the eating disorders at 6-, 12-, 18- and 24-month follow-up, and remission was defined as full abstinence from objective binge episodes in the month preceding each assessment. By the fourth week of treatment, 71% of study participants displayed a rapid response to treatment, although there were no differences between treatment groups. Across all time points, the mean differences in remission rates between rapid and non-rapid responders were 27.3% in CBT guided self-help, 13.4% in behavioural weight loss and 1.3% in interpersonal psychotherapy. Rapid responders had significantly higher rates of remission in patients receiving CBT guided self-help (at 6-, 12- and 18-month follow-up), but not in interpersonal psychotherapy or behavioural weight loss.

Dolemeyer and colleagues (search date 2012)[96] identified one RCT (Carrard, Crepin, Rouget, Lam, Golay et al., 2011)[53] of good methodological quality that compared internet-based guided self-help CBT to waitlist control in 74 adult (>18 years of age) female participants. The content for the French language 11-module, 6-month intervention was based on a previous online program, the ***SALUT*** project, inspired by CBT techniques outlined in the self-help manual ***Overcoming Binge Eating***[109]. Guidance was provided by weekly email contact with a coach who ensured participants were interacting correctly with the program. Intervention resulted in significant improvements to abstinence rate, binge eating behaviour, drive for thinness, body dissatisfaction and interoceptive awareness compared to controls. Results in all cases were maintained or improved at 6-month follow-up.

Cognitive Behavioural Therapy Pure Self-Help

This approach refers to CBT delivered in a pure self-help format. The individual follows a step-by-step program (usually written up as a book) and implements the treatment program independently.

One systematic review (summarising one RCT) and 3 RCTs evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Hay and colleagues (search updated to June 2009)[167] reported on one RCT[56] that compared CBT pure self-help to wait-list control and to CBT guided self-help. Comparisons of CBT pure self-help to wait-list control favoured CBT pure self-help at post-treatment on remission rate only (*N*=48), but there were no statistically significant differences between groups on overall drop-out rate (*N*=48) and binge frequency (*N*=48). Comparisons of CBT pure self-help to CBT guided self-help favoured CBT pure self-help for drop-out rate (*N*=69), but there was no statistically significant differences for post-treatment on remission rate (*N*=69), bulimic symptoms (*N*=69), depression symptoms (*N*=69), general psychiatric symptoms (*N*=69), rate of drop-out due to adverse events (*N*=58) and weight/BMI (*N*=69).

Level II Evidence

An RCT was conducted by Grilo, White, Masheb and Gueorguieva (2015)[156] to evaluate whether rapid response of BED patients was related to patient characteristics and outcomes. Obese BED patients (*N*=104) were randomised to one of 4 16-week treatments in a racially/ethnically diverse primary care setting: sibutramine (anti-obesity medication), placebo, sibutramine + CBT pure self-help or placebo + CBT pure self-help. Rapid response characterised 47% of patients, was significantly associated with remission from binge eating at post-treatment, 6-month and 12-month follow-ups, and was unrelated to any demographic or baseline clinical characteristics. Rapid responders also had significantly greater decreases in binge-eating or eating disorder psychopathology, depression and weight loss compared with non-rapid responders.

Grilo and colleagues (2014)[154] evaluated whether BED treatments with demonstrated efficacy when delivered in specialist treatment centres could be delivered effectively in primary care settings. Ethnically diverse obese patients with BED (*N*=104) were randomised to one of 4 16-week treatments: sibutramine (anti-obesity medication), placebo, sibutramine + CBT pure self-help or placebo + CBT pure self-help. Patients receiving sibutramine, but not placebo, displayed significant weight loss changes over time. There were significant differences between sibutramine and placebo from the third month to end of treatment, but not at 6- and 12-month follow-up.

An RCT by Grilo, White, Gueorguieva, Barnes and Masheb (2013)[155] examined the efficacy of CBT pure self-help as first line primary care intervention for ethnically/racially diverse obese patients with BED. Patients (*N*=48) were randomised to receive CBT pure self-help or usual care for 3 months. Patients in the CBT pure self-help group received a self-help treatment manual *Overcoming Binge Eating*[109] while usual care provided no additional intervention. At the end of treatment, patients receiving CBT pure self-help had significantly reduced binge eating while patients receiving usual care did not. However, there were no significant group differences on any measure or time point.

Dialectical Behavioural Therapy

Dialectical behaviour therapy is based on an emotion regulation model of eating disorders, which proposes that disordered eating arises because it assists the individual to manage intolerable emotional states if the individual has few adaptive coping strategies. The therapy is aimed at assisting the individual to tolerate and manage emotional states.

Two systematic reviews (summarising 4 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Godfrey, Gallo and Afari (search date 2013)[134] identified one RCT (Telch, Agras, & Linehan, 2001)[351] that randomised 44 women with BED to a 20-week program of dialectical behavioural therapy or wait-list control. At the end of the 20 weeks, completer outcomes only were analysed. Those in the dialectical behavioural therapy group had better outcomes on binge days per month, binge episodes per month, shape concern, weight concern, and eating concern. There were no between-group differences in dietary restraint, weight, depression, self-esteem or other measures of psychopathology at post- treatment. At 3-month follow-up, 67% of the dialectical behavioural therapy completers were abstinent from binge eating and after 6 months 56% were abstinent. Abstinence rates for the wait-list control group were not available for comparison as these individuals were offered treatment subsequent to the acute trial phase. A treatment manual has been published titled *Dialectical Behaviour Therapy for Binge Eating and Bulimia*[301].

Godfrey, Gallo and Afari reported on one RCT (Masson, von Ranson, Wallace and Safer, 2013)[213] that randomised 60 adults (predominantly female) to a phone-based guided self-help dialectical behavioural therapy treatment or wait-list control over 13 weeks. Subjects in the treatment condition received a dialectical behavioural therapy for BED self-help manual, which was based on previous manuals (see Safer, 2010)[300] and included psychoeducation components, activities and exercises. The aim of the treatment was to reduce binge eating by teaching subjects mindfulness, distress tolerance and emotion regulation. At the end of treatment, dialectical behavioural therapy guided self-help subjects reported significantly fewer binge episodes and significantly greater abstinence in the preceding month than controls. At 6-month follow-up, dialectical behavioural therapy guided self-help subjects reported significant reductions in eating disorder psychopathology and improvements in quality of life compared to baseline scores.

In another RCT (Safer, Robinson and Jo, 2010)[300] identified by Godfrey, Gallo and Afari (search date 2013)[134] , 110 adult males and females were randomised to manual-based group dialectical behavioural therapy for BED or active comparison group therapy. Both treatments consisted of 20, 2-hour weekly sessions over 21 weeks. The dialectical behavioural therapy for BED manual was based on a dialectical behavioural therapy manual originally developed for borderline personality disorder but adapted for BED by Telch[351], and emphasised mindfulness, emotion-regulation and distress tolerance. The comparison therapy was intended to be credible enough to generate therapeutic factors similar to dialectical behavioural therapy for BED, such as therapeutic alliance and optimism, without the elements unique to dialectical behavioural therapy for BED (see Safer and Hugo for discussion)[298]. Both treatment groups showed post-treatment and 12-month follow-up improvements in abstinence rates (dialectical behavioural therapy for BED: 64% post-treatment and 64% at follow-up; active comparison group therapy: 36% post-treatment and 56% at follow-up), although the differences between treatments were not significant. Dialectical behavioural therapy for had a significantly lower dropout rate (4%) than active comparison group therapy (33.3%).

Hay (search date 2012)[163] identified 2 RCTs[299,300] that evaluated dialectical behavioural therapy for adults with BED. One study[300] was identified by Godfrey, Gallo and Afari[134] and will not be described further here. The second study (Safer and Joyce, 2011)[299] examined whether rapid response (RR - defined as an early substantial decline in symptoms within the first 1-4 weeks of treatment) to treatment could predict outcomes of 2 previously unexplored treatments, dialectical behavioural therapy and active comparison group therapy. Adults with BED (*N*=101) were randomised to 20 weeks of dialectical behavioural therapy for BED or active comparison group therapy, and RR was defined as a ≥65% reduction in the frequency of binge eating by week 4. Binge eating abstinence was significantly higher for rapid-responders at the end of treatment (71% vs 33%) as well as at one-year follow-up (71% and 40%) for subjects receiving dialectical behavioural therapy but not active comparison group therapy. Rapid responders also had significantly lower rates of attrition than non-rapid responders.

Bankoff, Karpel, Forbes and Pantalone (2012)[26] identified one RCT (Safer, Robinson and Jo, 2010)[300] that evaluated dialectical behavioural therapy for BED, but as this was included in the systematic review by Godfrey, Gallo and Afari (search date 2013)[134], it will not be described further here.

Level II Evidence

There was no level II evidence available.

Interpersonal Psychotherapy

Interpersonal psychotherapy is based on interpersonal theory and aims to target interpersonal issues that are theorised to contribute to the development and maintenance of an eating disorder. Interpersonal psychotherapy addresses four theoretical interpersonal problem areas of grief, interpersonal disputes, role transitions, and interpersonal deficits.

One systematic reviews (summarising one RCT) and 2 RCTs evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Hay (search date 2012)[163] identified one RCT (Wilson, Wilfley, Agras and Bryson, 2010)[382] that randomised 245 male and female adults with BED to 10 sessions of CBT guided self-help or 20 sessions of behavioural weight loss or interpersonal psychotherapy over 6 months. The manualised CBT guided self-help was therapist-guided and based on Fairburn's book *Overcoming Binge Eating*[109]; behavioural weight loss was based on an adaptation of the *National Institutes of Diabetes and Digestive and Kidney Disease's Diabetes Prevention Program's* manual[353]; and interpersonal psychotherapy was based on the treatment manual adapted for BN by Fairburn (1997)[108]. There was no significant group difference in binge eating, specific eating disorder psychopathology of body weight, shape, and eating concern or general psychopathology at post-treatment. At the 2-year follow-up, however, subjects in the 'specialty therapy' CBT guided self-help and interpersonal psychotherapy groups displayed significantly greater remission from binge eating than subjects in the behavioural weight loss group.

Level II Evidence

An RCT by Hilbert and colleagues (2012)[173] evaluated the long-term efficacy of psychological treatments for BED. Ninety adults with BED were randomised to receive manualised outpatient group CBT or interpersonal psychotherapy. Both treatments consisted of 20 weekly 90-minute group sessions plus 3 individual sessions, with long-term follow up assessments conducted 4 years following end of treatment. Both treatments groups displayed substantial, long-term treatment efficacy at follow-up, with 64% of patients exhibiting a full recovery from binge eating and 58% exhibiting a clinically significant improvement in eating disorder psychopathology. There were no significant differences between treatment groups on any measure at any single time point, indicating that interpersonal psychotherapy is a viable treatment alternative to the more commonly administered CBT for BED.

Hilbert, Hildebrandt, Agras, Wilfey and Wilson (2015)[174] examined the short- and long-term effects of rapid response across 3 different treatments for BED. Adults with BED (*N*=205) were randomised to receive manualised behavioural weight loss, CBT guided self-help or interpersonal psychotherapy over 24 weeks. Rapid response was defined as a ≥70% reduction in binge eating by the fourth week of treatment. The behavioural weight loss program was based on the National Institutes of Health Diabetes Prevention Program's manual (2002)[255]; the CBT guided self-help was based on Fairburn's book *Overcoming Binge Eating* (1995)[109]; and the interpersonal psychotherapy program was an adaptation of a program by Wilfley and colleagues (1998) [374]. The number of binge eating episodes in the preceding month were assessed using the EDE at 6-, 12-, 18- and 24-month follow-up, and remission was defined as full abstinence from objective binge episodes in the month preceding each assessment. By the fourth week of treatment, 71% of study participants displayed a rapid response to treatment, although there were no differences between treatment groups. Across all time points, the mean differences in remission rates between rapid and non-rapid responders were 27.3% in CBT guided self-help, 13.4% in behavioural weight loss and 1.3% in interpersonal psychotherapy. Rapid responders had significantly higher rates of remission in patients receiving CBT guided self-help (at 6-, 12- and 18-month follow-up), but not in interpersonal psychotherapy or behavioural weight loss.

Medication

Anticonvulsant Medication

Many anticonvulsant medications have effects on weight, appetite and the neural systems involved in regulating eating and weight control. As such, they may hold therapeutic value for treating eating disorders.

One systematic review (summarising 3 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Brownley and colleagues (2016)[47] conducted a systematic review and meta-analysis of pharmacologic and psychological treatment options for adults with binge-eating disorder. They

identified three RCTs that randomised male and female patients with DSM-IV BED to anticonvulsant medication or placebo. One double-blind RCT (Guerdjikova et al., 2009)[159] randomised 51 patients with BED and obesity to 16 weeks of flexible-dose lamotrigine or placebo. Lamotrigine (236 ± 150 mg/day) was well tolerated and did not produce and serious adverse effects. Compared with placebo, lamotrigine led to significantly greater reductions in weight and levels of glucose, insulin and triglycerides, but did not significantly impact on binge eating frequency, measures of eating pathology, impulsivity or global illness severity.

Two RCTs identified by Brownley and colleagues evaluated the antiepileptic medication topiramate compared with placebo. One study (McElroy et al., 2003)[219] randomised 61 outpatients with BED and obesity to a 14-week, double-blind, flexible-dose trial of topiramate or placebo. Compared with placebo, topiramate (25-600mg/day) significantly reduced binge frequency, BMI, weight and scores on the Obsessive Compulsive Scale. The second study (McElroy et al., 2007)[225] randomised 394 patients with BED to a 16-week, double-blind, parallel-group, flexible-dose outpatient trial of topiramate or placebo. Compared with placebo, topiramate led to significant reductions in binge eating, weight and BMI.

Level II Evidence

There was no level II evidence available.

Antidepressant Medication

Serotonergic neurotransmission abnormalities have been theorised to contribute to eating disorders. Antidepressant medication seeks to improve serotonergic neurotransmission.

One systematic review (summarising 2 RCTs) and 2 RCTs evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Brownley and colleagues (2016)[47] conducted a systematic review and meta-analysis of pharmacologic and psychological treatment options for adults with binge-eating disorder. They identified two RCTs that randomised male and female patients with DSM-IV BED to antidepressant medication or placebo. One double-blind flexible dose study (Guerdjikova et al., 2008)[158] randomized 44 obese patients to 12 weeks of the SSRI esciptalopram (10-30mg/day) or placebo. Compared with placebo, high-dose escitalopram (mean dose 26.5 mg/day) led to significantly greater reductions in weight, BMI and global illness severity, but not binge episode frequency, binge day frequency, or obsessive compulsive features of binge eating symptoms. A second double-blind study (McElroy et al., 2000)[220] randomly assigned 34 outpatients with BED to 6 weeks of sertraline or placebo treatment. Compared with placebo, sertraline led to a greater reduction in the frequency of binges, clinical global severity and BMI along with a greater rate of increase in clinical global improvement.

Level II Evidence

White and Grilo (2013)[371] evaluated the short-term efficacy of bupropion for the treatment of BED in overweight and obese women (*N*=61). Participants were randomised to bupropion treatment (300mg/daily) or placebo for 8 weeks. Bupropion treatment resulted in significantly greater weight loss than placebo (1.8% vs 0.6% BMI loss). Treatment groups did not differ significantly on eating disorder psychopathology, food craving, or depression levels. At end of treatment, participants in the bupropion condition lost significantly more weight (based on percent of BMI) than those in the placebo condition (bupropion condition: 1.68kg; placebo: 0.43kg). There were no other group differences on any other measure.

An RCT by Grilo, Crosby, Wilson and Masheb (2012) assessed the long term efficacy of SSRI antidepressants for BED. Eighty-one overweight patients with BED were randomised to receive fluoxetine (60mg/day), fluoxetine + CBT (Fairburn & Cooper, 1993)[110], or CBT + placebo. Remission rates (as per intent-to-treat analysis) varied significantly across treatments at end of treatment, 6-month and 12-month follow-up, with the highest remission rates observed in the CBT + placebo group (36%), followed by fluoxetine + CBT (27%) then fluoxetine-only (4%). A significant main effect of treatment was found on all clinical outcome variables, except for weight, across all time points. While CBT treatment groups did not differ from each other, both were significantly more effective than fluoxetine-only on the majority of outcome variables.

Central Nervous System Stimulant

Abnormalities in eating behaviour characteristic of BED, such as pathological overeating, are thought to involve dysfunctions in dopamine and norephinephrine circuitry. Central nervous stimulants such as lisdexamfetamine dimesylate

(LDX) act on these systems by increasing levels of circulating dopamine and norephinephrine.

One systematic review (summarising 3 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Citrome and colleagues (search date 2015)[71] conducted a systematic review of the safety and efficacy of the central nervous system stimulant LDX for the treatment of BED. Lisdexamfetamine dimesylate is the first pharmacological agent that has received approval for the treatment of BED. Three randomised, double-blind, placebo-controlled clinical trials (from 2 publications)[224,226] were summarised, and the number needed to treat (NNT) and number needed to harm (NNH) were calculated. The NNT and NNH are measures of effect size that reflect the number of patients that would need to be treated with an agent compared to a comparison agent in order to detect one additional 'outcome of interest'. Large differences between the agent and the comparator are reflected by small NNTs (generally in the single digits) while a small number of undesirable events or harm induced by an agent are reflected by large NNHs (generally in the double digits). The ratio of NNH to NNT can be calculated to quantify the trade-offs between efficacy and tolerability, and reflects the likelihood to be helped or harmed (LLH) by a medication.

The 3 clinical trials reviewed by Citrome and colleagues included one 11-week Phase 2 proof-of-concept trial[226] that randomised 259 adults with moderate to severe BED to 30, 50 or 70mg/day of LDX, or placebo, and 2 12-week Phase 3 clinical trials[224] that randomised 379 and 366 adults with moderate or severe BED to 50 or 70 mg/day of LDX or placebo. Both 50 and 70mg/day of LDX significantly reduced BED symptoms as measured by the number of binge eating days per week. Pooling these studies, the LLH was 14.7 for response to treatment, and 11 for remission, indicating that LDX is about 15 times more likely to result in a therapeutic effect and 11 times more likely to result in remission than a discontinuation due to an adverse effect. This study demonstrated that short-term treatment of BED with LDX produces robust therapeutic effects with highly robust effect sizes. Long term clinical trials are required to further characterise the safety profile of this agent and to examine the maintenance of efficacy.

Fornaro and colleague (2016)[127] identified two RCTs[224,226] that were included in the systematic review by Citrome and colleagues[71], so these are not discussed further here.

Level II Evidence

There was no level II evidence available.

Endocannabinoid Agonist Medication

The endocannabinoid system plays a central function in modulating appetitive behaviours and has well described orexigenic effects. The cannabinoid system is also involved in metabolic processes controlling energy homeostasis through interactions with molecular targets (such as leptin) involved in peripheral fat metabolism. The cannabinoid CB1 receptor accounts for most of the psychotropic effects of 9-tetrahydrocannabinol (THC). Several studies have evaluated CB1 in AN induced by causes other than AN (e.g. alongside cancer or aids), but limited attention has been given to its potential as a treatment for AN. The study reviewed here administered the CB1 antagonist rimonabant, which was the first blocker of G protein-coupled CB1 cannabinoid receptors marketed for the treatment of obesity and has been shown to have anorexigenic effects.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Pataky and colleagues (2012)[264] conducted a multicentre, double-blind RCT assessing the effect of the cannabinoid CB1receptor antagonist rimonabant on body weight in obese patients with BED. Two hundred and eighty-nine patients with BED were randomised to receive rimonabant (20mg/day) or placebo for 6 months. The rate of completion, emergent adverse effects and discontinuations due to adverse effects was similar in both groups. Participants treated with rimonabant had significantly greater reductions in both body weight (4.7% vs 0.4%) and the total binge eating scale score. This study presents data from the first RCT examining the effects of rimonabant on BED, and study authors conclude the outcomes on weight loss to be clinically significant and equivalent or greater than the effect of other existing medications.

Glutamate Receptor Antagonist Medication

The glutamate system plays a role in the regulation of food intake and addictive behaviours, and has recently been implicated in binge eating. The study outlined here assesses the role of a glutamate NDMA receptor antagonist, acamprosate, which has previously been reported to reduce food craving and weight gain.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

McElroy and colleagues (2011)[223] conducted a 10-week, flexible-dose RCT with 40 BED outpatients receiving either acamprosate or placebo. All participants received 1998 mg daily over the first 2 weeks, followed by state-dependent increases (up to 2997 mg daily) or decreases (to a minimum of 999 mg daily) depending on response (increases occurred as long as tolerated, to maximise response; decreases occurred if adverse effects were encountered). Acamprosate treatment was associated with significant improvements in binge day frequency and measures of obsessive-compulsiveness of binge eating, food craving, and quality of life on the end-point analysis; however the longitudinal analysis was non-significant across all measures.

Norepinephrine Reuptake Inhibitors

Norepinephrine reuptake inhibitors increase the effects of norephinephrine and epinephrine and have psychostimulant effects. They are most commonly used to treat ADHD and narcolepsy, but have also been prescribed for obesity due to their appetite suppressant effects. The single study evaluating norepinephrine reuptake inhibitors prescribed the medication atomoxetine, which has been shown to reduce food consumption in animal models of feeding and is associated with anorexia and weight loss in clinical trials for ADHD.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Brownley and colleagues (2016)[47] conducted a systematic review and meta-analysis of pharmacologic and psychological treatment options for adults with binge-eating disorder. They identified one double-blind RCT (McElroy et al., 2007)[222] that randomised 40 outpatients with BED to 10 weeks of flexible dose (40-120 mg/day) atomoxetine or placebo. Compared with placebo, atomoxetine was associated with a significantly greater rate of reduction in binge-eating episode frequency, binge day frequency, weight, BMI, illness severity and obsessive compulsiveness.

Nutritional Supplements

Nutritional supplements have been used clinically with people with eating disorders because of vitamin deficiencies in the diet. The study included here assesses the efficacy of chromium, an essential mineral that enhances insulin and serotonergic activity, as a treatment for BED.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Brownley, Von Holle, Hamer, La Via and Bulik (2013)[48] randomised 24 overweight adults with BED to 6 months of moderate or high dose chromium picolinate (600 or 1000mcg/day) or placebo. Post-treatment, fasting glucose levels were significantly reduced in both chromium groups compared to placebo (with larger effects in the high dose group), but there was no significant difference in binge eating frequency, weight and symptoms of depression.

Obesity Medication

Obesity medication has been trialled to promote weight loss among individuals with BED. The rationale for this approach is that obesity is often comorbid with BED, due to the excessive energy intake relative to expenditure, and a high BMI can precipitate disordered eating, such as extreme dietary restriction.

One systematic review (summarising one RCT) and one RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Brownley and colleagues (2016)[47] conducted a systematic review and meta-analysis of pharmacologic and psychological treatment options for adults with binge-eating disorder. They identified one double-blind RCT by Golay and colleagues (2005)[136] that randomised 89 obese patients with BED to 24 weeks of treatment with orlistat (120 mg, 3x/daily) or placebo in combination with a mildly reduced-calorie diet. Compared with placebo, orlistat led to significantly improved end-of-treatment scores on the Eating Disorders Inventory 2 and significantly reduced weight.

Grilo and colleagues (2014)[154] evaluated whether BED treatments with demonstrated efficacy when delivered in specialist treatment centres could be delivered effectively in primary care settings. Ethnically diverse obese patients with BED (*N*=104) were randomised to one of 4 16-week treatments: sibutramine (anti-obesity medication), placebo, sibutramine + CBT pure self-help or placebo + CBT pure self-help. Patients receiving sibutramine, but not placebo, displayed significant weight loss changes over time. There were significant differences between sibutramine and placebo from the third month to end of treatment, but not at 6- and 12-month follow-up.

Opioid Antagonist Medication

The endogenous opioid system is involved in eating behaviour, and preclinical studies with animals have demonstrated that opioid agonists enhance, while opioid antagonists suppress, binge eating behaviour. The study outlined below evaluates the efficacy of the new oral opioid antagonist ALKS-33, which may be safer than available alternatives because it does not undergo extensive first-pass metabolism by the liver and thereby may have reduced hepatoxicity.

One RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

McElroy and colleagues (2013)[221] conducted a proof-of-concept RCT to assess the effectiveness of the novel opioid antagonist ALKS-33 in BED. Sixty-two outpatients with obesity and BED were randomised to receive ALKS-33 or placebo for 6 weeks. Binge eating frequency decreased in both groups, but there were no significant differences between treatment groups on binge eating frequency, body weight or eating pathology.

Mindfulness-Based Therapies

Mindfulness is characterised by 2 key components: attention to present-moment experiences and a state of openness or acceptance towards these experiences. Regarding binge eating behaviour, mindfulness-based therapies conceptualise dietary restraint as one pathway to binge eating while negative affect, interoceptive awareness and emotional eating represent a second pathway [134]*. Amongst other aspects of binge eating, mindfulness principles have been aimed at improving eating regulation and awareness of hunger and fullness.*

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Godfrey, Gallo and Afari (search date 2013)[134] identified one RCT (Kristeller, Wolever and Sheets, 2014)[193] that randomised 111 male and female participants with BED to the 12-session Mindfulness-Based Eating Awareness Training group program, a psycho-educational/cognitive–behavioural intervention or wait-list control. The mindfulness program was designed to increase mindful awareness of experiences surrounding eating and decrease habitual reactivity through 3 forms of meditation alongside body awareness and acceptance components. The psychoeducation treatment covered basic concepts from the cognitive behavioural models and included education on obesity and binge eating. Both interventions led to a reduction in BED classification at one-month follow-up compared to controls: 80% of mindfulness participants, 82% of psychoeducation participants, and 38% of control participants no longer qualified for BED diagnosis at one-month follow-up. Similarly, both interventions led to greater decreases in BED diagnosis at 4-month follow-up compared to controls (mindfulness=68%; psychoeducation=46%; Control=36%), with the difference between all groups being significant, but not between treatments.

Motivational Interviewing

Motivational interviewing seeks to enhance motivation and readiness to change by helping the individual place their behaviours within the context of their own values and come to terms with the positive and negative components of changing their behaviour. Motivational interviewing focuses on exploring and resolving the ambivalence that commonly characterises, and frequently complicates treatment of, eating disorders.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

MacDonald and colleagues (2012)[208] identified one RCT (Cassin, Ranson, Heng, Brar and Wojtowicz, 2008)[60] that assessed the impact of adapted motivational interviewing on binge eating symptoms. One hundred and eight female college-age outpatients were randomised to a 16-week trial of pure self-help with or without one session of adapted motivational interviewing. The self-help program was based on an unpublished manual. Pure self-help with adapted motivational interviewing was superior at endpoint on binge eating frequency, depression symptoms, self-esteem, satisfaction with general life and satisfaction with oneself, in comparison to pure self-help alone. There were no significant differences between the 2 groups at endpoint on satisfaction with social life, sex life, physical appearance, family or relationships.

Obesity Treatment

This approach aims to encourage weight loss in individuals with BED by creating a calorie deficit. The program that has been investigated involved nutritional education, behavioural strategies for weight control, and a very low calorie diet program. The very low calorie diet program comprised a 12-week protein-sparing fast during which the only source of nutrition is a powdered supplement. After 12 weeks, the individual commences a 6-week refeeding program during which regular foods are re-introduced, followed by a 6-week weight stabilisation phase. Implementation of the program is managed by a doctor and a dietician.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Hay (search date 2012)[163] identified one RCT (de Zwaan, Mitchell, Mussell, Raymond, Specker, and Seim, 2005)[396] that randomised 71 obese female patients with BED to a very low calorie diet program with CBT or a very low calorie diet program alone. The trial concluded there were no clinically significant differences between the 2 conditions on weight loss, frequency of binge eating, and binge abstinence. Outpatients from both conditions lost on average 16% of their original body weight. There were no significant differences at endpoint on weight and BMI kg/m2 between the 2 conditions at 1-year follow-up. The percentage of outpatients who did not meet diagnostic criteria for BED at 1-year follow-up did not differ between conditions (54% for very low calorie diet + CBT and 58% for very low calorie diet – CBT), nor did the percent who were binge abstinent (33% for very low calorie diet + CBT and 32% for very low calorie diet – CBT). There was a high degree of early weight regain following treatment at 6-month follow-up the proportion who had regained 50% or more original weight was 39% for very low calorie diet + CBT and 56% for very low calorie diet – CBT, though the between-group difference was not statistically significant.

Psychodynamic Interpersonal Psychotherapy

Psychodynamic interpersonal psychotherapy is oriented in a psychodynamic model of eating disorders. It aims to help individuals gain insight into interpersonal relationships in the here-and-now, early relationships, and historical life experiences. Individuals are encouraged to understand the relationship between interpersonal relations, attachment patterns, distressing emotions, and binge eating as a means of coping. The approach does not directly address diet, cognitions related to dietary restriction, or weight-related issues.

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Hay (search date 2012)[163] identified one study (Tasca, Ritchie, Conrad, Balfour, Gayton, Lybanon, and associates, 2006)[347] that randomised 135 outpatients with BED into 3 conditions; group CBT, group psychodynamic interpersonal psychotherapy, or wait-list control (unpublished treatment manuals). At 16-week endpoint the 2 active treatment groups had a significantly greater improvement on binge days, interpersonal problems, and restraint, in comparison to wait-list control. Group CBT showed significantly greater improvement on hunger, and group psychodynamic interpersonal psychotherapy showed significantly greater improvement on depression, relative to the wait-list control condition. There were no significant differences between the active treatment conditions compared to wait- list control on BMI kg/m2 and self-esteem. At endpoint, no significant differences were identified between treatment groups on BMI kg/ m2, binge eating days, depression, self-esteem, interpersonal problems, restraint, and hunger. Significant improvements were found on binge eating days, hunger, and depression within both treatment groups. Group psychodynamic interpersonal psychotherapy participants had greater improvement in self-esteem from pre- treatment to 6-month follow-up.

Virtual-Reality-Based Therapy

Virtual-reality-based therapy uses virtual technology to deliver treatment content. The program that has been investigated adopts primarily a cognitive-behavioural orientation and is conducted in concurrence with a low-calorie diet and physical training.

One systematic review (summarising 2 RCTs) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

Koskina, Campbell and Schmidt (search date 2012)[192] identified 2 RCTs[289,291] that examined the efficacy of virtual-reality-based therapies. One study (Riva, Bacchetta, Baruffi and Molinari, 2002)[289] evaluated a virtual reality-based therapy (unpublished treatment manual) for the treatment of body image disturbance in BED. Twenty female BED patients that were participating in a residential weight control treatment, including a low-calorie diet (1200 cal/day) and exercise regime, were randomly assigned to the virtual-reality-based program (7 sessions) or a group program of nutritional management (3 times/week) which used CBT techniques. The treatment for both groups lasted approximately 6.5 weeks. The virtual-reality condition experienced significant pre-post improvement in body image avoidance and other aspects of psychopathology, such as anxiety. All participants achieved cessation of binge eating (within the past 2 weeks) at the end of treatment.

Another study (Riva, Bacchetta, Cesa, Conti and Molinari, 2003)[291] randomised 36 adult female BED patients to one of 3 treatment conditions or wait-list control for 6-weeks. The nutritional treatment group maintained a low calorie diet, participated in physical training and participated in 5 weekly dietician-led nutritional groups. The CBT group received individual and group CBT sessions targeting assertiveness, motivation to change, eating behaviour and self-esteem, in additional to the nutritional treatment. The experiential cognitive therapy was similar to the CBT group with the addition of virtual reality sessions targeting food-related anxiety and the subject's body experience. The CBT intervention was based on manuals by Fairburn (1985)[106]; the experiential cognitive therapy intervention was based on detailed protocols set out by Riva (2000)[290]; and the virtual reality intervention was based on the ***Virtual Reality for Body Image Modification*** virtual environment used in preliminary studies[288]. Eating control, binging frequency, weight loss and self-esteem levels improved from baseline to post-treatment in all treatment groups, but not waitlist control; depressive symptoms improved in experiential cognitive therapy and CBT treatment groups only; while a complete remission in depressive symptoms was experienced by the experiential cognitive therapy group alone. At 6-month follow-up, body satisfaction and self-esteem scores were significantly higher in the experiential cognitive therapy group compared to the other treatment groups.

Level II Evidence

There was no level II evidence available.

Combination Therapies

Combined Cognitive Behavioural Therapy and Antidepressant Medication

One systematic review (summarising one RCT) and one RCT evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Brownley and colleagues (2016)[47] conducted a systematic review and meta-analysis of pharmacologic and psychological treatment options for adults with binge-eating disorder. They identified one RCT by Devlin and colleagues (2005)[91] that randomised 116 overweight and obese men and women with BED to 16 sessions of CBT + fluoxetine, CBT + placebo, fluoxetine only or placebo only. All participants received 16 sessions of concurrent of group behavioural weight control treatment over 20 weeks. Participants in all groups displayed improvements in binge eating frequency and most measures of psychopathology at the end of treatment compared with their pre-treatment scores. Binge frequency and binge abstinence were significantly improved by addition of CBT but not medication, while depressive symptoms were significantly improved by the addition of fluoxetine.

An RCT by Grilo, Crosby, Wilson and Masheb (2012)[152] assessed the long term efficacy of SSRI antidepressants for BED. Eighty-one overweight patients with BED were randomised to receive fluoxetine (60mg/day), fluoxetine + CBT (Fairburn & Cooper, 1993)[110], or CBT + placebo. Remission rates (as per intent-to-treat analysis) varied significantly across treatments at end of treatment, 6-month and 12-month follow-up, with the highest remission rates observed in the CBT + placebo group (36%), followed by fluoxetine + CBT (27%) then fluoxetine-only (4%). A significant main effect of treatment was found on all clinical outcome variables, except for weight, across all time points. While CBT treatment groups did not differ from each other, both were significantly more effective than fluoxetine only on the majority of outcome variables.

Combined Cognitive Behavioural Therapy and Anticonvulsant Medication

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Brownley and colleagues (2016)[47] conducted a systematic review and meta-analysis of pharmacologic and psychological treatment options for adults with binge-eating disorder. They identified one double-blind RCT by Claudino and colleagues (2007)[72] that randomised 73 male and female participants with obesity and BED to 21 weeks of group CBT (19 sessions) plus topiramate (target daily dose of 200 mg) or CBT plus placebo. Both groups had improvements in binge-eating behaviour over the course of treatment, however, compared with placebo, CBT plus topiramate led to greater binge remission and weight loss.

Combined Cognitive Behavioural Therapy and Exercise

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Vancampfort and colleagues (2013)[363] identified one high quality RCT (Pendleton, Goodrick, Poston, Reeves and Forey, 2002)[268] that randomised 114 adult female patients with BED to CBT only, CBT with exercise, CBT with maintenance or CBT with exercise and maintenance. All subjects received weekly 90-minute manualised[350] group CBT sessions over 4 months. The CBT component comprised 2 halves; the first half of each session aimed to eliminate binge eating be establishing regular, healthy eating patterns and encouraging subjects to self-monitor. The second half of each session included efforts to enhance social influence processes and to develop problem solving skills. The exercise component consisted of an educational component, which instructed subjects on the relationship between fitness and dieting and binging, and an aerobic exercise component, in which subjects exercised 3 times perweek for 45 minutes per session. The maintenance component extended the subjects previous group conditions and consisted of 12 biweekly meetings over a 6-month period. While all treatment groups experienced reductions in binge eating during treatment, exercisers had significantly greater reductions in binge eating following treatment and at follow-up. Twice as many exercisers were abstinent from binge eating at every measure as compared to non-exercisers. The addition of treatment maintenance resulted in 50% higher

abstinence rates from binge eating than subjects CBT only or CBT and exercise only.

Combined Self-Help and Motivational Interviewing

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

MacDonald and colleagues (2012)[208] identified one RCT (Cassin, Ranson, Heng, Brar and Wojtowicz, 2008)[60] that assessed the impact of adapted motivational interviewing on binge eating symptoms. The 16-week trial randomised 108 female outpatients to either adapted motivational interviewing with self-help or self- help alone (unpublished manuals). The results of the study identified adapted motivational interviewing with self-help as superior to self-help alone, on binge eating frequency, depression symptoms, self-esteem, satisfaction with general life, and satisfaction with oneself, at endpoint. The study found no significant differences between the 2 groups at endpoint on satisfaction with social life, sex life, physical appearance, family or relationships.

Combined Cognitive Behavioural Therapy and Nutrition Counselling

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Hay (search date 2012)[163] identified one RCT (Masheb, Grilo and Rolls, 2011)[212] that randomised 50 adult patients with BED and obesity to 6 months of CBT for BED plus a low-energy-density diet or CBT for BED plus general nutrition counselling not related to weight loss. The CBT manual used was not specified. At 6- as well as 12-month follow-up, 26% of patients achieved at least a 5% reduction in weight, although there was no difference between treatment groups. Participants receiving the low-energy-density diet had significantly greater reductions in energy density and significantly greater increases in fruit and vegetable consumption than participants receiving general nutritional counselling.

Combined Cognitive Behavioural Therapy and Obesity Treatment

One systematic review (summarising one RCT) evaluated this treatment approach and met inclusion criteria.

Level I Evidence

There was no level I evidence available.

Level II Evidence

Hay (search date 2012)[163] identified one RCT (de Zwaan, Mitchell, Mussell, Raymond, Specker, and Seim, 2005)[396] aimed to determine if CBT targeting binge eating behaviour (manual unpublished) added as an adjunctive treatment to a very low calorie diet program would improve short- and long-term outcomes in obese female outpatients with BED (*N*=71). The study showed there were no clinically significant differences in weight loss, frequency of binge eating, and binge abstinence between the two conditions. On average, outpatients lost 16% of their original body weight. Abstinence from binge eating was 58% at endpoint, 50% at 1-month follow-up and 33% at 1-year follow- up for the very low calorie diet program with CBT condition. At 1-year follow-up there were no significant differences between the 2 conditions in weight and BMI kg/m2. The study found no differences in the proportion of outpatients who did not meet diagnostic criteria for BED at 1-year follow-up.

Summary of Research Findings

Table 5 summarises the treatment evidence base as discussed more fully within this chapter.

Table 5. Summary of Eating Disorder Treatment Studies

Treatment Approach	Degree to Which Evaluated	Magnitude of Effect
AN in Young People		
Cognitive behavioural therapy*	Some	Moderate
Complementary therapies*	Some	Some
Family-based treatment (Maudsley therapy)	Moderate	Substantial
Hormone replacement therapy*	Moderate	Low-Moderate
Individual adolescent supportive psychotherapy*	Some	Moderate
Inpatient treatment for medical stabilisation	Some	Moderate
Parent-focused treatment*	Some	Low
Physical therapy*	Moderate	Low
Refeeding*	Some	Moderate
Specialised outpatient treatment	Some	Moderate
Systemic family therapy*	Some	Moderate
AN in Adults		
Cognitive analytic therapy	Moderate	None
Cognitive behavioural therapy	Substantial	Moderate
Cognitive interpersonal therapy (MANTRA)*	Some	Moderate
Cognitive remediation therapy*	Moderate	Low-Moderate
Complementary therapies*	Moderate	Some
Exposure and response prevention*	Some	Slight
Family-based therapy (Maudsley)	Some	Moderate
Interpersonal psychotherapy	Some	None
Medications		
Antidepressants	Moderate	Low
Antipsychotics	Substantial	Low
Anxiolytics*	Some	None
Endocannabinoid agonists*	Some	Moderate
Hormone replacement therapy	Substantial	Low-Moderate
Psychodynamic or psychoanalytic therapy*	Moderate	Moderate
Repeated transcranial magnetic stimulation*	Some	Low
Specialist supportive clinical management	Moderate	Moderate
Combined cognitive behavioural therapy + antipsychotic medication	Some	Low
Combined nutritional rehabilitation + cognitive behavioural therapy	Some	None
Combined nutritional rehabilitation +antipsychotic medication	Some	Low
BN in Young People		
Cognitive behavioural therapy for adolescents	Some	Some
Family-based treatment (Maudsley therapy)	Some	Some
BN in Adults		
Cognitive behavioural therapy	Substantial	Substantial
Cognitive behavioural therapy guided self-help	Some	Substantial
Exposure therapy*	Moderate	Moderate
Healthy weight program	Some	Moderate
Medication		
Antidepressants	Some	Moderate
Nutritional management	Some	Low
Physical exercise	Some	Moderate
Repetitive transcranial magnetic stimulation	Some	None
Combined cognitive behavioural therapy + interpersonal psychotherapy	Some	Moderate
Combined cognitive behavioural therapy + refeeding	Some	Moderate

BED in Adults		
Behavioural weight loss	Moderate	Low-Moderate
Behavioural weight loss guided self-help	Some	Low
Cognitive behavioural therapy	Substantial	Substantial
Cognitive behavioural therapy guided self-help	Substantial	Low-Moderate
Cognitive behavioural therapy pure self-help	Moderate	Low
Dialectical behavioural therapy	Substantial	Moderate
Interpersonal psychotherapy	Moderate	Moderate
Medications		
Anticonvulsants	Moderate	Moderate
Antidepressants	Moderate	Low-Moderate
Central nervous system stimulants*	Moderate	Substantial
Endocannabinoid agonists*	Some	Moderate
Glutamate antagonist*	Some	Low
Norepinephrine reuptake inhibitors	Some	Moderate
Nutritional supplements*	Some	None
Obesity medication	Some	Moderate
Opioid antagonists*	Some	None
Mindfulness*	Some	Moderate
Motivational interviewing*	Some	Low
Obesity treatment	Some	Moderate
Psychodynamic interpersonal psychotherapy	Some	Moderate
Virtual-reality based therapies	Moderate	Moderate
Combined cognitive behavioural therapy + antidepressants	Some	Moderate
Combined cognitive behavioural therapy + anticonvulsants	Some	Moderate
Combined cognitive behavioural therapy + exercise	Some	Moderate
Combined self-help + motivational interviewing	Some	Low
Combined cognitive behavioural therapy + nutritional counselling	Some	Low
Combined cognitive behavioural therapy + obesity treatment	Some	Moderate

Notes: Degree to which evaluated: None = no Level I or Level II studies; Some = 1 to 2 Level II studies/RCTs; Moderate = > 2 Level II studies/RCTs and/or Level I and II evidence available; Substantial = > 2 Level 1 studies. Magnitude of effect: None = no beneficial effect; Low = slight beneficial effect; Moderate = moderate beneficial effect; Substantial = substantial and persistent effect. Asterisks indicate interventions that were not evaluated in the previous Evidence Review.

Anorexia Nervosa in Young People

Family-based therapy was the most validated treatment for young people with AN, with a moderate degree of evaluation and substantial beneficial effects. Family-based treatment was effective when delivered in short- and long-term groups, in a research trial and in specialised outpatient clinical care, and with and without the addition of parent-to-parent consultation. The greatest improvements were observed in participants with greater eating related psychopathology at baseline and participants with earlier weight gain.

One study compared family-based therapy to parent-focused therapy and reported significantly greater end-of-treatment rates of remission in adolescents participating in the parent-focused program, although this difference did not persist and 6- or 12-month follow-up, and no other differences (EDE scores or weight) were evident.

Moderate treatment benefits were observed in a number of interventions. One year of individual adolescent supportive psychotherapy resulted in improvements in psychological symptoms (particularly depressive symptoms and dietary restraint) to 12-month follow-up. Specialised outpatient treatment resulted in significant improvements on the Morgan-Russell average outcome scale that persisted up to 5 years following treatment completion. A high-energy refeeding protocol (38 kcal/kg/day while traditional guidelines recommend 5 kcal/kg/day) resulted in

significant improvements in weight without concomitant complications. Three RCTs evaluated **hormone replacement therapy** and reported mixed outcomes: low-dose oral ethinyl-estradiol, but not triphasic oral contraceptive, improved bone mineral density in young girls with AN, while a 28-day course of recombinant human growth hormone improved medical and cardiovascular stability compared with placebo-only controls. **Physical therapy** (including strength training and a graded exercise protocol) was well tolerated but had limited benefits. One study reported improvements in muscular strength, while the second study found no improvements on any physical or psychological measure. The effect of bright light therapy (a form of **complementary therapy**) on depressive symptoms in girls with restrictive AN was evaluated in a single RCT. This study found a greater improvement in girls receiving CBT + bright light therapy than CBT alone. Manualised **systemic family therapy** resulted in 25% remission at end of treatment and 39% remission at one year follow-up. Finally, **inpatient treatment for medical stabilisation** followed by outpatient family-based therapy had worse outcomes (in terms of the number of days in-hospital) in individuals who received longer hospitalisation for weight restoration than those who received shorter hospitalisation for medical stabilisation.

Changes in Treatment Approaches and Outcomes for Young People with Anorexia Nervosa

Treatment interventions for adolescent AN that that were newly evaluated in the current review were cognitive behavioural therapy, complementary therapies, hormone replacement therapy, individual adolescent supportive psychotherapy, parent-focused treatment, physical therapy, refeeding and systemic family therapy. Family-based treatment had an increased magnitude of effect (from low to moderate). Ego-oriented therapy was evaluated in the 2009 review but did not emerge in the evidence for the present review.

Anorexia Nervosa in Adults

Cognitive behavioural therapy was the most supported interventions trialled for adults with AN, and had a substantial body of evidence. Outcomes from CBT were generally positive, although not consistently greater than comparison/control therapies (e.g. optimised treatment as usual, specialist supportive clinical management). Benefits include reduction in relapse risk, and eating wand weight concerns, and improvements in BMI and weight, which were sustained up to 12 month follow-up in some cases.

Cognitive remediation therapy and hormone replacement therapy had a substantial degree of assessment and low-moderate beneficial effects. **Cognitive remediation therapy** produced significant improvements in neurocognitive measures, exceeding outcomes from cognitive behavioural therapy and nonspecific neurocognitive therapy comparison groups. However, one study reported a decrease in caloric intake post-intervention when compared with baseline consumption. Positive outcomes from **hormone replacement therapy** were reported following administration of the parathyroid hormone teriparatide, recombinant human growth hormone and low-dose transdermal testosterone. These therapies improved serum levels of specific bone formation markers, bone mineral density and lean body mass, respectively.

Cognitive analytic therapy, interpersonal psychotherapy, specialist supportive clinical management, psychodynamic and psychoanalytic therapies and complementary therapies were all trialled in 2 or more RCTs. **Cognitive analytic therapy** and **interpersonal psychotherapy** were not found to be effective on most measures, while positive physical, psychological and eating disorder outcomes were generally observed following **specialist supportive clinical management**. **Focal psychodynamic therapy** significantly increased BMI and recovery rates at 12-month follow ups compared to optimised treatment as usual. **Complementary therapies** were effective in reducing in reducing eating concerns (acupressure plus massage), stress, anxiety and body dissatisfaction (massage only) in 2 RCTs.

Medications had a low to substantial degree of evaluation with low to moderate beneficial outcomes. Two SSRI **antidepressants** were trialled with mixed positive and negative outcomes. Fluoxetine prescribed to AN patients who had completed inpatient weight regain had no benefit in terms of weight, depression or eating disorder-related obsessions and compulsions, while citalopram improved depression, obsessive-compulsive features, impulsiveness and anger. The atypical **antipsychotics** olanzapine and amisulpride had similarly mixed outcomes. Overall, olanzapine was well-tolerated to faster weight gain and higher BMI and a reduction of obsessive symptoms, while amisulpride increased anxiety and overall eating disorder symptoms but reduced levels of depression. One study investigated the **anxiolytic** benzodiazepine alprazolam and reported an

increase in fatigue without anticipated reductions in anxiety or benefits on caloric intake. One study investigated the synthetic **endocannabinoid** agonist dronabinol and reported improvements in weight without concomitant adverse psychotropic effects.

The remaining interventions were trialled in a single RCT only. **Cognitive interpersonal therapy** resulted in improved BMI, eating disorder symptomatology, distress and clinical impairment up to 2 years following treatment, **family-based treatment** resulted in improved weight and recovery, and **exposure and response prevention** resulted in increased caloric intake from baseline to end of treatment. One session of high-frequency **repeated transcranial magnetic stimulation** led to improvement in core symptoms of AN post-treatment and 24 hours later relative to those receiving sham stimulation.

Changes in Treatment Approaches and Outcomes for Adults with Anorexia Nervosa

Treatment interventions for adult AN that that were newly evaluated in the current evidence review were cognitive interpersonal therapy, cognitive remediation therapy, complementary therapies, exposure and response prevention, psychodynamic or psychoanalytic therapies, repeated transcranial magnetic stimulation, anti-anxiety medications and endocannabinoid medications.

Interventions that have had an increased level of evaluation and/or magnitude of effect since the previously published (2010) evidence review were cognitive analytic therapy (increased from small to moderate evidence base – although with no beneficial effect), cognitive behavioural therapy (improved from moderate to substantial degree of evaluation and low to moderate magnitude of effect), family-based treatment (improved from low to moderate magnitude of effect) and hormone replacement therapy (increased from moderate to substantial evidence base and none-low to low-moderate level of evidence).

Interventions that were evaluated in the previous review but did not have sufficient evidence for evaluation in the current review were behavioural therapy, nutritional supplements, refeeding, antihistamine medication and supportive family therapy. The previous review reported no effect or minimal effect in each case except for refeeding by cyclic enteral nutrition, which was previously demonstrated (in a single RCT) to have a moderate beneficial effect.

Bulimia Nervosa in Young People

Evidence on treatments for youth with BN is lacking. Only two RCTs met inclusion criteria and were evaluated in this review. One RCT compared cognitive behavioural therapy for adolescents to family-based therapy and reported significantly greater rates of abstinence from binge eating and purging in participants receiving family-based therapy. Likewise, a second RCT compared family-based treatment to supportive psychotherapy, and reported a greater proportion of remitted patients in the family-based therapy group.

Bulimia Nervosa in Adults

Cognitive behavioural therapy was the most supported interventions trialled for adults with BN, and had a substantial body of evidence with generally favourable outcomes. Where improvements were seen, CBT improved primary and secondary BN symptoms and psychopathology across both individually delivered and group formats, and was more effective than general **nutritional counselling**. However, one study reported a greater benefit from **physical exercise** than CBT in reducing pursuit of thinness, change in body composition and frequency of binging and purging, while a second study reported eating disorder psychopathology improvements that were statistically indistinguishable from waitlist control.

One study compared combination **CBT guided self-help** to specialist supportive clinical management and reported improvements on bulimic symptom severity, eating disorder psychopathology and depression in both groups, with no significant difference between groups.

Exposure therapy was evaluated in 3 studies, 2 of which provided exposure therapy as an adjunct to a treatment program. Of these, one study reported no additional treatment benefits from the addition of an exposure therapy component to CBT, while the second study reported greater abstinence in individuals that had received CBT followed by exposure therapy rather than CBT followed by relaxation training. The third study compared pure or guided exposure therapy, and reported reductions in salivary cortisol levels from the start to end of treatment in both groups, with greater feelings of body satisfaction in the pure exposure group.

The remaining interventions were trialled in a single RCT only. A 6-session **healthy weight** intervention led to significant reductions in BMI and remission, and greater remission at 3-month

follow-up than waitlist controls. **Repetitive transcranial magnetic stimulation** was ineffective in improving BN symptomatology. Ten weeks of **antidepressant** treatment resulted in improvements in bulimic and purging episodes in patients treated with fluoxetine and fluvoxamine but not sertraline.

Changes in Treatment Approaches and Outcomes for Adults with Bulimia Nervosa

Treatment interventions for adult BN that that were newly evaluated in the current evidence review were exposure therapy and physical exercise. Cognitive behavioural therapy had an increased level of evaluation (from moderate to substantial) since the previously published (2010) evidence review.

Nutritional management had a reduction in magnitude of effect (from moderate effect to low effect). Interventions that were evaluated in the previous review but did not have sufficient evidence for evaluation in the current review were active light therapy, crisis intervention, dialectical behavioural therapy, guided imagery, certain medications (androgen receptor antagonists, anticonvulsants and serotonin antagonists), multimodal day programs, multimodal inpatient programs and stress management. The previous review reported no effect or minimal effect for active light, androgen receptor antagonists, anticonvulsant medication and crisis intervention, and a moderate effect for guided imagery, multimodal day programs, multimodal inpatient programs, serotonin agonists and stress management.

Binge Eating Disorder in Adults

The interventions with the largest evidence base was **cognitive behavioural therapy**, which was evaluated in 8 RCTs and had the most consistent and substantial positive outcomes. Overall, cognitive behavioural therapy (delivered individually or in groups) improved depressive symptoms, eating disorder psychopathology (eating control, binging frequency, dietary restraint, etc.) weight-loss and self-esteem levels. Cognitive behavioural therapy outperformed most other comparison interventions (although this effect was not always sustained in the longer term), but was as effective as **interpersonal therapy**, **psychodynamic interpersonal psychotherapy** and **brief strategic therapy** and **behavioural weight loss**. One study examining rapid responders (those with a ≥70% reduction in binge eating by week 4) reported no difference in binge eating and eating disorder psychopathology following CBT treatment compared with non-rapid responders. Two studies compared nutritional management plus CBT to virtual-reality based interventions, as part of a CBT intervention or as stand-alone interventions. One study reported similar outcomes on binge eating frequency in the virtual-reality based program and the CBT based program, while the other study reported that the addition of a virtual reality intervention to a CBT plus nutrition program resulted in greater body satisfaction, self-esteem and remission in depressive symptoms than those receiving the CBT plus nutrition program only.

Dialectical behavioural therapy significantly reduced binge eating episodes and led to improvements in weight, shape and eating concerns, abstinence and quality of life in comparison to wait-list controls. **Virtual-reality based therapies** were evaluated in two RCTs and were found to improve body image avoidance, eating control, binging frequency, weight loss and self-esteem.

Interpersonal psychotherapy resulted in clinically significant improvements in eating disorder psychopathology and higher rates of remission at 2-year follow-up. The relationship between rapid response and treatment outcomes was not consistent across interventions and trials. For example, one study reported higher remission rates in patients receiving CBT-guided self-help but not interpersonal psychotherapy or behavioural weight loss, while a second study reported that patients receiving behavioural weight loss were more likely to achieve remission if they were rapid responders.

Cognitive behavioural therapy guided self-help likewise led to significant improvements in binge eating abstinence, binge eating behaviour, drive for thinness, body dissatisfaction, interoceptive awareness, eating concern, cognitive restraint, attention control, self-esteem and remission. Cognitive behavioural therapy guided self-help was more effective than **behavioural weight-loss guided self-help** and cognitive behavioural therapy-pure self-help, but not **interpersonal psychotherapy**, indicating (in a single study) that interpersonal psychotherapy may be a viable treatment alternative to the more commonly administered CBT for BED. Treatment with **CBT-pure self-help** improved binge eating and remission rates but not weight loss at up to 12-months follow up.

A number of pharmacological interventions were trialled for adults with BED with primarily positive outcomes. **Anticonvulsant medication** reduced weight, levels of glucose, insulin and triglycerides in one study, and binge eating, weight and BMI in two studies. **Central nervous system stimulants**

significantly reduced binge eating episodes and improved remission compared with placebo, with highly robust effect sizes. The antidepressant fluoxetine was less effective than CBT, and in one study, the addition of fluoxetine to CBT actually worsened remission rates in comparison to CBT plus placebo. The antidepressants bupropion and escitalopram were effective for weight loss but did not have a significant impact on eating disorder psychopathology, food cravings or depression levels, while the antidepressant sertraline reduced binge frequency along with BMI and clinical global severity. Endocannabinoid agonists significantly reduced body weight and the binge eating scale scores, although note that the medication evaluated (rimonabant) is not current available in Australia. The glutamate receptor antagonist acamprosate improved binge eating episodes and eating disorder-related obsessive compulsive symptoms at trial end, although these outcomes were not sustained in longitudinal analyses. The norepinephrine reuptake inhibitor atomoxetine significantly reduced binge-eating frequency, weight, BMI, illness severity and obsessive compulsiveness. The obesity medication sibutramine resulted in significant weight loss at end of treatment and 3 month follow-up, but again, this outcome was not sustained over the longer-term. Pharmacological interventions that were ineffective in improving features of BED include the opioid antagonist ALKS-33 and the supplement chromium picolinate.

Changes in Treatment Approaches and Outcomes for Adults with Binge Eating Disorder

Treatment interventions for adult BED that were newly evaluated in the current evidence review include central nervous system stimulants, norepinephrine reuptake inhibitors, endocannabinoid agonists, glutamate antagonists, nutritional supplements, opioid antagonists, mindfulness and motivational interviewing.

Interventions that had changes in their level of evaluation and/or magnitude of effect since the previous evidence review include dialectical behavioural therapy (improved from small to substantial evidence base), behavioural weight loss, obesity medication (improved from small to moderate evidence base), cognitive behavioural therapy , cognitive behavioural therapy guided self-help, antidepressant and anticonvulsant medication (improved from moderate to substantial evidence base), interpersonal psychotherapy (improved from small to moderate evidence base but had a reduction in effect from substantial to moderate) and virtual-reality based therapies (improved from small to moderate evidence base and low to moderate magnitude of effect).

6. Discussion

Recommendations for Research

Improvements to Randomised Controlled Trials

Longer follow-up periods may be necessary to detect changes from certain interventions. For example, pharmacotherapy trials often involve very short acute treatment phases that provide a small window of time for clients to improve, given the often lengthy time course of most medications. There is a pressing need for longer-term studies that address clinical questions about safety, treatment length and relapse. For example, the literature on longer-term effects of medication for BED is extremely limited, and the few data that are presently available indicate that relapse often occurs following discontinuation[284]. Similarly, prospective and repeated follow-up over months and years is required to determine whether the benefits of prevention programs are durable and cost-effective, and whether prevention programs impact eating disorders incidence[29,134,213]. These questions pose practical and methodological challenges because of the costliness of long-term follow-ups, the generally small sample sizes used (which reduces statistical power of analyses) and the low incidence of eating disorders.

The impact of prevention and treatment interventions on broader demographic groups should be considered. The majority of studies covered in this review were delivered to adolescent females. Relatively few RCTs have been conducted among certain populations, for instance, individuals with OSFED, chronically ill individuals, minority populations, individuals younger or older than adolescence/early adulthood, and males. However, all eating disorders may arise at any age, in any ethnicity, and in both females and males.

Like females, males are susceptible to body dissatisfaction and disordered eating yet are often excluded from inclusion in research studies. Males with eating disorders benefit significantly from targeted treatment, in respect to weight restoration, eating behaviours and cognitions, and mood and anxiety symptoms[370]. Further, since boys make up an important part of the social environment of young females, their attitudes about body image play a critical role in reducing pressure on girls[84], and likewise, increased awareness in girls about the male body ideals could improve the environment for boys[387]. In regards to prevention, universal program delivery to both genders may also help address between-gender misconceptions about attractiveness[69], and may streamline program delivery in classrooms by eliminating the need to divide up classrooms and create alternative activities for boys[386].

Most prevention efforts are targeted at mid-to-late adolescence, which is logical given that this is a peak period for eating disorders onset[327]. However, disordered eating also occurs outside this age range and should be investigated in controlled studies. One recent example is a brief 8-week CBT program targeting mid-life (ages 30-60) women, which reported improvements in body image and eating concerns through 6-month follow-up[230].

Broader outcome evaluation is required in treatment trials. The outcome measures used in research trials are often narrow, particularly for BED and BN where outcome is primarily defined by the frequency with which a person binges and purges and their BMI. However, BMI is an imperfect measure[14,15]. A broader scope of measurement that captures the full experience of an eating disorder – the physical (e.g. binge eating and overeating episodes, spectrum of purging methods and episodes, excessive exercise), psychological (e.g. concern with weight, shape, eating, and dietary restraint, body dissatisfaction, shape and weight overvaluation), social (e.g. quality of life), and comorbid (e.g. physical functioning, anxiety, depression, other psychological processes such as dichotomous thinking and emotion regulation, substance use, self-harm etc.) aspects is arguably a more meaningful way of representing and conceptualising outcome[168].

Researchers should consider a broader range of evidence than RCTs alone. Randomised controlled trials in the eating disorders field, particularly for AN, are costly, require large sample sizes, multiple years of testing and multiple centres with large numbers of patients. There are many promising mental health promotion, prevention and treatment interventions that are generally not considered in RCTs or reviews that adopt a level of evidence scheme because they are more challenging to evaluate with RCT methodology, tend to be disseminated naturalistically, or contain multiple components[51,66]. For example,

multidisciplinary practice models are rarely examined within RCT designs, as they make it difficult for researchers to ascertain which component of practice produced the benefit. At the same time, multidisciplinary practice models are widely accepted models of care for individuals with eating disorders, given the biopsychosocial conceptualisation of eating disorder aetiology and maintenance, and the psychosocial and medical correlates and consequences of eating disorders.

Qualitative research may also contribute to a better understanding of eating disorders as well as the development of improved interventions. For example, qualitative research has helped clarify the relationship that many AN patients have with exercise. These include patient exercise preferences[99], the role of activity in cultivating a non-anorexic identity[22], and the distinction between perceived positive effects of exercise (such as distraction that refocuses negative attention away from the body) and negative exercise effects (such as 'boring' exercise programs that can enhance negative bodily focus)[99].

Further Research Required

Further research is needed that substantiates the theory underlying the prevention program. Where appropriate, assessments should include objective biological measures that verify that programs that reduce eating disorders risk factors or symptoms are doing so in the way posited by the intervention theory. One example of an intervention that has been rigorously evaluated and validated across a wide range of measures is the dissonance-based *The Body Project* program. As hypothesised, reductions in thin-ideal internalisation mediate eating disorders symptom reduction[310]; a high-dissonance version of the program produced greater reductions in eating disorder symptoms than a low-dissonance version of the program[231]; and participation in the program resulted in reductions in neural activity within key reward-valuation and attention regions of the brain (evaluated through fMRI studies)[339].

Evaluating whether eating disorder prevention programs reduce eating disorder incidence and disordered eating (i.e. behavioural features of eating disorders) is an important outcome to evaluate, yet the majority of trials report on the reduction of eating disorder *risk factors* without continuing forward to assess possible reductions in eating disorder onset. Two recent programs that significantly reduced the risk for future onset of eating disorders are the dissonance-based program *The Body Project*[328], in which cognitive dissonance is putatively induced through the process of critiquing the thin ideal, and the *Health Weight*[336] intervention, that promotes participant-driven improvements in dietary intake and physical activity. These programs both induced clinically meaningful reductions in eating disorders over 3 years of follow-up. Similar in-depth and long-term assessments of eating disorders outcomes in large scale efficacy trials are required across the range of available prevention programs.

Exploring the role of the facilitator in the outcome of prevention programs is an important research direction. Many efficacy trials use exogenous facilitators, such as doctoral psychologists trained in the theoretical principles underlying the program, rather than endogenous facilitators, such as school teachers or peer leaders, who inhabit the prevention participants' environment. Having peers (i.e. endogenous facilitators who are naturally present within the social system) deliver interventions comprises a more ecologically valid, naturalistic dissemination approach and may improve the reach of efficacious programs that lack the resources to recruit clinicians to deliver a program. The current evidence based is mixed. There is some evidence for successful program delivery by endogenous facilitators for cognitive dissonance interventions[33,45], and research also indicates that the act of administering these programs can have positive implications for the peer-facilitators themselves. One study[28] found that peer- facilitators experienced greater reductions in eating disorder risk factors than they experienced as participants in the same program. However, other studies suggest that endogenous facilitators may lead to diminished program effects in comparison to professional facilitators (e.g. cognitive dissonance and mindfulness-based interventions[15]). The effects appear to depend on the degree of facilitator knowledge and experience.

Outside of the treatment delivery, peers may be able to provide a unique level of support to individuals with eating disorders. Individuals with a lived experience possess insights, knowledge and skills that they can use to "to facilitate, guide, and mentor another person's recovery journey by instilling hope, role modelling recovery, and supporting people in their own efforts to reclaim meaningful and self-determined lives in the communities of their choice"[233]. There is evidence in support of peer workers in the greater context of mental health[68,87], but few investigations specifically in the context of eating disorders. This is an area that requires additional consideration and evaluation.

Peer-based prevention programs and initiatives have undergone insufficient evaluation, despite the consistent finding that peer influences are related to eating disorder correlates and indicators such as body dissatisfaction, disordered eating, and dysfunctional attitudes and beliefs about weight, shape, and eating. Prevention programs with a primary aim of modifying peer-based factors have not been rigorously evaluated in randomised controlled trials. The peer-based secondary school program ***Happy Being Me*** includes lessons on ways in which peers can support each other with body image issues and build a positive environment. Since its inception in 2010[286], the program has been evaluated in a number of (non-randomised or non-controlled) studies[37,100,387]. This program consistently produced positive outcomes in body image, self-esteem, internalisation, appearance comparisons, and disordered eating attitudes.

Integrated service delivery requires attention in future research. Individuals with AN who access treatment are often hospitalised at one point or another, sometimes for many weeks, which can hinder social and occupational functioning. Anorexia nervosa requires a significant length of treatment, and symptom severity and morbidity including medical risk, varies throughout the course of the illness. Although some eating disorder hospital admissions are necessary to avert a medical crisis, the impact and rationale for protracted inpatient or residential management is unclear. A recent systematic review by Madden, Hay and Touyz (2015)[210] found that there were no significant differences in treatment outcomes in AN patients receiving care in inpatient, partial hospitalisation and outpatient settings, nor between shorter and lengthier inpatient treatments. This study provides preliminary support for providing care for AN in briefer and less restrictive treatment settings, but further research is required to identify the optimal parameters for best care. Until there is further evidence to shed light on this important issue, integrated service delivery that incorporates a continuum-of-care model is recommended for eating disorders management.

Identification of clear, consistent and integrated, health-promoting messaging for the eating disorder and obesity fields is an important priority for future research. Research is needed to identify appropriate key messaging for the prevention of eating disorder symptoms, with consideration of the obesity field. The eating disorder and obesity prevention fields need to transition toward greater integration, partnership, collaboration, and sharing of expertise in order to enhance the achievement of respective aims. Partnership is necessary at each level of the health promotion spectrum, from promotion and prevention, to identification and early intervention, to standards and strategies for managing acute illness (obesity/eating disorders). Key messages, public awareness campaigns, and prevention programs for eating disorders require evaluation, particularly given the real possibility of inadvertent harm.

Standardised definitions of recovery, remission, and response are needed. One of the inherent challenges in the field is an appropriate definition of recovery, across diagnosis, age, and complexities of illness. There are no standardised definitions of recovery in use across treatment trials, and the subjective nature of recovery complicates routine conceptualisation[199] as individual practitioners emphasise different characteristics of recovery within their own practice. For the binge-eating spectrum of eating disorders, outcome is often assessed in terms of behaviours (i.e. binge eating and purging frequency) or biomarkers (e.g. weight or BMI), while ignoring psychological features. There is currently a lack of consensus on what an 'ideal' BMI is, particularly for individuals losing large amounts of weight[16,302], and the emphasis that is currently placed on external measures of health such as BMI may detract from other important measures of health, such as physical activity and well-being[303]. A recent conceptual framework for interpreting recovery and translating recovery guidance into practice is provided in the 2011 qualitative analysis by Le Boutillier and colleagues[40]. This document reviews 30 international guidelines for recovery-oriented practice and synthesises 16 dominant themes across 4 practice domains: promoting citizenship, organisational commitment, supporting personally defined recovery, and working relationships.

A greater understanding of the genetic, epigenetic and neurobiological basis for eating disorders has important implications for prevention, detection, early intervention and treatment. Genetic research may have utility even prior to the recognition of individual gene targets. For example, prevention efforts can be targeted towards individuals at higher genetic risk, such as offspring of mothers with eating disorders. As the study of the genetics and biology of eating disorders progresses, the identification of genetic variants, biomarkers of starvation and biomarkers of eating disorders may aid researchers and clinicians in delivering targeted interventions to those that are most vulnerable[361].

A genetic or biological reframing of eating disorders may also reduce stigma surrounding eating

disorders. A number of preliminary studies have demonstrated that a lack of awareness about the possible genetic and biological underpinnings of eating disorders may contribute to stigma in the general public. For example, college students[77,383] exposed to information about the biological underpinnings of eating disorders were less likely to attribute blame to eating disorders sufferers than participants exposed to sociocultural explanations. In another recent study, women with past or present eating disorders expressed their perspective that a genetic reframing of eating disorders would reduce stigma, guilt and self-blame associated with eating disorders[102]. However, caution must be exercised in interpreting – and delivering advice – based on putative biogenetic models for eating disorders. On the one hand, since research in this domain is still exploratory, new studies have the potential to have a large impact on the narrative and our understanding of the role for biogenetic causes of eating disorders. On the other hand, presenting eating disorders as biologically-driven illnesses may increase, rather than decrease, stigma for example, through the notion that the eating disorder is an immutable characteristic of the person.

Research into the optimal methods for disseminating programs with the strongest evidence-base is required to reduce the research-practice gap. For example, many effective prevention programs exist, but very little research has been conducted on how to widely disseminate information about these programs or how to increase 'buy-in" from individuals or organisations considering implementing such programs. Likewise, studies are required that clarify the barriers to successful dissemination. The treatment literature has demonstrated that efficacious interventions, in eating disorders as well as other forms of psychopathology, remain underutilised in clinical practice[323].

Community participatory research is one method to disseminate evidence-based programs. Community participatory research, adapted for use with eating disorders by Piran in 2001[275], involves sharing decision making and power with communities so as to engage them in the research process, enhance problem solving, and integrate health care knowledge[323]. One prominent example of successful community-based participatory research was the dissemination of the ***Body Project*** across over 100 American university campuses between 2005 and 2012, in partnership with a large national sorority[32].

Mediators and moderators of treatment outcome require identification. Mediators are the mechanisms by which a treatment may achieve its aims of reducing symptomatology (i.e. a medicine may lead to changes in biochemistry which alter disordered behaviour) and moderators are the factors that determine who responds to treatment and who does not (i.e. symptom severity, illness duration, presence of comorbid disorders). While *predictors* of treatment outcome have a main effect on outcome, moderators of treatment outcome have an interactive effect on outcome, with or without a main effect present[142]. A common moderator of treatment outcome is the severity of initial symptoms (initial elevations in baseline pathology[292], thin-ideal internalisation[247], body image distress and bulimic symptoms[329]), with greater severity at baseline associated with the greatest improvements post-treatment. Research should evaluate the interrelationship between mediators/moderators and the proposed mechanism of action for a given program, as well as inform the design of more effective treatment interventions or modifications to extant programs.

Research is required that evaluates widely disseminated but untested programs[323]. Service settings have a responsibility to monitor and evaluate the safety and adequacy of care provided. Evaluation should be integrated into service delivery to benchmark outcomes against those obtained in RCTs. Where available, promising pilot data from evaluation of an endogenous program could be the stimulus for further innovative treatment research.

Likewise, ***new programs validated in efficacy trials must be tested in effectiveness trials*** to confirm that interventions are effective when delivered under ecologically valid, real-world conditions. Effectiveness trials which investigate interventions which produced positive outcomes in tightly controlled efficacy trials generally (although not always) produce smaller intervention effects[323].

Recommendations for Practice

Mental Health Promotion

Mental health literacy interventions, such as public awareness campaigns, support dissemination of effective treatment standards and strategies by removing barriers to help-seeking, reducing stigmatisation and shame, and raising awareness of available and effective treatment options. *Beyondblue*: *get to know anxiety* is one campaign example that appears to have had an ongoing

impact on Australian society's awareness, understanding, and destigmatisation of anxiety[36]. Given that body image is a leading concern among youth in Australian society[232], the incidence of disordered eating is increasing[5,81], and that eating disorders are stigmatised, poorly understood and poorly recognised by the public[150], it would be valuable to disseminate a planned, evaluable public awareness campaign across the Australian community.

Public awareness campaigns can have a far-reaching effect on attitudes and behaviours that culminate in a healthier society. One important example is *The Voluntary Industry Code of Conduct on Body Image*, launched in 2009 by the Australian Government[354]. This initiative promotes positive body image by encouraging advertisers, the media and the fashion industry to adopt realistic and natural images of people, including the use of healthy weight models, and recommends disclosure when images of people have been digitally manipulated[354]. The code also includes media awareness and literacy recommendations such as building resilience in young people through a focus on peer interactions, parenting, and the role of schools and community groups, which have been shown to reduce eating disorder risk[30]. The code was developed based on a literature review conducted by the National Advisory Group on Body Image formed by the Government in 2009. This review found that exposure to various forms of media can have a significant effect on body dissatisfaction and distortions of young people, especially in women. Media exposure impacts on the body image of females in correlation to eating disorder behaviour[215], self-objectification[251], body dissatisfaction[34,251]; and self-esteem[186]. In males, there are pressures of conforming to physical norms and cultural standards of dress and appearance centred around on the 'muscular' ideal[125].

Eating Disorders Prevention

The "golden rule" of eating disorders prevention: ***"First, do no harm"***. Inappropriate content within eating disorder prevention initiatives can potentially increase disordered eating or eating disorder risk factors in recipients[262]. Researchers in the field of eating disorders have expressed concern that programs using education-based interventions (i.e. directly teaching individuals about eating disorders and symptoms of eating disorders) may be harmful to participants[260,261]. This sentiment is expressed by professionals in the field and community-based organisation workers who have heard families and individuals recount stories about unhelpful triggers of eating disorder development. For instance, descriptions of the symptoms of eating disorders and morally-loaded eating messages (e.g. "good" versus "bad" foods), could negatively impact upon the child who is vulnerable to an eating disorder by promoting methods to achieve thinness, which is overvalued by these individuals, and invoking fear of food and weight gain. Unhelpful information provided to children and adolescents, though typically well-intentioned, has the potential to cause harm. All prevention initiatives require thorough piloting and evaluation to ensure that they are safe[260,261].

There is an imperative need for an integrated, partnered approach to eating disorder prevention. The eating disorder and obesity sectors are closely related yet may disseminate potentially conflicting messaging. It is unclear whether messaging from one field inadvertently increases risk of illness in the other field. Ideally, obesity and eating disorder prevention and public messaging initiatives should be integrated, with experts from each field involved in development and evaluation. Training programs for clinicians should ensure that obesity and eating disorders are covered in equal measure, with particular attention given to the significant shared space between them. For example, the Boden Institute of Obesity, Nutrition, Exercise & Eating Disorders is a joint initiative of the Faculties of Health Sciences, Medicine and Science administered through the Sydney Medical School in Sydney, Australia. The institute brings together experts in clinical, public health and health policy research to undertake research and contribute to policy in the areas obesity, eating disorders and other chronic diseases.

Eating Disorders Management and Treatment

A cornerstone of successful management of eating disorders is ***sound medical management, administered primarily through primary care physicians***. Medical management may involve monitoring the physical status of the individual, treating medical complications associated with the illness, educating the individual about the illness, ongoing case management including referral to specialised services, and treatment delivery, typically medication management or perhaps a first step in a "stepped care" approach (e.g. guided self-help). Ethical and other factors preclude examination of this important aspect of care, which may or may not involve the application of a specific treatment approach, yet nonetheless, it is a vital strategy within the broader context of eating disorder management.

Although a multidisciplinary model of care is an important aspect of treatment for many individuals with eating disorders, needs will vary according to illness type, severity, duration, comorbidity, and other factors. A stepped-care model for health intervention, broadly-speaking, matches the intensity of the intervention to the severity and risk profile of the illness. Within the eating disorders field, stepped care models are in use, for example, non-guided and guided self-help, through to community-based outpatient treatment with a psychologist or psychiatrist and adjunct clinical management by a general practitioner, through to day hospital or inpatient hospital programs with extensive multidisciplinary input.

Models of care must negotiate contextual demands and complexities such as population and resource distributions. One example that is especially relevant to Australia concerns rural- and remote-based service providers, who have different treatment delivery needs to metropolitan-based treatment providers. Rural- and remote-based service providers require tailored support to enable them to deliver appropriate standards of care. This support entails accessible training and education, opportunity for tertiary support in consultation, liaison, and supervision, and broader systemic health system support (e.g. Medicare rebates that overcome barriers to disseminating care, such as appropriate imbursement to establish and maintain teleconference infrastructure). They require access to telemedicine and access to a mobile team who can support them locally, for instance, staff from a specialist service provider (i.e. teaching hospital) who can provide rural- or remote-based support when necessary. They must be able to refer individuals to specialist service providers if required, and be included in the long-term management plan after crisis has been through intervention with metropolitan-based specialist service providers.

Clinicians should be 'culturally competent', with the appropriate knowledge, skills, awareness and attitudes to work with diverse cultural and Aboriginal groups presenting with eating disorders[168]. Aboriginal and Torres Strait Islander individuals are at greater risk of obesity, diabetes and other diseases related to poor nutrition, and have higher rates of mental health problems and self-harm than non-indigenous Australians[274]. Epidemiological studies indicate Aboriginal and Torres Strait Islanders are equally or more likely to experience disordered eating (particularly binge eating) as non-indigenous Australians[164]. Body image concerns are common in adolescents although these more frequently manifest as a desire for a muscular body than a specific interest in being thin or losing weight[70,216]. An awareness of the history and culture of individuals of Aboriginal and Torres Strait Islander background may facilitate engagement and delivery of appropriate care.

The experiences of consumers and carers should be integrated to intervention design and delivery. Historically, consumers and carers were viewed as passive recipients of services with clinical treatments designed, implemented, and evaluated by professional experts. Consequently, research on consumer perspectives has focused on determining satisfaction and acceptability of treatments.

Relapse prevention should become a critical component of ongoing eating disorders care. Prospective and retrospective studies have reported a wide range of estimates for the rate of relapse which vary alongside the definitions of relapse employed, study methodology and length of follow-up. A recent prospective study by Carter and colleagues (2012)[57] showed a relapse rate of 41%, with 4-9 months following treatment appearing as the time period with the greatest risk for relapse. This study identified 3 main predictors of relapse that were clinically significant and consistent with prior literature (for example, see:[62,90,342]): (1) AN subtype: individuals with binge-purge subtype more than double the rates of relapse than those with restrictive AN (resumption of binge-purge behaviour characterised how these patients first relapsed); (2) level of motivation to recover; and (3) greater pre-treatment severity of obsessive compulsive symptoms (specifically, checking behaviours as measured on the Padua Inventory). The findings from this study point toward key targets for relapse prevention. Firstly, additional attention and potentially more intensive follow-ups should be prescribed to individuals with AN-binge purge subtype, since they have higher rates of relapse. First, since resumption of regular binge-purge behaviour characterised how patients with binge-purge AN first relapsed, interventions targeting this group may benefit from a continued focus on building skills to prevent the return of binge-purge symptoms even after the effects of underweight have been eliminated. Second, it may be important to target motivation to change during acute stages of treatment rather than as a prelude of treatment as has typically been the case (e.g. by incorporating motivational interviewing strategies). Third, addressing comorbid obsessive–compulsive symptoms during acute treatment as well as during the relapse prevention phase may play an important role in maintaining remission from the eating disorder.

Technology may play an important role in the implementation, dissemination and sustainability of prevention and treatment interventions, including relapse prevention. Eating disorders prevention programs are often impeded by barriers such as limited resources and inadequate infrastructure to support the translation of programs from research to practice. Treatment programs may face the further challenge of overcoming practical barriers, such as treatment location, availability and cost, and emotional barriers, such as stigma, secrecy and shame faced by individuals with eating disorders. Interventions enhanced or based on technology may be a valuable means of overcoming some of these challenges, as well as extending the reach of providers to allow access to underserved populations, reducing barriers to help seeking, and facilitating access to treatment[27]. A recent (2015) systematic review[305] collated evidence from 45 publications (with a total of 3646 patients) assessing technology-based interventions for AN and BN and reported largely positive outcomes. Guided technology-based interventions delivered through various platforms led to improvements in core symptoms in individuals with BN (binging, purging and eating disorder psychopathology) and showed some efficacy in preventing relapse in individuals with AN or when used as a therapeutic adjunct. These interventions were also supported for use in the context of eating disorders prevention and early intervention and carer support.

Training & Education

Training and education for health and education professionals is an essential strategy for health promotion and prevention of eating disorders. This intervention approach supports objectives across the entire spectrum of care across promotion, prevention, identification and early intervention, and treatment standards and strategies. Training on causes, risk factors, and identification, screening, diagnosis, and referral and management options could improve mental health literacy specific to eating disorders among professionals groups, contributing to a healthier, informed community. Training should be targeted to:

- *Health professionals:* An example of such a program is the Online Training Program In Eating Disorders developed by The Centre for Eating and Dieting Disorders in Australia. The program includes 5 modules designed to educate medical practitioners, nurses, dietitians, psychologists and other allied health professionals in the nature, identification, assessment and management of eating disorders through mediums including text based learning, videos, interactive activities and quizzes. Evaluation of the program has shown significant improvements in knowledge, skill, and confidence to treat eating disorders in health professionals who completed the course, along with a significant decrease in stigmatised beliefs about eating disorders[49].

- *Rural and remote clinicians:* A recent example of a practice model applied in Western Australia is the launch of Western Australia Eating Disorders Outreach and Consultation Service (WAEDOCS) which includes rural- and remote-based training for health and education professionals who treat and care for individuals over the age of 16 with eating disorders[139]. Administered through Sir Charles Gairdner Hospital, WAEDOCS aims to upskill clinicians working in inpatient settings and also offers consulting, mentoring, professional support and education for clinicians throughout the state in all settings: metropolitan and rural, public and private, community and hospital-based, mental and physical health[139]. Evaluations assessing the effectiveness of this initiative have yet to be developed.

- *Fitness professionals:* These professionals occupy a key position to identify warning signs of eating disorders such as excessive exercise, inadequate diet, and physical risk indicators. Some training workshops and resources are delivered or have been developed in Australia (e.g. by the Eating Disorders Foundation of Victoria[263],the Australian Centre for Eating Disorders[352] and the NEDC[355]), but there are no systematically developed and evaluated programs.

- *Education professionals:* Education professionals are in a key position to identify early warning signs of eating disorders and should be trained to recognise and act efficiently to assist individuals in need, or trained in the implementation of empirically-supported school- or classroom-based prevention programs to reduce eating disorder risk. The Butterfly Foundation, for example, offers professional development workshops for educators working with young people that provide skills and strategies to help support healthy body image. The Free to BE workshop is a flexible program for teachers and other educators to implement amongst students and young people in years 3 to 12. Developed as

part of the Australian Government's body image strategy, the evidence based resource provides education, training and support for education professionals on how to identify and prevent the early development of eating disorders through activities that promote positive body image and self-esteem[128].

- *Community providers*: Broad dissemination of evidence-based prevention programs will require infrastructure and training models to *train community providers*. In contrast to community providers, which can target thousands of individuals, the reach of health, fitness and education professionals is comparatively limited. Preliminary evidence provides support for efforts by the *Body Project* initiative to train peer-led trainers to deliver the intervention amongst community members[270]. Likewise, early evidence suggests that masters-level graduate students can train and supervise less experienced graduate students to successfully deliver cognitive behavioural therapy guided self-help for BED[393].

Appendix A

Search filters used to retrieve systematic reviews

Medline

1. ("review" or "review academic" or "review tutorial").pt.
2. (medline or medlars or embase or pubmed).tw,sh.
3. (scisearch or psychinfo or psycinfo).tw,sh.
4. (psychlit or psyclit).tw,sh.
5. cinahl.tw,sh.
6. ((hand adj2 search$) or (manual$ adj2 search$)).tw,sh.
7. (electronic database$ or bibliographic database$ or computeri?ed database$ or online database$).tw,sh.
8. (pooling or pooled or mantel haenszel).tw,sh.
9. (retraction of publication or retracted publication).pt.
10. (peto or dersimonian or der simonian or fixed effect).tw,sh.
11. or/2-10
12. 1 and 11
13. meta-analysis.pt.
14. meta-analysis.sh.
15. (meta-analys$ or meta analys$ or metaanalys$).tw,sh.
16. (systematic$ adj5 review$).tw,sh.
17. (systematic$ adj5 overview$).tw,sh.
18. (quantitativ$ adj5 review$).tw,sh.
19. (quantitativ$ adj5 overview$).tw,sh.
20. (quantitativ$ adj5 synthesis$).tw,sh.
21. (methodologic$ adj5 review$).tw,sh.
22. (methodologic$ adj5 overview$).tw,sh.
23. (integrative research review$ or research integration).tw.
24. or/13-23
25. 12 or 24
26. ("eating disorder$" or "anorexia nervosa" or "bulimia nervosa" or "binge eating disorder").sh.
27. 25 and 26
28. Limit 27 to yr=”2009-2016”

PsycINFO

1. meta analysis.sh.
2. meta-anal:.tw.
3. metaanal:.tw.
4. meta analysis.id.
5. (systematic: and (review: or overview)).tw.
6. (critical: and apprais:).tw.
7. (critical: and review:).tw.
8. or/1-7
9. case report.sh.
10. 8 not 9
11. limit 10 to human
12. eating disorders/ or anorexia nervosa/ or bulimia/ or binge eating/
13. 11 and 12

Excerpta Medica Database (EMBASE)

1. exp review/
2. (medline or medlars or embase or pubmed).ti,ab,sh.
3. (scisearch or psychlit or psyclit).ti,ab,sh.
4. (psycinfo or psychinfo).ti,ab,sh.
5. cinahl.ti,ab,sh.
6. ((hand adj2 search$) or (manual$ adj search$)).tw.

7. ((electronic adj database$) or (bibliographic adj database$)).tw.
8. ((pooled adj analys$) or pooling).tw.
9. (peto or dersimonian or (fixed adj effect) or mantel haenszel).tw.
10. RETRACTED ARTICLE/
11. or/2-10
12. 1 and 11
13. exp meta analysis/
14. meta?analys$.tw,sh.
15. (systematic$ adj5 review$).tw,sh.
16. (systematic$ adj5 overview$).tw,sh.
17. (quantitativ$ adj5 review$).tw,sh.
18. (quantitativ$ adj5 overview$).tw,sh.
19. (methodologic$ adj5 review$).tw,sh.
20. (methodologic$ adj5 overview$).tw,sh.
21. ((integrative adj5 research adj5 review$) or (research adj5 integration)).tw.
22. (quantitativ$ adj5 synthesi$).tw,sh.
23. or/13-22
24. 12 or 23
25. ("eating disorder$" or "anorexia nervosa" or "bulimia nervosa" or "binge eating disorder".sh.
26. 24 and 25

SCOPUS

1. (TITLE-ABS-KEY((eating disorder*) OR (anorexia nervosa) OR (bulimia nervosa) OR (binge eating disorder)))
2. (TITLE-ABS-KEY((systematic review*) OR (systematic overview*) OR (meta?analy*) OR (quantitativ* review*) OR (quantitativ* overview*) OR (methodologic* review*) OR (methodologic* overview*)))
3. ((TITLE-ABS-KEY((eating disorder*) OR (anorexia nervosa) OR (bulimia nervosa) OR (binge eating disorder)))) AND ((TITLE-ABS-KEY((systematic review*) OR (systematic overview*) OR (meta?analy*) OR (quantitativ* review*) OR (quantitativ* overview*) OR (methodologic* review*) OR (methodologic* overview*))))

Cochrane Collaboration - Database of Systematic Reviews

1. (eating disorder):ti,ab,kw or (anorexia nervosa):ti,ab,kw or (bulimia nervosa):ti,ab,kw or (binge eating):ti,ab,kw

Search Filters Used to Retrieve Randomised Controlled Trials (Key Questions 1 to 6)

Medline

1. exp randomised controlled trials/
2. "randomised controlled trial".pt.
3. "controlled clinical trial".pt.
4. (random$ or placebo$).ti,ab,sh.
5. ((singl$ or double$ or triple$ or treble$) and (blind$ or mask$)).tw,sh.
6. (retraction of publication or retracted publication).pt.
7. or/1-6
8. (animals not humans).sh.
9. 7 not 8
10. ("eating disorder$" or "anorexia nervosa" or "bulimia nervosa" or "binge eating disorder") .sh.
11. 9 and 10
12. Limit 11 to yr="2009-2016"

PsycINFO

1. treatment effectiveness evaluation.sh.
2. (random: and trial:).tw.
3. (random: and allocat:).tw.
4. double blind.tw.
5. single blind.tw.
6. or/1-5
7. limit 6 to human
8. clinical trial.id.
9. clinical trial:.tw.
10. ((singl: or doubl: or trebl: or tripl:) adj5 blind).tw.
11. (clin: adj25 trial:).ti,ab.

12. placebo:.tw.
13. placebo:.ti,ab.
14. random:.ti,ab.
15. methodology.sh.
16. experimental design.sh.
17. experimentation.sh.
18. experimental methods.sh.
19. or/7-18
20. limit 19 to human
21. eating disorders/ or anorexia nervosa/ or bulimia/ or binge eating/
22. 20 and 21

Excerpta Medica Database (EMBASE)

1. (random$ or placebo$).ti,ab.
2. ((single$ or double$ or triple$ or treble$) and (blind$ or mask$)).ti,ab.
3. controlled clinical trial$.ti,ab.
4. RETRACTED ARTICLE/
5. or/1-4
6. (animal$ not human$).sh,hw.
7. 5 not 6
8. ("eating disorder$" or "anorexia nervosa" or "bulimia nervosa" or "binge eating disorder").sh.
9. 7 and 8

SCOPUS

1. (eating disorder*) OR (TITLE-ABS-KEY(anorexia nervosa)) OR (TITLE-ABS-KEY(bulimia nervosa)) OR (TITLE-ABS-KEY(binge eating disorder))
2. randomised controlled trial*
3. random* OR placebo*
4. TITLE-ABS-KEY(blind* OR mask*)
5. TITLE-ABS-KEY(singl* OR doubl* OR tripl* OR trebl*)
6. (TITLE-ABS-KEY(blind* OR mask*)) AND (TITLE-ABS-KEY(singl* OR doubl* OR tripl* OR trebl*))
7. TITLE-ABS-KEY(clinical trial)
8. TITLE-ABS-KEY(control* trial)
9. (randomised controlled trial*) OR (random* OR placebo*) OR ((TITLE-ABS-KEY(blind* OR mask*)) AND (TITLE-ABS-KEY(singl* OR doubl* OR tripl* OR trebl*))) OR (TITLE-ABS-KEY(clinical trial)) OR (TITLE-ABS-KEY(control* trial))
10. ((ED*) OR (TITLE-ABS-KEY(anorexia nervosa)) OR (TITLE-ABS-KEY(bulimia nervosa)) OR (TITLE-ABS-KEY(binge eating disorder))) AND ((randomised controlled trial*) OR (random* OR placebo*) OR ((TITLE-ABS-KEY(blind* OR mask*)) AND (TITLE-ABS-KEY(singl* OR doubl* OR tripl* OR trebl*))) OR (TITLE-ABS-KEY(clinical trial)) OR (TITLE-ABS-KEY(control* trial)))
11. TITLE((eating disorder*) OR (anorexia nervosa) OR (bulimia nervosa) OR (binge eating disorder))
12. ((randomised controlled trial*) OR (random* OR placebo*) OR ((TITLE-ABS-KEY(blind* OR mask*)) AND (TITLE-ABS-KEY(singl* OR doubl* OR tripl* OR trebl*))) OR (TITLE-ABS-KEY(clinical trial)) OR (TITLE-ABS-KEY(control* trial))) AND (TITLE((eating disorder*) OR (anorexia nervosa) OR (bulimia nervosa) OR (binge eating disorder)))

Cochrane Collaboration - Central Register of Controlled Trials

1. (eating disorder):ti,ab,kw or (anorexia nervosa):ti,ab,kw or (bulimia nervosa):ti,ab,kw or (binge eating):ti,ab,kw or (disordered eating):ti,ab,kw in Clinical Trials
2. (therap*):ti,ab,kw or *therap*:ti,ab,kw or (trial):ti,ab,kw or (treatment):ti,ab,kw or (prevent*):ti,ab,kw
3. (drug):ti,ab,kw or (medicat*):ti,ab,kw or (pharm*):ti,ab,kw
4. (#2 OR #3)
5. (#4 AND #1)

Appendix B

Critical Appraisal of Systematic Reviews

Brief Summary of Overview Quality Assessment Questionnaire (OQAQ) Items
1. Were the search methods reported?
2. Was the search for evidence reasonably comprehensive?
3. Were the study inclusion criteria reported?
4. Was selection bias avoided?
5. Were the criteria for assessing study validity reported?
6. Was assessment of study validity appropriate?
7. Were methods to combine studies reported?
8. Were the findings of studies combined appropriately?
9. Were the conclusions supported by the data/analysis?

Note: OQAQ = Overview Quality Assessment Questionnaire. The OQAQ score ranges from 0 to 18, with 18 comprising the maximum quality score (scoring: no=0, partially or can't tell=1, yes=2). Poor quality: meets <50% of criteria; adequate quality: meets >50% of criteria; good quality: meets most (17/18 or more) criteria.

Critical Appraisal of Systematic Reviews Included in this Evidence Review

OQAQ Items	1	2	3	4	5	6	7	8	9	OQAQ	Overall
Allen (2011)	Yes	Partially	Partially	Partially	No	No	No	No	Yes	7	Poor
Balestrieri (2013)	Yes	Partially	Partially	Partially	No	No	No	No	Yes	7	Poor
Bankoff (2012)	Yes	Partially	Partially	Partially	No	No	No	No	Yes	7	Poor
Brownley	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	18	Excellent
Ciao (2014)	Yes	Partially	Partially	Partially	No	No	No	No	No	9	Poor
Citrome (2015)	Yes	Yes	Partially	Partially	No	No	Yes	Yes	Yes	12	Adequate
Couturier (2013)	Partially	Partially	No	No	No	No	No	No	Partially	3	Poor
Dahlgren (2014)	Yes	Partially	Yes	Partially	No	No	No	No	Partially	7	Poor
De Vos (2014)	Partially	Partially	Yes	Partially	Yes	Yes	Yes	Yes	Yes	15	Adequate
Dold (2015)	Yes	Yes	Yes	Partially	Yes	Partially	Yes	Yes	Yes	16	Adequate
Dolemeyer (2013)	Yes	Partially	Yes	Partially	Yes	Yes	Yes	No	Yes	14	Adequate
Fogarty (2016)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	14	Adequate
Galsworthy (2014)	Yes	Yes	Partially	Partially	Partially	No	No	No	Partially	8	Poor
Godfrey (2015)	Yes	Yes	Yes	Partially	Yes	Yes	Yes	Yes	Yes	17	Good
Hay (2015)	Yes	Yes	Yes	Partially	Yes	Partially	Yes	Yes	Yes	16	Adequate
Hay (2012)	Yes	Partially	No	Partially	No	No	No	No	Partially	5	Poor
Hay (2013)	Yes	Partially	Partially	Partially	Yes	Partially	No	No	Partially	9	Poor
Hay (2009)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	18	Good
Koskina (2013)	Yes	Partially	Partially	Partially	No	No	No	No	Yes	7	Poor
Lebow (2013)	Yes	Yes	Yes	Partially	Yes	Partially	Yes	Yes	Yes	16	Adequate
Lewis-Smith (2016)	Yes	Yes	Partially	Partially	Yes	Yes	No	Partially	Yes	13	Adequate
Loucas (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	18	Good
Macdonald (2012)	Yes	Partially	Partially	Partially	No	No	Partially	Partially	Yes	9	Poor
McClelland (2013)	Yes	Partially	Yes	Partially	No	No	No	No	Yes	8	Poor
Moola (2013)	Yes	Partially	Yes	Partially	No	No	No	No	Yes	8	Poor
Polnay (2014)	Yes	Partially	Yes	Partially	Yes	Yes	Yes	Yes	Yes	16	Adequate
Schlegl (2015)	Yes	Partially	Partially	Partially	No	No	Yes	Yes	Yes	11	Adequate
Tchanturia (2014)	Yes	Partially	Partially	Partially	No	No	No	No	Yes	6	Poor
Vancampfort (2014)	Yes	Yes	Partially	Yes	Yes	Yes	Yes	No	Yes	15	Adequate
Vancampfort (2013)	Yes	Partially	Partially	Partially	Yes	Yes	No	Partially	Yes	12	Adequate
Watson (2016)	Yes	Yes	Yes	Partially	Yes	Yes	Yes	Yes	Yes	17	Good

Appendix C

Systematic Reviews on Prevention Meeting Inclusion Criteria for the Evidence Review

Study Features	Inclusion/Exclusion Criteria	Intervention (s) Reviewed and # of RCTs
First author: Ciao **Publication year:** 2014 **Search year:** 2014 **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ RCTs or quasi-RCT ▪ ED prevention program ▪ Reported a reduction in existing ED pathology or prevented ED onset	**Total # RCTs**: 9 2 CBT 3 Obesity prevention 3 Cognitive dissonance 2 Healthy weight intervention
First author: Koskina **Publication year:** 2013 **Search year:** 2012 **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ Studies that applied an exposure therapy technique to an ED sample alone or in comparison to a control group	**Total # RCTs:** 31 exposure therapy Studies used either in vivo or virtual reality exposure
First author: Lewis-Smith **Publication year:** 2016 **Search year:** 2015 **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Sample comprised of women with average ages of 35-55 years (in 'midlife') ▪ Controlled studies ▪ Measured body image ▪ Pre- to post-intervention outcomes compared **Exclusion criteria:** ▪ Studies with participants with a history of diagnosed EDs or other clinical conditions ▪ Couples-based interventions ▪ Primary focus on weight loss ▪ Literature reviews and meta-analyses ▪ Studies that were entirely qualitative	**Total # RCTs**: 9 2 CBT 1 Acceptance and commitment therapy 1 Mindfulness 1 Dance 3 Walking 1 Yoga 1 Pilates 1 Resistance training
First author: Loucas **Publication year:** 2014 **Search year:** 2014 **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCTs ▪ e-therapy designed to prevent or treat an eating disorder ▪ Comparison to any other active intervention or control	**Total # RCTs**: 20 (13 prevention) 10 'Student Bodies' CBT program 1 Motivational interviewing 1 Cognitive dissonance 1 Physical education
First author: Melioli **Publication year:** 2016 **Search year:** 2015 **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported (Cochrane methodology); all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Studies published between 2000 – 2015 ▪ Experimental or quasi-experimental design ▪ control group with a minimal intervention such as a brochure ▪ included symptomatic participants or participants with full eating disorders **Exclusion criteria:** ▪ Studies that included an active control group or compared face-to-face and Internet-based programs	**Total # RCTs:** 20(all prevention) 19 CBT based 1 Motivational interviewing

Study Features	Inclusion/Exclusion Criteria	Intervention (s) Reviewed and # of RCTs
First author: Schlegl **Publication year:** 2015 **Search year:** 2014 **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ Technology-based interventions ▪ Samples with diagnosed AN or BN, body image concerns, disordered eating, subthreshold EDs or carers of ED patients ▪ Outcome data at post-intervention and follow-up ▪ Minimum sample of N=10 **Exclusion criteria:** ▪ Psychoeducational or counselling interventions, online support groups and computer-based assessment methods ▪ Studies that evaluated VR in the treatment of body image ▪ Studies of the prevention program StudentBodies ▪ Unpublished studies, abstracts, conference proceedings, dissertations and letters	**Total # RCTs:** 45 41 Computer based interventions 4 Mobile interventions
First author: Watson **Publication year:** 2016 **Search year:** 2016 **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Peer reviewed RCTs ▪ ED prevention program, focus on efficacy **Exclusion criteria:** ▪ Participants (all or some) with an ED diagnosis ▪ Whole sample or subsample could not be categorised as universal, selective or indicated	**Total # RCTs**: 9 2 CBT 3 Self-esteem based 3 Media literacy 3 Secondary prevention 1 Positive psychology intervention 2 Multicomponent programs

Appendix D

Randomised Controlled Trials on Prevention (Universal, Selective, or Indicated) Meeting Inclusion Criteria for the Evidence Review

Study Features	Study Groups	Summary of outcomes
First author, year: Aardoom, 2016 **Country:** Netherlands **Setting:** Electronic **Px approach:** Indicated **Population:** Males and females aged 16 and older with ED symptoms **Number randomised:** 354 **Total number of sessions:** 3 1-hour sessions **Analysis:** Completers **Follow-up:** 3 and 6 months post-intervention **Inclusion criteria:** age ≥ 16 years; internet access; ED symptoms **Exclusion criteria:** None reported **Format:** Electronic **Funding**: Yes	**Study groups:** Internet-based psychoeducation intervention 'Featback' ***N*:** 87 **Mean age:** 24.7 years (SD = 7.1) **% female:** 98.9% **Attrition rate:** 37.9% **Study groups:** Featback + low-intensity digital therapist support ***N*:** 88 **Mean age:** 23 years (SD = 7) **% female:** 98.9% **Attrition rate:** 45.5% **Study groups:** Featback + high-intensity digital therapist support ***N*:** 89 **Mean age:** 26.3 years (SD = 9.2) **% female:** 97.8% **Attrition rate:** 50.6% **Study groups:** Waitlist control ***N*:** 90 **Mean age:** 22.8 years (SD = 6.6) **% female:** 90% **Attrition rate:** 72%	Post-intervention improvements in bulimic psychopathology and symptoms of depression and anxiety, and 3-month follow-up improvements in ED-related quality of life and symptoms of depression and anxiety, were observed in participants receiving Featback (any version) compared with waitlist controls. Participants receiving the high-intensity therapist support showed greater improvement in ED-related quality of life at post-intervention and 6-month follow-up than participants receiving low-intensity therapist support. There were no other significant differences between the three versions of the intervention.
First author, year: Atkinson, 2014 **Country:** Australia **Setting:** South Australian university campuses **Px approach:** Selective **Population:** Young females **Number randomised:** 50 **Total number of sessions:** 3 1-hour sessions **Analysis:** Completers **Follow-up:** 1 and 6 months post-intervention **Inclusion criteria:** Young women with body image concerns at risk for an eating disorder **Exclusion criteria:** Diagnosed eating disorder **Format:** In-person group sessions **Funding**: Yes	**Study groups:** Mindfulness based intervention (MBI) program based on key features of mindfulness in the 'The Body Project' ***N*:** 17 **Mean age:** 21.4 years (SD = 3.22) **% female:** 100% **Attrition rate:** 23.5% **Study groups:** Dissonance-based intervention (DBI) program developed by Stice et al. (2006) that involves dissonance-inducing activities ***N*:** 16 **Mean age:** 20.5 years (SD = 3.22) **% female:** 100% **Attrition rate:** 18.8% **Study groups:** Assessment-only control ***N*:** 17 **Mean age:** 20.5 years (SD = 3.22) **% female:** 100% **Attrition rate:** 0%	At the one month follow-up, MBI was significantly more effective at reducing weight and shape concerns, thin-ideal internalisation and associated dietary restraint, eating disorder symptoms and psychosocial impairment in young women with body image concerns compared to the control group. The size of this effect was large. A small but significant difference was found in the reduction of negative affect in the MBI group compared to the control group. These improvements, however, were lost by the 6-month follow-up. The DBI group had no significant differences on any outcome measures compared to the control group, with the exception of dietary restraint and eating disorder symptoms.

Study Features	Study Groups	Summary of outcomes
First author, year: Atkinson, 2015 **Country:** Australia **Setting:** Single-sex female high-schools in South Australia **Px approach:** Selective **Population:** Female adolescents at high-school **Number randomised:** 347 students (from 19 classes across 4 high-schools) **Total number of sessions:** 1 lesson per week, for 3 weeks **Analysis:** ITT **Follow-up:** 1 and 6 months post-intervention **Inclusion criteria:** Students in grade 10 – 12 **Exclusion criteria:** Not reported **Format:** Classroom lessons **Funding**: Yes	**Study groups:** Mindfulness based intervention (MBI) program based on key features of mindfulness in the 'The Body Project'. The intervention also included some exercises adapted from Mindfulness-Based Cognitive Therapy (MBCT) for depression ***N***: 138 **Mean age:** 15.7 (SD = 0.77) **% female:** 100% **Attrition rate:** 2.2% **Study groups:** Dissonance Based Intervention (DBI) program ***N***: 108 **Mean age:** 15.7 (SD = 0.77) **% female:** 100% **Attrition rate:** 0% **Study groups:** Control group (no intervention) ***N***: 101 **Mean age:** 15.7 (SD = 0.77) **% female:** 100% **Attrition rate:** 3.9%	Outcomes measured were negative affect, thin-ideal internalisation, body dissatisfaction, dietary restraint and bulimic pathology. This study found that overall, when delivered by peer facilitators, neither MBI nor DBI had a statistically significant impact on any of the outcome measures. However when delivered by a trained facilitator the MBI group displayed reductions in weight and shape concerns, dietary restraint, sociocultural pressures, eating disorder symptoms, and psychosocial impairment, with significant reductions relative to the control group at the 6-month follow-up. The size of this effect was medium.
First author, year: Becker, 2010 **Country:** USA **Setting:** Trinity University **Px approach:** Selective **Population:** University students **Number randomised:** 106 (across 7 sororities) **Total number of sessions:** 2 2-hour sessions **Analysis:** ITT **Follow-up:** 8 weeks, 8 months, 14 months **Inclusion criteria:** Female sorority members **Exclusion criteria:** Individuals with a diagnosed eating disorder **Format:** Peer-led, in person sessions **Funding**: No	**Study groups:** Peer-led cognitive dissonance prevention program (CD) ***N***: 53 **Mean age:** 18.73 (SD = 0.72) **% female:** 100% **Attrition rate:** 0% **Study groups:** Peer-led modified healthy weight prevention program (MHW) ***N***: 53 **Mean age:** 18.73 (SD = 0.72) **% female:** 100% **Attrition rate:** 7.5%	At 14 month follow-up, both peer-led CD and peer-led MHW showed statistically significant reductions in eating disorder risk factors including reductions in the thin-ideal, body dissatisfaction, dietary restraint and bulimic symptoms. There were no significant differences between intervention groups at 14 months. However at 8-week and 8-month follow-ups, CD had a significantly greater impact on negative affect, thin idealization and bulimic pathology than MHW.
First author, year: Becker, 2012 **Country:** USA **Setting:** University **Px approach:** Selective **Population:** Female college athletes **Number randomised:** 168 (over 9 sports teams) **Total number of sessions:** 3 60-80 minute sessions **Analysis:** ITT **Follow-up:** 6 weeks and 12 months **Inclusion criteria:** Female college athletes participating in a varsity sports team **Exclusion criteria:** Individuals with an eating disorder **Format:** In-person, peer-led sessions **Funding**: Yes	**Study groups:** Peer-led athlete modified dissonance based prevention (AM-DPB) ***N***: 79 **Mean age:** 18.94 (SD = 1.04) **% female:** 100% **Attrition rate:** 7.6% **Study groups:** Peer-led athlete-modified-healthy weight prevention initiative (AM-HWI) ***N***: 89 **Mean age:** 18.94 (SD = 1.04) **% female:** 100% **Attrition rate:** 5.6%	Outcomes were thin-ideal internalisation, dietary restraint, bulimic pathology, body dissatisfaction, negative affect, and manipulation check. At 6 weeks post intervention, both AM-DPB and AM-HWI resulted in statistically significant reductions in all eating disorder risk factors. There were no significant differences between intervention types. At the 12-month post-intervention follow-up, these effects remained significant for negative affect, bulimic pathology and WSC.

Study Features	Study Groups	Summary of outcomes
First author, year: Brown, 2015 **Country:** USA **Setting:** University and the community **Px approach:** Selective **Population:** Gay males **Number randomised:** 87 **Total number of sessions:** 2 sessions **Analysis:** Not reported **Follow-up:** Post-intervention and 4 weeks **Inclusion criteria:** Gay males, aged 18 - 30 **Exclusion criteria:** Individuals who met the DSM-5 criteria for an eating disorder **Format:** In person **Funding**: Yes	**Study groups:** Cognitive dissonance based program taken from The Pride Body Project (CD) ***N***: 47 **Mean age:** 21.5 (SD = 2.53) **% female:** 0% **Attrition rate:** 4.2% **Study groups:** Waitlist control ***N***: 40 **Mean age:** 21.5 (SD = 2.53) **% female:** 0% **Attrition rate:** 2.5%	The CD prevention program resulted in significantly greater reductions in body dissatisfaction, drive for masculinity, dietary restrain and bulimic symptoms at both post-intervention and 4 week follow-ups. A significantly greater reduction in body ideal internalisation was also found at the post intervention follow-up, but this was not maintained at 4 weeks. The CD prevention program also saw a significant shift in participants shelf-evaluation formerly based on appearance, towards a self-evaluation based on competence. This shift was not observed in the control group.
First author, year: Diedrichs, 2015 **Country:** United Kingdom **Setting:** Year 7 and 8 students **Px approach:** Universal **Population:** British adolescents **Number randomised:** 1707 **Total number of sessions:** 1 session **Analysis:** ITT **Follow-up:** Pre-, post-intervention, 5-10 weeks **Inclusion criteria:** Grade 7 & 8 students in participating schools **Exclusion criteria:** Not reported **Format:** In-person group session **Funding**: Yes	**Study groups:** 90-minute single-session school-based body image intervention *Dove Confident Me* delivered by teachers ***N***: 729 **Mean age:** boys: 12.3 (SD=0.7); girls: 12.2 (SD=0.7) **% female:** 50.8% of total sample were girls **Attrition rate:** Not reported **Study groups:** 90-minute single-session school-based body image intervention *Dove Confident Me* delivered by researchers ***N***: 551 **Mean age:** boys: 12.1 (SD=0.7); girls: 12.2 (SD=0.7) **% female:** 50.8% of total sample were girls **Attrition rate:** Not reported **Study groups:** Usual lessons control ***N***: 427 **Mean age:** boys: 12.1 (SD=0.7); girls: 12.1 (SD=0.6) **% female:** 50.8% of total sample were girls **Attrition rate:** Not reported	Multilevel mixed-models showed improvements in body esteem, negative affect, dietary restraint, eating disorder symptoms, awareness of sociocultural pressures and life engagement in students receiving the teacher-led intervention compared to controls. Students receiving the researcher-led intervention improved in life engagement as well. However, benefits were primarily seen in females and effects were small to moderate in size and were not maintained at follow-up.
First author, year: Kilpela, 2016 **Country:** USA **Setting:** Liberal arts colleges **Px approach:** Universal **Population:** Undergraduate males and females **Number randomised:** 185 **Total number of sessions:** 2, 2-h sessions **Analysis**: Completers **Follow-up:** Post-intervention, 2- and 6-month follow-up **Exclusion criteria:** Meet criteria for EDs on baseline EDE-Q **Format:** Small-group sessions delivered by a peer leader **Funding**: No	**Study groups:** Mixed-gender version of the cognitive dissonance intervention, the Body Project ***N***: 77 women; 45 men **Mean age:** 19.9 (SD=1.2) **% female:** 63% **Attrition rate:** Not reported **Study groups:** Female-only version of the cognitive dissonance intervention, the Body Project ***N***: 65 women **Mean age:** 19.9 (SD=1.2) **% female:** 100% **Attrition rate:** Not reported **Study groups:** Waitlist control group ***N***: 38 women; 46 men **Mean age:** 19.9 (SD=1.2) **% female:** 45% **Attrition rate:** Not reported	At follow-up, men receiving the cognitive dissonance intervention had significant improvements in body satisfaction, body fat and muscularity that were sustained at 6-month follow-up, compared with waitlist controls. In contrast, women in both intervention groups exhibited post-intervention improvements in body satisfaction and eating pathology, but neither effect was sustained at either 2- or 6-month follow-up.

Study Features	Study Groups	Summary of outcomes
First author, year: Lopez-Guimera, 2011 **Country:** Spain **Setting:** High-school classrooms **Px approach:** Universal **Population:** Adolescent girls **Number randomised:** 363 (across 7 schools) **Total number of sessions:** 1 90-minute nutrition session plus 4 60-90 minutes sessions delivered weekly **Analysis:** Completers **Follow-up:** Post-intervention and 6-month follow-up **Inclusion criteria:** Grade 8 adolescent girls **Exclusion criteria:** Not reported **Format:** In-person classes taught by a trained facilitator **Funding**: No	**Study groups:** Media-literacy prevention program that included a nutritional component (NUT+ML). The program was based on a social-cognitive and media-literacy approach ***N***: 57 **Mean age:** 13.5 (SD = 0.38) **% female:** 100% **Attrition rate:** Not reported **Study groups:** Partial prevention program with only a media literacy component (ML) ***N***: 78 **Mean age:** 13.5 (SD = 0.38) **% female:** 100% **Attrition rate:** Not reported **Study groups:** No treatment (control group) who participated in their normal classes ***N***: 128 **Mean age:** 13.5 (SD = 0.38) **% female:** 100% **Attrition rate:** Not reported	The NUT+ML and ML prevention programs resulted in improvements in attitudes towards eating and body image concerns at the post-treatment follow-up compared with controls. The size of this effect ranged from small to moderate, and there were no significant differences between the two prevention interventions. Of those who completed the 6-month follow-up, effects were maintained across both prevention programs compared to the control, with no significant differences between programs at the 6 month follow-up.
First author, year: McMillan, 2011 **Country:** USA **Setting:** University **Px approach:** Selective **Population:** Female undergraduate college students **Number randomised:** 124 **Total number of sessions:** 4 60-minute weekly sessions **Analysis:** ITT **Follow-up:** Post intervention and 3 month follow-up **Inclusion criteria:** Female undergraduate students with body image concerns **Exclusion criteria:** Individuals who meet the criteria for an ED **Format:** In-person sessions **Funding**: No	**Study groups:** High-level cognitive dissonance program (HCD) ***N***: 44 **Mean age:** 20.9 (SD = 3.9) **% female:** 100% **Attrition rate:** 19% **Study groups:** Low-level cognitive dissonance program (LCD) ***N***: 39 **Mean age:** 20.9 (SD = 3.9) **% female:** 100% **Attrition rate:** 19% **Study groups:** Assessment-only control ***N***: 41 **Mean age:** 20.5 years (SD = 3.22) **% female:** 100% **Attrition rate:** 19%	Outcomes assessed were thin idealization, body dissatisfaction, restrained eating, eating disorder symptoms and negative affect. Individuals in the HCD group experienced significantly greater reductions in all outcome measures post-intervention compared to those in the wait-list control group. All of these effects persisted at 3-months with the exception of eating disorder symptoms. Participants in the LCD group experienced significant reductions in thin-ideal internalisation, body dissatisfaction and dieting compared to the wait-list control, and all of these effects except those for body dissatisfaction persisted at 3-months. When compared to each other, HCD saw a greater reduction in eating disorder symptoms but this was only demonstrated at the post-intervention follow-up and not at the 3 month follow-up.
First author, year: Muller, 2013 **Country:** USA **Setting:** High-schools and universities **Px approach:** Selective **Population:** Adolescent female high school and college students with body image concerns **Number randomised:** 977 from 12 high-schools and 8 universities **Total number of sessions:** 4 1-hour sessions **Analysis:** Not reported **Follow-up:** Post treatment (4 weeks) **Inclusion criteria:** Young women with body image concerns **Exclusion criteria:** Individuals who met DSM-IV criteria for an eating disorder **Format:** In-person, group sessions **Format:** Not reported **Funding**: No	**Study groups:** Dissonance-based thin-ideal internalisation reduction program (DBP) ***N***: 488 **Mean age:** 18.6 (SD = 4.6) **% female:** 100% **Attrition rate:** Not reported **Study groups:** Assessment only control group ***N***: 189 **Mean age:** 18.6 (SD = 4.6) **% female:** 100% **Attrition rate:** Not reported	DBP programs were more effective for reducing eating disorder symptoms and thin-ideal internalisation in individuals who already reported an internalisation of the thin ideal; for reducing eating disorder symptoms for individuals with DSM-V eating disorder symptoms; and for reducing body dissatisfaction in older rather than younger adolescent participants.

Study Features	Study Groups	Summary of outcomes
First author, year: Raich, 2010 **Country:** Spain **Setting:** Secondary school **Px approach:** Universal **Population:** Female secondary school students **Number randomised:** 349 students from 13 schools **Total number of sessions:** Not reported **Analysis:** ITT **Follow-up:** Post-intervention **Inclusion criteria:** Secondary school students **Exclusion criteria:** Not reported **Format:** In-person, group sessions **Funding**: No	**Study groups:** Eating disorder prevention program including education on nutrition, critiquing models of beauty, and media literacy (EDP) ***N***: 84 **Mean age:** 13 (SD = 0.47) **% female:** 100% **Attrition rate:** 17% **Study groups:** Partial prevention program without the nutritional component (PPP) ***N***: 97 **Mean age:** 13 (SD = 0.47) **% female:** 100% **Attrition rate:** 17% **Study groups:** Assessment-only control ***N***: 167 **Mean age:** 13 (SD = 0.47) **% female:** 100% **Attrition rate:** 17%	EDP was the most effective for improving eating attitudes, pressure to be thin and dieting. PPP was more effective for improving outcome measures compared to the control group, but not EDP. Participants in the control group did not show significant improvements in outcome measures.
First author, year: Rohde, 2014 **Country:** USA **Setting:** Middle school classrooms **Px approach:** Universal **Population:** Female middle school students with body dissatisfaction **Number randomised:** 133 **Total number of sessions:** 6 45-minute sessions, delivered weekly **Analysis:** Not reported **Follow-up:** Post-intervention and 3-month follow-up **Inclusion criteria:** Female middle school students with body dissatisfaction **Exclusion criteria:** Individuals withr an eating disorder **Format:** In person, classroom sessions **Funding**: No	**Study groups:** Adaptation of the Body Project delivered to middle school students (MS Body Project) ***N***: 41 **Mean age:** 12.1 (SD = 0.9) **% female:** 100% **Attrition rate:** 12.2% **Study groups:** No-intervention control, however participants were given a brochure with general information about body image ***N***: 40 **Mean age:** 12.1 (SD = 0.9) **% female:** 100% **Attrition rate:** 2.5%	The MS Body Project significantly reduced the perceived pressure to be thin compared to the control group at post-intervention follow-up, and was significantly more effective than control treatment at reducing negative affect compared at 3-month follow-up (medium effect size).
First author, year: Stice, 2009 **Country:** USA **Setting:** High-schools **Px approach:** Universal **Population:** Female adolescent high school students **Number randomised:** 306 **Total number of sessions:** 4 60-minute sessions **Analysis:** ITT **Follow-up:** Post-intervention and 6-month follow-up, and at 1-, 2-, and 3-year follow-up **Inclusion criteria:** Adolescent girls with body image concerns **Exclusion criteria:** Individuals who met DSM-IV criteria for AN, BN or BED **Format:** In-person group sessions **Funding**: No	**Study groups:** Dissonance prevention program (DP) ***N***: 139 **Mean age:** 15.7 (SD = 1.1) **% female:** 100% **Attrition rate:** 24.5% **Study groups:** Assessment only control ***N***: 167 **Mean age:** 15.7 (SD = 1.1) **% female:** 100% **Attrition rate:** 6%	Participants in the DP group had significantly greater reductions in eating disorder risk factors, including thin-ideal internalisation, body dissatisfaction, and dieting, and in eating disorder symptoms from pre-test to post-test compared with assessment-only controls. The effects for body dissatisfaction, dieting, and eating disorder symptoms persisted through 1-year follow-up (small to medium effect size).

Study Features	Study Groups	Summary of outcomes
First author, year: Stice, 2011 **Country:** USA **Setting:** High-school **Px approach:** Selective **Population:** Female adolescents **Number randomised:** 306 **Total number of sessions:** 4 60-minute group sessions **Analysis:** ITT **Follow-up:** 2 and 3 year follow-ups **Inclusion criteria:** Female high-school students with body image concerns, aged 14 – 19 years **Exclusion criteria:** Individuals who met DSM-IV criteria for AN, BN or BED **Format:** In-person group sessions delivered by health professionals **Funding**: No	**Study groups:** Dissonance-based prevention program (DBP) ***N*: 135** **Mean age:** 15.7 (SD = 1.1) **% female:** 100% **Attrition rate:** 18.5% **Study groups:** Educational brochure control group ***N*:** 171 **Mean age:** 15.7 (SD = 1.1) **% female:** 100% **Attrition rate:** 14.6%	Participants in the DBP group experienced significantly greater reductions in body dissatisfaction at 2 years and in eating disorder symptoms at 3 years, compared to the control group (moderate effect size).
First author, year: Stice, 2012 **Country:** USA **Setting:** High-schools and universities **Px approach:** Selective **Population:** Female adolescents **Number randomised:** 410 **Total number of sessions:** 3 weekly 60-minute sessions **Analysis:** Not reported **Follow-up:** post-intervention and 6-month, 1-year, 2-year, and 3-year follow-ups **Inclusion criteria:** Female adolescents aged 14 – 19 with body image concerns **Exclusion criteria:** Individuals who met DSM-IV criteria for AN, BN or BED **Format:** In-person group sessions **Funding**: No	**Study groups:** Dissonance-based prevention program (DBP) ***N*:** Not reported **Mean age:** 17.1 (SD = 1.6) **% female:** 100% **Attrition rate:** 6% **Study groups:** P ***N*:** Not reported **Mean age:** 17.1 (SD = 1.6) **% female:** 100% **Attrition rate:** 6% **Study groups:** P ***N*:** Not reported **Mean age:** 17.1 (SD = 1.6) **% female:** 100% **Attrition rate:** 6% **Study groups:** P ***N*:** Not reported **Mean age:** 17.1 (SD = 1.6) **% female:** 100% **Attrition rate:** 6%	The strongest predictor for eating disorder onset was the denial of the costs associated with pursuing the thin ideal: women in the upper 16% of this measure were 4x more likely to develop an eating disorder compared to the rest of the sample. Negative affect was the most significant enhancer of other risk factors for the onset of an eating disorder, increasing risk from 5 to up to 27% in participants across the four groups. DBP was the most effective program for reducing the risk for eating disorder onset, although when compared to AC, both ECW and HWC were also able to reduce this risk at a significant level at all follow-ups.
First author, year: Stice, 2012 **Country:** USA **Setting:** University **Px approach:** Selective **Population:** Young women **Number randomised:** 398 **Total number of sessions:** 4 1-hour group sessions **Analysis:** ITT **Follow-up:** Post-intervention and 6 months **Inclusion criteria:** Female college students presenting with body image concerns **Exclusion criteria:** DSM-IV criteria for AN, BN or BED **Format:** In-person group sessions **Funding**: No	**Study groups:** Healthy Weight prevention program (HW) which promotes gradual lasting healthy improvements to dietary intake and physical activity ***N*:** 198 **Mean age:** 18.4 (SD = 0.6) **% female:** 100% **Attrition rate:** 4.5% **Study groups:** Psychoeducational brochure control condition ***N*:** 200 **Mean age:** 18.4 (SD = 0.6) **% female:** 100% **Attrition rate:** 9%	The primary outcome measure was eating disorder symptoms. Secondary outcome measures included body dissatisfaction, depressive symptoms, dieting, dietary intake and physical activity. This study found that participants in the HW group experienced statistically greater reductions in eating disorder symptoms at the post-intervention follow-up but not the 6 month follow-up. At the post-intervention follow-up participants in the HW group also experienced reduced dieting and body dissatisfaction, but not depression or self-reported caloric intake.

Study Features	Study Groups	Summary of outcomes
First author, year: Stice, 2013 **Country:** USA **Setting:** University **Px approach:** Selective **Population:** Female university students and female university staff **Number randomised:** 408 across 7 universities **Total number of sessions:** 4 sessions **Analysis:** ITT **Follow-up:** Post-intervention and 12 months **Inclusion criteria:** Female university students and staff with body image concerns **Exclusion criteria:** Individuals who met DSM-IV criteria for AN, BN or BED **Format:** In-person group sessions **Funding**: No	**Study groups:** Enhanced dissonance intervention program based on principles of The Body Project (EDP) ***N*:** 203 **Mean age:** 21.6 (SD = 5.64) **% female:** 100% **Attrition rate:** 3.9% **Study groups:** Educational brochure control group ***N*:** 205 **Mean age:** 21.6 (SD = 5.64) **% female:** 100% **Attrition rate:** 5.4%	Girls in the EDP group demonstrated a significantly greater improvement in body dissatisfaction, internalisation of the thin-ideal, eating disorder symptoms and overall psychosocial functioning compared to controls. These effects were found at post-intervention and 12-month follow-ups.
First author, year: Stice, 2013 **Country:** USA **Setting:** University **Px approach:** Universal **Population:** Female university students **Number randomised:** 171 recruited from 2 universities **Total number of sessions:** 4 1-hour group session **Analysis:** ITT **Follow-up:** Post-intervention and 12-month follow-up **Inclusion criteria:** Female undergraduate students with body image concerns **Exclusion criteria:** Individuals who met DSM-IV criteria for AN, BN or BED **Format:** In-person group sessions led by undergraduate peer leaders and clinicians **Funding**: Yes	**Study groups:** Cognitive dissonance program led by undergraduate peer leaders ***N*:** 44 **Mean age:** 20.9 (SD = 4) **% female:** 100% **Attrition rate:** 16.2% **Study groups:** Cognitive dissonance program led by trained clinicians ***N*:** 55 **Mean age:** 20.9 (SD = 4) **% female:** 100% **Attrition rate:** 0% **Study groups:** Educational brochure control group ***N*:** 72 **Mean age:** 20.9 (SD = 4) **% female:** 100% **Attrition rate:** 1.4%	Participants in both dissonance programs experienced significantly greater improvements in thin-ideal internalisation, body dissatisfaction, dieting, negative affect and eating disorder symptoms at the post-intervention follow-up compared with controls. Compared to the peer-led group sessions, the clinician-led cognitive dissonance sessions resulted in significantly greater reductions in body dissatisfaction, dieting and negative affect. At the 12-month follow-up participants in the clinician-led cognitive dissonance group showed significantly greater improvements across all outcome measures compared to the control group, while the peer-led dissonance group had greater improvements than control on the dieting measure only.
First author, year: Stice, 2013 **Country: USA** **Setting:** College/university **Px approach:** Selective **Population:** Female college students, aged 17 – 20 years **Number randomised:** 398 **Total number of sessions:** 1 4-hour group session **Analysis:** ITT **Follow-up:** Post-intervention, 6 months and 1- and 2- years **Inclusion criteria:** Female college students with body image concerns **Exclusion criteria:** Individuals who met DSM-IV criteria for AN, BN or BED **Format:** In person group sessions **Funding**: No	**Study groups:** Healthy Weight 2; an education based prevention program that educates participants about a healthy diet, exercise and behaviour (HW2) ***N*:** 198 **Mean age:** 18.4 **% female:** 100% **Attrition rate:** 7% **Study groups:** Psychoeducational brochure control condition ***N*:** 200 **Mean age:** 18.4 **% female:** 100% **Attrition rate:** 7%	The HW2 prevention intervention resulted in statistically greater reduction in body dissatisfaction, depressive symptoms, dieting, caloric intake and physical activity at 1 and 2 year follow-up (small effect size) compared to the control group. The HW2 intervention resulted in a statistically and clinically significant (60%) reduction in eating disorder onset at 2 years, and significant reductions in body dissatisfaction and BMI in individuals with comorbid obesity.

Study Features	Study Groups	Summary of outcomes
First author, year: Stice, 2013 **Country:** USA **Setting:** High-school **Px approach:** Selective **Population:** Female high-school students **Number randomised:** 306 **Total number of sessions:** 4 60-minute group sessions **Analysis:** Not reported **Follow-up:** Post-intervention and 12 months **Inclusion criteria:** Female high-school students with body image concerns **Exclusion criteria:** Participants with DSM-IV AN, BN or BED **Format:** In-person group sessions **Funding**: No	**Study groups:** Dissonance based prevention program (DBP) ***N*:** 139 **Mean age:** 15.7 (SD = 1.1) **% female:** 100% **Attrition rate:** Not reported **Study groups:** Educational brochure control group ***N*:** 167 **Mean age:** 15.7 (SD = 1.1) **% female:** 100% **Attrition rate:** Not reported	DBP significantly reduced thin-ideal internalisation, body dissatisfaction and eating pathology at the 12-month follow-up (moderate effect size) compared to the control group.
First author, year: Tanofsky-Kraff, 2016 **Country:** USA **Setting:** Group therapy and lab **Px approach:** Selective **Population:** Healthy adolescent females aged 12-17 **Number randomised:** 88 **Total number of sessions:** 12 weekly 90-min group sessions **Analysis:** Not reported **Follow-up:** Post-intervention, 6- and 12-months **Inclusion criteria:** Females aged 10-16 with poor body image, low self-esteem or self-confidence, non-participation in sports, poor diet, over- or under-weight **Exclusion criteria:** None listed **Format:** In-person group sessions and individual testing **Funding**: Yes	**Study groups:** Interpersonal psychotherapy (IPT) ***N*:** 46 **Mean age:** 14.1 (SD = 1.5) **% female:** 100% **Attrition rate:** Not reported **Study groups:** Health education ***N*:** 46 **Mean age:** 14.7 (SD = 1.8) **% female:** 100% **Attrition rate:** Not reported	The percentage of daily energy needs consumed by snack-foods increased for those receiving the health education intervention and decreased for those receiving the IPT intervention by 1-year follow-up. Girls receiving the health education intervention also experienced improvements in pre-meal state depressive state at 6-month but not 1-year follow-up. None of the changes observed in the study were considered to be clinically significant.
First author, year: Tanofsky-Kraff, 2014 **Country:** USA **Setting:** University and hospital **Px approach:** Selective **Population:** Adolescent females **Number randomised:** 113 **Total number of sessions:** 12 90-minute sessions **Analysis:** ITT **Follow-up:** EOT, 6- and 12- months **Inclusion criteria:** Adolescent females at risk of adult obesity and an eating disorder, BMI 75th – 97th percentile, loss of control eating **Exclusion criteria:** Individuals with a medical condition (e.g. diabetes), a DSM-IV or V eating disorder or axis I or II psychiatric condition, participation in weight loss therapy or psychotherapy, medications that effect body weight **Format:** In-person individual therapy or in-person group sessions **Format:** In-person sessions **Funding**: No	**Study groups:** Interpersonal psychotherapy prevention program (IPP) ***N*:** 56 **Mean age:** 14.2 (SD =1.5) **% female: 100%** **Attrition rate:** 12.5% **Study groups:** Standard health education (SHE) ***N*:** 60 **Mean age:** 14.8 (SD = 1.7) **% female:** 100% **Attrition rate:** 18.3%	Participants in both groups experienced improvements in weight status, mood and reductions in feelings of a loss of control over eating by 1-year follow-up.

Study Features	Study Groups	Summary of outcomes
First author, year: Tirlea, 2016 **Country:** Australia **Setting:** Primary and secondary school **Px approach:** Selective **Population:** Students **Number randomised:** 122 **Total number of sessions:** 10 3-h sessions **Analysis:** Not reported **Follow-up:** Post-intervention and 12 months **Inclusion criteria:** Females aged 10-16 with poor body image, low self-esteem or self-confidence, non-participation in sports, poor diet, over- or under-weight **Exclusion criteria:** None listed **Format:** In-person group sessions **Funding**: Yes	**Study groups:** Multicomponent prevention program ***N*:** 122 participants in total; groups alternately received the intervention or control **Mean age:** 12 (SD = 1) **% female:** 100% **Attrition rate:** 8% **Study groups:** Waitlist control ***N*:** 122 participants in total; groups alternately received the intervention or control **Mean age:** 12 (SD = 1) **% female:** 100% **Attrition rate:** 8%	Participation in the intervention led to significant improvements in self-esteem, self-efficacy and dieting behaviours that were sustained through 6-month follow-up.
First author, year: Wilksch, 2015 **Country:** Australia **Setting:** High-school **Px approach:** Universal **Population:** Grade 7 and 8 boys and girls **Number randomised:** 1316 from 12 schools **Total number of sessions:** 8 50-minute lessons delivered twice weekly **Analysis:** ITT **Follow-up:** Post intervention, 6- and 12-month follow-ups **Inclusion criteria:** Grade 7 and 8 students **Exclusion criteria:** Individuals meeting the clinical baseline for a diagnosable eating disorder **Format:** In-person, class sessions **Funding**: Yes	**Study groups:** Media Smart prevention program (MSP) ***N*: 239** **Mean age:** 13.21 (SD = 0.68) **% female:** 64% **Attrition rate:** 19% **Study groups:** Life Smart prevention program (LSP) ***N*:** 347 **Mean age:** 13.21 (SD = 0.68) **% female:** 64% **Attrition rate:** 20% **Study groups:** Helping, Encouraging, Listening and Protecting Peers (HELPP) prevention program ***N*:** 225 **Mean age:** 13.21 (SD = 0.68) **% female:** 64% **Attrition rate:** 24%	At 6- and 12-month follow-ups, MSP and HELPP resulted in significantly greater reductions in weight concern among female participants compared to the control group. MSP also improved shape concerns among female participants. Females in the MSP group had improvements in regular and regulated exercise compared to participants in the control group. Males in the MSP and LSP groups had significant improvements in body dissatisfaction, and males in the MSP and HELPP groups had significant reductions in media internalisation at both 6- and 12-month follow-ups.

Abbreviations: AN**:** anorexia nervosa; BN: bulimia nervosa; BED: binge eating disorder; DSM: Diagnostic and Statistical Manual

Appendix E

Systematic Reviews on Treatment Meeting Inclusion Criteria for the Evidence Review

Study Features	Inclusion/Exclusion Criteria	Intervention (s) Reviewed and # of RCTs
First author: Allen **Publication year:** 2011 **Search year:** 2009 **Indication(s):** AN, BN, BED **Intervention(s) reviewed:** Psychological treatment **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ Treatment provided in a primary care setting **Exclusion criteria:** ▪ Qualitative or case series data ▪ Non-treatment studies ▪ Focus on weight-loss or including an obesity-related approach ▪ Non-psychological treatments	**Total # RCTs**: 5 ▪ 1 CBT ▪ 1 Pure self-help ▪ 4 Guided self-help
First author: Balestrieri **Publication year:** 2013 **Search year:** 2012 **Indication(s):** AN **Intervention(s) reviewed:** Antipsychotic and antidepressant medication **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ RCTs, open-label, retrospective, and case-control studies ▪ Published between 1990-2012 ▪ Included a well-defined sample of patients, comprehensive information on the medication and its dosage, a detailed description of outcome measures and a clear assessment of treatment efficacy **Exclusion criteria:** ▪ Case reports ▪ Posters, oral reports, abstracts-only	**Total # RCTs**: 10 ▪ 6 Antipsychotic medication ▪ 4 Antidepressant medication
First author: Bankoff **Publication year:** 2012 **Search year:** 2012 **Indication(s):** AN, BN, BED **Intervention(s) reviewed:** DBT **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ English-language, peer-reviewed articles	**Total # RCTs**: 4 ▪ 6 DBT
First author: Brownley **Publication year:** 2016 **Search year:** 2016 **Indication(s):** BED **Intervention(s) reviewed:** Psychological and pharmacologic therapies **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported (Cochrane methodology); all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ English randomized, controlled trial ▪ Pharmacologic, psychological, and behavioral treatments, as well as complementary and alternative medicine ▪ Randomly assigned 10+ patients ▪ Included active intervention, placebo or waitlist control comparator ▪ Conducted as outpatient, inpatient, or home-based settings	**Total # RCTs**: 34 ▪ CBT ▪ Psychodynamic interpersonal psychotherapy ▪ Antidepressants ▪ Antipsychotics ▪ Norephinephrine reuptake inhibitor ▪ Obesity medication
First author: Citrome **Publication year:** 2015 **Search year:** 2015 **Indication(s):** BED **Intervention(s) reviewed:** Lisdexamfetamine pharmacotherapy **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ Clinical trial reports registered at http://www.clinicaltrials.gov and/or http://www.clinicaltrialsregister.eu	**Total # RCTs**: 3 ▪ 3 Lisdexamfetamine pharmacotherapy

Study Features	Inclusion/Exclusion Criteria	Intervention (s) Reviewed and # of RCTs
First author: Couturier **Publication year:** 2013 **Search year:** Not reported **Indication(s):** AN **Intervention(s) reviewed:** Maudsley FBT **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported (Cochrane methodology); all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCTs with parallel groups ▪ Evidence of allocation concealment ▪ Assessors blinded to condition ▪ Subjects aged 12-20 ▪ Individual therapy control condition ▪ Reported useable data ▪ Remission as outcome variable ▪ Outcome measured post-treatment & 6-12 months follow-up **Exclusion criteria:** ▪ Open trials ▪ Studies comparing FBT to other therapies or involving other therapies ▪ Long-term follow-up studies	**Total # RCTs**: 6 ▪ 6 FBT
First author: Dahlgren **Publication year:** 2014 **Search year:** 2013 **Indication(s):** AN **Intervention(s) reviewed:** CRT **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ Study focus on CRT for AN ▪ Article written in English ▪ Peer reviewed **Exclusion criteria:** ▪ CRT + emotional skills training ▪ Theoretical CRT papers	**Total # RCTs**: 4 ▪ 4 CRT trials
First author: De Vos **Publication year:** 2014 **Search year:** Not reported **Indication(s):** AN **Intervention(s) reviewed:** Pharmacotherapy **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCTs comparing pharmacotherapy with a placebo controlled condition ▪ Patients with AN ≥12 years	**Total # RCTs**: 18 ▪ 4 Antidepressants ▪ 6 Antipsychotics ▪ 8 Hormonal therapy
First author: Dold **Publication year:** 2015 **Search year:** 2014 **Indication(s):** AN **Intervention(s) reviewed:** Pharmacotherapy; olanzapine, quetiapine, risperidone **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported (Cochrane methodology); all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ All published and unpublished RCTs that compared second-generation antipsychotic drugs with placebo or no treatment in management of AN **Exclusion criteria:** ▪ Studies with quasi-randomisation or cluster-randomisation ▪ Trials using a switch design were excluded	**Total # RCTs**: 7 ▪ 4 Olanzapine ▪ 2 Quetiapine ▪ 1 Risperidone
First author: Dolemeyer **Publication year:** 2013 **Search year:** 2012 **Indication(s):** Any ED **Intervention(s) reviewed:** Internet-based EDs interventions **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Peer-reviewed, controlled studies ▪ Internet-based ▪ Adults (>16 years) ▪ Presence of changed eating behaviour as primary outcome **Exclusion criteria:** ▪ Focused on prevention ▪ Focused on weight loss ▪ Standardised diagnosis not reported	**Total # RCTs:** 48 ▪ 48 Psychological therapies using a range of approaches: CBT, IPT, DBT, hypnobehavioural therapy, supportive psychotherapy, behavioural weight loss treatment and self-monitoring

Study Features	Inclusion/Exclusion Criteria	Intervention (s) Reviewed and # of RCTs
First author: Fogarty **Publication year:** 2016 **Search year:** 2015 **Indication(s):** AN **Intervention(s) reviewed:** Complementary therapies **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Complementary/alternative medicine treatment of an ED ▪ Published and unpublished RCTs **Exclusion criteria:** ▪ Dietary supplements and diet therapy ▪ Studies that did not include an ED sample	**Total # RCTs:** 48 ▪ 16 complementary/alternative medicine therapies, including: acupuncture, bright light therapy, eye movement desensitisation and reprocessing, hypnosis, massage, relaxation, repetitive transcranial magnetic stimulation, spirituality and yoga
First author: Galsworthy-Francis **Publication year:** 2014 **Search year:** 2014 **Indication(s):** AN **Intervention(s) reviewed:** CBT **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Published between 1995 to 2014 ▪ Used quantitative methods ▪ Measured two time points (at minimum) ▪ Reported AN separately from other diagnoses and CBT separately from other treatments	**Total # RCTs**: 5 ▪ 5 CBT
First author: Godfrey **Publication year:** 2015 **Search year:** 2013 **Indication(s):** BED **Intervention(s) reviewed:** Mindfulness-based interventions **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCT or uncontrolled cohort studies ▪ Group or individual interventions using DBT, ACT, mindfulness-based therapies, mindfulness meditation and mindful eating ▪ Binge eating assessed as outcome variable (but not necessarily the primary target of treatment) **Exclusion criteria:** ▪ Observational studies, case studies, single case experiments ▪ RCTs using pharmacotherapy for BED ▪ Studies only looking at binge eating in the context of BN Treatments looking at ACT or DBT without a mindfulness component	**Total # RCTs**: 8 ▪ 4 ACT ▪ 1 Mindfulness-based ▪ 3 DBT
First author: Hay **Publication year:** 2009 **Search year:** 2007, updated **Indication(s):** BN; BED; EDNOS with recurrent binge eating episodes **Intervention(s) reviewed:** Any psychotherapy **Quality appraisal of incl studies:** +++In-depth quality appraisal conducted; only studies meeting inclusion criteria and achieving a 'fair' or 'good' quality rating were included	**Inclusion criteria:** ▪ RCT comparison of psychotherapy to wait-list or no-treatment control or other psychotherapies ▪ Standardised diagnostic criteria and broader criteria ▪ Adults (aged>16 years) ▪ Subjects recruited from the community or primary, secondary, or tertiary sectors ▪ A priori specified outcomes **Exclusion criteria:** ▪ Studies with >50% non-completion rates	**Total # RCTs:** 48 ▪ 48 Psychological therapies ▪ A range of approaches, including CBT, IPT, DBT, hypnobehavioural therapy, supportive psychotherapy, behavioural weight loss treatment and self-monitoring
First author: Hay **Publication year:** 2012 **Search year:** 2011 **Indication(s):** AN **Intervention(s) reviewed:** **Quality appraisal of incl studies:** ++ Assessment of risk of bias; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCTs ▪ Participants had AN for 3+ years ▪ Applied a standardised outcome assessment	**Total # RCTs**: 11 ▪ 1 Nutritional ▪ 2 Antipsychotics ▪ 2 Antidepressants ▪ 1 Bisphosphonates ▪ 1 Psychotherapy ▪ 2 FBT ▪ 1 CBT ▪ 1 Other

Study Features	Inclusion/Exclusion Criteria	Intervention (s) Reviewed and # of RCTs
First author: Hay **Publication year:** 2013 **Search year:** 2012 **Indication(s):** AN, BN, BED, EDNOS **Intervention(s) reviewed:** Psychological treatments **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Randomised comparisons of psychological treatments ▪ Included a control comparison ▪ Participants met diagnostic criteria for an ED ▪ The primary outcome was reduction in ED psychopathology or symptoms **Exclusion criteria:** ▪ Trials of pharmacological treatments, treatment setting, or where the primary outcome was weight reduction or other psychological features	**Total # RCTs**: 23 ▪ FBT, CBT, CBT-IPT, guided self-help CBT, guided self-help, BWL, DBT, dietary counselling, healthy weight program, obesity treatment
First author: Hay **Publication year:** 2015 **Search year:** 2014, updated **Indication(s):** AN **Intervention(s) reviewed:** Any individual psychological therapies **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCTs that included at least 50% older adolescents (aged>16 years) and trials with adults recruited from the community Comparison to another individual psychological therapy, treatment as usual, a 'control' psychological therapy or treatment wait-list ▪ Individual psychological therapy for AN outpatients based on DSM 3-5 diagnostic criteria ▪ Treatment provided by a single therapist to one person **Exclusion criteria:** ▪ Studies of systems therapy and psychological therapy in relapse prevention or chronic illness	**Total # RCTs**: 10 (6 published in 2000 or more recent) ▪ A range of approaches including CBT, IPT, CAT, MANTRA and Karolinkski Mandometer outpatient treatment
First author: Koskina **Publication year:** 2013 **Search year:** 2012 **Indication(s):** EDs **Intervention(s) reviewed:** Exposure therapy **Quality appraisal of incl studies:** +None reported	**Inclusion criteria:** ▪ Studies that applied exposure techniques in an ED sample alone, or in comparison to another treatment or control condition	**Total # RCTs**: 14 ▪ 10 In-person exposure therapy ▪ 4 Virtual reality
First author: Lebow **Publication year:** 2013 **Search year:** 2011 **Indication(s):** AN **Intervention(s) reviewed:** Antipsychotic medication **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCTs that compared atypical antipsychotics to a control procedure ▪ BMI, ED symptoms and psychiatric symptoms as outcomes ▪ Studies of adolescents or adults ▪ Assessed BMI before during and/or after treatment **Exclusion criteria:** ▪ Studies that included a psychotic disorder	**Total # RCTs**: 7 ▪ 7 Antipsychotic medications
First author: Loucas **Publication year:** 2014 **Search year:** 2013 **Indication(s):** EDs **Intervention(s) reviewed:** E-therapy for the prevention and treatment of EDs **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Prevention and treatment RCTs that included a control group **Exclusion criteria:** ▪ Trials where the therapist was the primary means of delivering the intervention, e.g. face-to-face treatments augmented with an e-therapy component ▪ Interventions that were delivered entirely by a therapist but transmitted electronically ▪ Abstracts only, dissertations and theses	**Total # RCTs**: 20 ▪ 13 Prevention studies + 6 Treatment studies ▪ 16 CBT (3 delivered via CD-ROM, 13 delivered via the internet) ▪ 2 psycho-education (1 delivered via CD-ROM, 1 delivered via the internet) ▪ 1 CD (internet) ▪ 1 MI

Study Features	Inclusion/Exclusion Criteria	Intervention (s) Reviewed and # of RCTs
First author: Macdonald **Publication year:** 2012 **Search year:** Not specified **Indication(s):** AN, BN, BED, EDNOS **Intervention(s) reviewed:** Motivational interviewing **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Focus on MI or MET for EDed behaviours ▪ Fulfilled inclusion criteria required in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement **Exclusion criteria:** ▪ Non-English language ▪ Book reviews ▪ Focus on: trans-theoretical model, concept of 'readiness to change' and Readiness and Motivation Interview	**Total # RCTs:** 13 ▪ 13 MI or MET
First author: McClelland **Publication year:** 2013 **Search year:** Not specified **Indication(s):** EDs **Intervention(s) reviewed:** Neuromodulation techniques **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ English or German studies ▪ Focused on effects of neuromodulation on ED symptoms, cravings, eating behaviours, food intake, weight and BMI ▪ Studies on healthy participants, people with ED, people with other disorders and animal studies ▪ RCTs, clinical studies, case series or case reports **Exclusion criteria:** ▪ Examined neuromodulation techniques as a conditioned response rather than as a neuromodulatory tool ▪ Examined effects of neuromodulation on bodily form/perception ▪ Studies reporting on non-eating related outcomes and safety issues in ED	**Total # RCTs**: 13 ▪ 13 Neuromodulation – Only two on human subjects with BN (rTMS); remaining were subjects without ED diagnosis or animal studies
First author: Moola **Publication year:** 2013 **Search year:** 2013 **Indication(s):** AN **Intervention(s) reviewed:** Exercise & physical activity **Quality appraisal of incl studies:** +None reported	**Inclusion criteria:** ▪ Presented original data ▪ Used human subjects ▪ Patients with AN only ▪ Used exercise-based intervention	**Total # RCTs**: 5 ▪ 2 Resistance training ▪ 1 Graded exercise ▪ 1 Yoga ▪ 1 Strength training
First author: Polnay **Publication year:** 2014 **Search year:** 2013 (updated) **Indication(s):** BN **Intervention(s) reviewed:** Group therapies **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCTs of face-to-face psychological therapies delivered in a group (3+ participants) settings ▪ Participants aged 18+ ▪ DSM-IV diagnosis of BN **Exclusion criteria** ▪ Studies where >20% of participants had diagnoses other than BN ▪ Studies of in-patients ▪ Guided self-help therapies	**Total # RCTs**: 11 ▪ 11 CBT, IPT, Exposure with response prevention, behavioural therapy, nutritional counselling

Study Features	Inclusion/Exclusion Criteria	Intervention (s) Reviewed and # of RCTs
First author: Schlegl **Publication year:** 2015 **Search year:** Not specified **Indication(s):** AN and BN **Intervention(s) reviewed:** Computer-based psychological interventions **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ Computer-based psychological interventions ▪ Outcome data at post-intervention or follow-up ▪ Sample size of at least 10 per study **Exclusion criteria:** ▪ Psychoeducational or counselling interventions, online support groups, computer-based assessment methods ▪ Studies evaluating the computer-based program *Student Bodies*	**Total # RCTs:** 22 ▪ 22 Computer-based psychological interventions
First author: Tchanturia **Publication year:** 2014 **Search year:** Updated in 2014 **Indication(s):** AN **Intervention(s) reviewed:** CRT **Quality appraisal of incl studies:** + None reported	**Inclusion criteria:** ▪ CRT or training interventions in AN, MDD, OCD and ASD only ▪ Adult clinical population ▪ Individual and/or group programs **Exclusion** ▪ Other disorders ▪ Solely self-help or web-based programs	**Total # RCTs**: 4 ▪ 4 CRTs were assessed
First author: Vancampfort **Publication year:** 2013 **Search year:** 2012 **Indication(s):** BED **Intervention(s) reviewed:** Physical therapy interventions **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCTs of a physical therapy intervention compared with a placebo or control condition ▪ BED diagnosis ▪ Specific effects of physical therapy intervention were separable from other active components in the intervention ▪ Intervention and control conditions had similar durations	**Total # RCTs**: 3 ▪ 3 Physical therapy (1 rated as strong quality): ▪ 1 Walking ▪ 1 Graded ▪ 1 Yoga
First author: Vancampfort **Publication year:** 2014 **Search year:** 2013 **Indication(s):** AN and BN **Intervention(s) reviewed:** Physical therapy **Quality appraisal of incl studies:** ++ Assessment of risk of bias reported; all studies meeting inclusion criteria were reported	**Inclusion criteria:** ▪ RCTs that compared a physical therapy intervention to placebo or control condition ▪ Formal ED diagnosis ▪ One of the following types of exercise: aerobic, resistance training, relaxation training, basic body awareness therapy, yoga or massage ▪ One of the following outcome measures: eating pathology, anthropometric, physiological or psychological variables **Exclusion criteria** ▪ Specific effects of physical therapy intervention were separable from other active components in the intervention	**Total # RCTs**: 8 ▪ 8 Physical therapy (3 rated as strong quality): ▪ 2 Massage ▪ 1 Graded exercise ▪ 1 Aerobic exercise ▪ 2 Strength training ▪ 1 Yoga ▪ 1 Basic body awareness therapy

Abbreviations: **ACT**: acceptance and commitment therapy; **AN:** anorexia nervosa; **ASD**: Autism spectrum disorder; **BMI**: body mass index; **BN**: bulimia nervosa; **BED**: binge eating disorder; **CBT**: cognitive behavioural therapy; **CRT**: cognitive remediation therapy; **DBT:** dialectical behavioural therapy; **DSM**: Diagnostic and Statistical Manual; **ED**: eating disorder; **FBT**: family based treatment; **IPT**: interpersonal therapy; **MDD**: major depressive disorder; **MET:** motivational enhancement therapy; **MI**: motivational interviewing; **OCD**: obsessive compulsive disorder

Appendix F

Randomised Controlled Trials on Treatment Meeting Inclusion Criteria for the Evidence Review

Anorexia Nervosa in Young People

Study Features	Study Groups	Summary of outcomes
First author, year: Accurso, 2014 **Country:** USA **Setting:** Delivered at 2 universities **Population:** Adolescents with AN **Number randomised:** 121 **Length:** 12 months **Follow-up:** Post treatment, 6- and 12-months **Design:** Parallel, ITT **Inclusion criteria:** Adolescents diagnosed with AN **Exclusion criteria:** Not reported **Funding**: No	**Program name/Treatment type:** FBT ***N*:** Not reported **Age:** 14.4 (SD = 1.6) **% female:** 100% **Attrition rate:** Not reported **Program name/Treatment type:** Individual adolescent supportive psychotherapy ***N*:** Not reported **Age:** 14.4 (SD = 1.6) **% female:** 100% **Attrition rate:** Not reported	Both FBT and individual psychotherapy led to significant improvements in eating psychopathology at 12 months, although there were no significant differences between treatment types. Depressive symptoms and dietary restraint were most improved, weight and shape concerns were least improved, and self-esteem was not improved for either treatment group.
First author, year: Accurso, 2015 **Country:** USA **Setting:** Outpatient **Population:** Youth with AN **Number randomised:** 84 **Length:** 8 – 9 months **Follow-up:** Post treatment and 12-months **Design:** Parallel, ITT **Inclusion criteria:** Youth who met the DSM-V criteria for AN and were medically stable **Exclusion criteria:** New or unstable medication, psychosis, drug and/or alcohol dependence, previous receipt of either two treatment types **Funding**: Yes	**Program name/Treatment type:** FBT delivered without cost to patients ***N*:** 32 **Age:** 14.4 (SD = 2.5) **% female:** 83% **Attrition rate:** Not reported **Program name/Treatment type:** Speciality clinical care (SCC) in which patients' families paid a fee ***N*:** 52 **Age:** 14.9 (SD = 1.8) **% female:** 83% **Attrition rate:** Not reported	The majority (57.1%) of study participants achieved weight restoration within 12 months with no significant difference between treatment types. Youth with lower % expected body weight did worse in SCC than FBT, and weight restoration was achieved faster by youth who were younger and who had greater depressive symptoms.
First author, year: Agras, 2014 **Country:** USA **Setting:** Outpatient **Population:** Youth with AN **Number randomised:** 164 **Length:** 9 months **Follow-up:** 6 and 12 months **Design:** Parallel, ITT **Inclusion criteria:** DSM-IV AN **Exclusion criteria:** Current psychotic illness, mental retardation, bipolar disorder, pregnancy, substance dependence, previous family therapy for AN, current use of weight loss medications, medical instability, weight at or below 75% IBW **Funding**: Yes	**Program name/Treatment type:** FBT ***N*:** 78 **Age:** 15.1 (SD=1.7) **% female:** 85.9% **Attrition rate:** 26% **Program name/Treatment type:** Systemic family therapy ***N*:** 80 **Age:** 15.1 (SD=1.7) **% female:** 92% **Attrition rate:**25%	There were no significant differences between treatment groups for % of IBW, ED symptoms or comorbid psychiatric disorders at the EOT or follow-up. However, participants receiving FBT achieved faster weight gain earlier in treatment and spent fewer days in hospital (incurring lower treatment costs) compared with participants receiving systemic family therapy.

Study Features	Study Groups	Summary of outcomes
First author, year: Gowers, 2010 **Country: UK** **Setting:** 35 mental health services in the North-West of England **Population:** Adolescents with AN **Number randomised:** 167 **Length:** Minimum of 6 months **Follow-up:** 1,2 and 5 years **Design:** Population-based RCT, ITT **Inclusion criteria:** Food restriction ± compensatory behaviours, weight ≥ 85% of IBW and primary or secondary amenorrhoea of at least 3 months in females **Exclusion criteria:** Severe learning difficulties or the presence of severe chronic comorbid physical conditions affecting digestion or metabolism **Funding**: No	**Program name/Treatment type:** Inpatient treatment ***N*:** Not reported **Age:** 14 **% female:** Not reported **Attrition rate:** 53% at 5 years **Program name/Treatment type:** Specialist outpatient program ***N*:** Not reported **Age:** 14 **% female:** Not reported **Attrition rate:** 53% at 5 years **Program name/Treatment type:** General outpatient treatment ***N*:** Not reported **Age:** 14 **% female:** Not reported **Attrition rate:** 53% at 5 years	Participants in all 3 treatment types demonstrated significant improvements in general pathology, weight and BMI at all follow-ups. There were no significant differences in treatment outcomes between inpatient and either outpatient treatment, or between the two different treatment types.
First author, year: Le Grange, 2016 **Country:** Australia **Setting:** Clinic **Population:** Adolescents with AN **Number randomised:** 106 **Length:** 6 months **Follow-up:** baseline, EOT, 6- and 12-months post-treatment **Design:** RCT **Inclusion criteria:** DSM-IV AN (excl amenorrhea); aged 12-18; living with 1+ parent(s); min 6th grade English proficiency for family; ≤90% mBMI for adolescents ≤75th percentile for height and ≤ 95% mBMI for adolescents ≥ 75th percentile for height **Exclusion criteria:** Medical instability; current psychotic disorder; drug or alcohol dependence; acute suicidality; physical condition influencing eating or weight; previous FBT for AN; psychotropic medication <8 weeks	**Program name/Treatment type:** Family-based treatment ***N*:** 55 **Age:** 15.4 (SD=1.3) **% female:** 89.1% **Attrition rate:** 16.4% **Program name/Treatment type:** Parent-focused treatment ***N*:** 51 **Age:** 15.7 (SD=1.6) **% female:** 86.3% **Attrition rate:** 13.7%	Parent-focused treatment led to significantly higher rates of remission than family-based treatment at end-of-treatment, but not 6- or 12-month follow-up. There were no significant differences at any time point in EDE scores or weight.
First author, year: Madden, 2014 **Country:** Australia **Setting:** Hospital (two-sites in Sydney, Australia) **Population:** Medically unstable adolescents with AN **Number randomised:** 82 **Length:** **Follow-up:** post-admission and 12-month follow-up **Design:** Cluster RCT, ITT **Inclusion criteria:** Aged 12-18, DSM-IV diagnosis of AN < 3 years duration, medically unstable, lived within 2-h drive to centre, not receiving other psychotherapies **Exclusion criteria:** Evidence of psychosis, mania, substance abuse or significant medical illnesses or comorbid psychiatric conditions	**Program name/Treatment type:** Short inpatient hospitalisation for medical stabilisation followed by 20 sessions of outpatient FBT ***N*:** 41 **Age:** 14.9 (SD=1.4) **% female:** 95% **Attrition rate:** 53% at 5 years **Program name/Treatment type:** Long inpatient hospitalisation for weight restoration followed by 20 sessions of outpatient FBT ***N*:** 41 **Age:** 14.9 (SD=1.6) **% female:** 95% **Attrition rate:** 53% at 5 years	The weight restoration group used significantly more total hospital days and post-protocol FBT sessions than the medical stabilisation group. Individuals in the medical stabilisation group who had higher eating psychopathology and compulsive features reported better clinical outcomes.

Study Features	Study Groups	Summary of outcomes
First author, year: O'Connor, 2016 **Country:** London, UK **Setting:** Hospital **Population:** Adolescents with AN **Number randomised:** 36 **Length:** 10 days **Follow-up:** N/A **Design:** RCT **Inclusion criteria:** Aged 10-16, AN <78% mBMI and on a weight loss trajectory **Exclusion criteria:** Had medical conditions that could influence biochemical or cardiovascular parameters or were taking antipsychotic or antidepressant medication **Funding**: Yes	**Program name/Treatment type:** High-energy refeeding (start at 1200 kcal/day) ***N*:** 18 **Age:** 13.7 (SD=1.8) **% female:** 95% **Attrition rate:** 0% **Program name/Treatment type:** Low-energy refeeding (control; start at 500 kcal/day) ***N*:** 18 **Age:** 14.9 (SD=1.6) **% female:** 95% **Attrition rate:** 0%	On average, the low-energy group consumed 16 kcal/kg/day while the high-energy group consumed 38 kcal/kg/day. Compared with controls, individuals receiving the higher energy diet had significantly greater weight gain but did not differ in QTc intervals and other outcomes. The higher energy group did not experience an increase in complications associated with refeeding when compared with the low energy group.

Anorexia Nervosa in Adults

Study Features	Study Groups	Summary of outcomes
First author, year: Andries, 2014 **Country:** Denmark **Setting:** Hospital **Population:** Women with AN **Number randomised:** 25 **Length:** 8 weeks **Follow-up:** Post treatment **Design:** RCT, ITT **Inclusion criteria:** Women with AN for at least 5 years who had attended both psychiatric and somatic therapy as an in- or outpatient **Exclusion criteria:** Previous or current alcohol or drug abuse and a primary diagnosis of a major psychiatric disorder **Funding**: No	**Program name/Treatment type:** Dronabinol-placebo: 2.5mg of Dronabinol 2 x daily for 4 weeks, then a placebo for 4 weeks ***N*:** Not reported **Age:** Not reported **% female:** 100% **Attrition rate:** Not reported **Program name/Treatment type:** Placebo- dronabinol: Placebo pill for 4 weeks then 2.5mg of Dronabinol 2 x daily for 4 weeks ***N*:** Not reported **Age:** Not reported **% female:** 100% **Attrition rate:** Not reported	Compared to the placebo pill, Dronabinol produced significant weight gain over the 4-week period (+1.0kg vs. +0.34kg) regardless of the sequence in which the drugs were received. There were no significant changes in participants' ED behavioural and attitudinal symptoms. Adverse effects were reported in half of the sample, although these were only mild in effect.
First author, year: Fazeli, 2016 **Country:** USA **Setting:** Clinical research centre **Population:** Women with AN **Number randomised:** 21 **Length:** 6 months **Follow-up:** Mid-treatment (3 months) and post-treatment **Design**: RCT, ITT **Inclusion criteria:** Women who met the DSM-IV criteria for AN with a bone mineral density score of T-score of ≤ - 2.5 at any site, 60 – 85% of IBW **Exclusion criteria:** Chronic diseases that affect bone mineral density, medications effecting bone metabolism in previous 3 months **Funding**: Yes	**Program name/Treatment type:** Teriparatide injection (TPT) administered at 20µg SC ***N*:** 10 **Age:** 47 (SD = 2.7) **% female:** 100% **Attrition rate:** Not reported **Program name/Treatment type:** Placebo injection ***N*:** 11 **Age:** 47.1 (SD = 2.3) **% female:** 100% **Attrition rate:** Not reported	Compared to the placebo, participants receiving TPT had a significantly greater increase in bone mineral density at the spine and lateral spine (+6% vs. + 0.7% and + 10.5% vs. -0.6%, respectively). Those receiving TPT also experienced significantly greater increases in P1NP (a marker of bone formation) and CTX (a marker of bone resorption) at post-treatment. Levels of P1NP increased by 136% in the TPT group and levels of CTX increased by 45%. Body weight of participants across both groups did not change significantly. Mild adverse effects were experienced by some participants in the TPT group, including elevated serum calcium levels.
First author, year: Fichter, 2013 **Country:** Germany **Setting:** Inpatient/hospital **Population:** Women with AN **Number randomised:** 258 **Length:** 9 months **Follow-up:** Post-treatment and 9-month follow-up **Design:** Prospective RCT, completer **Inclusion criteria:** DSM-IV AN diagnosis or sub-threshold AN without amenorrhea, internet connection at home, increased BMI during inpatient stay, sufficient motivation for relapse prevention **Exclusion criteria:** Other serious psychiatric conditions and premature or irregular discharge from inpatient treatment **Funding**: No	**Program name/Treatment type:** Internet-based CBT relapse prevention program (iCBT), delivered monthly for 9 months ***N*:** 128 **Age:** 24 (SD = 6.5) **% female:** 100% **Attrition rate:** 24.2% **Program name/Treatment type:** No treatment control ***N*:** 130 **Age:** 24 (SD = 6.5) **% female:** 100% **Attrition rate:** 6.2%	At post-treatment, the BMIs of participants receiving iCBT were significantly greater than participants in the control group. At the 9-month follow-up, there were no significant differences in BMI between those in the iCBT group and those in the control group. However, individuals who completed the full iCBT program had sustained improvement in BMI at the 9 month follow-up as well as at post-treatment, whereas individuals who only completed part of the program did not differ significantly from the controls in BMI scores. Overall, neither group differed significantly at either follow-up period in eating pathology, although individuals who completed the full iCBT program had significantly greater improvements in bulimic symptoms at post-treatment and 9-month follow-ups.

Study Features	Study Groups	Summary of outcomes
First author, year: McClelland, 2016 **Country:** England **Setting:** Clinic **Population:** Males and females with AN **Number randomised:** 54 **Length:** 1 trial **Follow-up:** Post-treatment and 24 hour follow-up **Design:** Double-blind parallel-group RCT **Inclusion criteria:** DSM-5 AN; BMI diagnosis; BMI between 14.5-18.5 **Exclusion criteria:** TMS contraindications identified in the TMS Adult Safety Screen; left-handedness; on psychotropic medication; excessive use of alcohol or cigarettes (>3 and >15/day, respectively) **Funding**: No	**Program name/Treatment type:** Repeated transcranial magnetic stimulation (rTMS) ***N***: 21 **Age:** 25.3 (SD = 6.9) **% female:** not reported **Attrition rate:** 25% **Program name/Treatment type:** Control (sham rTMS) ***N***: 28 **Age:** 27.7 (SD =9.9) **% female:** not reported **Attrition rate:** 12.5%	After controlling for pre-rTMS scores, individuals who had received the intervention experienced a reduction in core symptoms of AN post-treatment and 24 hours later, relative to those receiving sham stimulation.
First author, year: Schmidt, 2015 and 2016 **Country:** U.K. **Setting:** Outpatient **Population:** Individuals with broadly defined AN **Number randomised:** 142 **Length:** 20 – 34 weeks **Follow-up:** **Design:** ITT **Inclusion criteria:** BMI ≤ 18, and a DSM diagnosis of AN or EDNOS **Exclusion criteria:** Life-threatening AN requiring immediate inpatient treatment, significant medical or physical disability, substance dependency and pregnancy **Funding**: No	**Program name/Treatment type:** Maudsley Model of Anorexia Nervosa Treatment for Adults (MANTRA) ***N***: 70 **Age:** 27.5 (SD = 8.1) **% female:** 100% **Attrition rate:** 17% **Program name/Treatment type:** Specialist Supportive Clinical Management (SSCM) ***N***: 72 **Age:** 25.9 (SD = 7.1) **% female:** 96% **Attrition rate:** 27%	Both MANTRA and SSCM resulted in significant improvements (gains) in BMI at 6- and 12-month follow-ups, (an average increase of + 1.06 and + 1.83 points, respectively) however there were no significant differences in these improvements between treatment groups. Both treatment groups also demonstrated significant improvements in ED symptoms at 6- and 12-month follow-ups, however there were no significant differences between treatment groups – and the size of these effects was small. Neither treatment group resulted in changes in neurocognitive and social cognition, or acceptability. In a follow-up investigation conducted 24 months later, BMI, ED symptomatology, distress levels, and clinical impairment were still improved or had improved further in both groups, with no significant differences between groups.
First author, year: Steinglass, 2014 **Country:** USA **Setting:** Inpatient **Population:** Individuals with AN **Number randomised:** 20 **Length:** 3 weeks **Follow-up:** Post-treatment **Design:** RCT **Inclusion criteria: AN** DSM-V criteria, medically stable, inpatient, patients who had achieved 80% of IBW **Exclusion criteria:** Significant co-morbid diagnoses **Funding**: No	**Program name/Treatment type:** 0.75mg of alprazolam daily (a benzodiazepine) administered 90 min before the test meal ***N***: Not reported **Age:** 25.6 (SD = 7.8) **% female:** Not reported **Attrition rate:** 15% **Program name/Treatment type:** Placebo pill administered 90 min before the test meal ***N***: Not reported **Age:** 25.6 (SD = 7.8) **% female:** Not reported **Attrition rate:** 15%	Alprazolam did not improve caloric intake in participants when compared to those who received the placebo pill. There was also no significant difference between alprazolam and placebo in the change in anxiety after medication administration. Alprazolam did, however, result in significantly greater experiences of sedation in patients, compared to the placebo pill, although the size of this effect was small.

Study Features	Study Groups	Summary of outcomes
First author, year: Touyz, 2013 **Country:** Australia and the U.K. **Setting:** Outpatient **Population:** Individuals with severe and enduring AN **Number randomised:** 63 **Length:** 8 months **Follow-up:** Post-treatment and 6- and 12-months **Design: RCT,** ITT **Inclusion criteria:** DSM-IV AN for previous 7 years, aged 18+ **Exclusion criteria:** Significant current medical or neurological illness with the exception of nutrition-related alterations that impact on weight, psychosis or substance abuse, and current engagement with psychotherapy **Funding**: Yes	**Program name/Treatment type:** Cognitive behavioural therapy for AN (CBT-AN) ***N*:** 30 **Age:** 34.6 (SD = 9.0) **% female:** Not reported **Attrition rate:** 23.3% **Program name/Treatment type:** Specialist supportive clinical management (SSCM) ***N*:** 32 **Age:** 32.3 (SD = 10.0) **% female:** Not reported **Attrition rate:** 18.2%	Primary outcomes were quality of life, mood disorder symptoms and social adjustment. Weight, ED psychopathology, motivation for change, and health-care burden were secondary outcomes. Both treatment groups demonstrated significant improvements on all primary and secondary outcome measures and post-treatment, 6- and 12- month follow-ups. At the post-treatment follow-up, there were no significant differences between the treatment groups on any of the outcome measures, however at the 12-month follow-up CBT-AN was associated with significantly lower ED symptoms, and higher scores on the 'readiness for recovery' measure.

Bulimia Nervosa in Adults

Study Features	Study Groups	Summary of outcomes
First author, year: Díaz-Ferrer, 2015 **Country:** Spain **Setting:** Not reported **Population:** Women with BN **Number randomised:** 29 **Length:** 6 sessions over 3 weeks **Follow-up:** Post-treatment **Design:** RCT, completers **Inclusion criteria:** DSM-IV BN diagnosis, BMI 18-29 **Exclusion criteria:** Substance abuse, current treatment for a psychiatric condition or for BN, following a weight loss program **Funding**: Yes	**Program name/Treatment type:** Pure exposure (PE) ***N***: 14 **Age:** 21.14 (SD = 3.5) **% female:** 100% **Attrition rate:** 0% **Program name/Treatment type:** Guided exposure (GE) ***N***: 16 **Age:** 20.8 (SD = 2.5) **% female:** 100% **Attrition rate:** 6.3%	Both PE and GE resulted in statistically significant reductions in body discomfort, cortisol levels and negative body image thoughts as well as an increase in positive body image thoughts. However only participants in the PE group experienced significant increases in overall body satisfaction.
First author, year: Gay, 2016 **Country:** France **Setting:** Outpatient **Population:** Females with BN aged 18-40 years **Number randomised:** 47 **Length:** 3 weeks **Follow-up:** 15 days post-treatment **Design:** RCT **Inclusion criteria:** DSM-IV BN diagnosis (≥6 months), right-handed, non-responder to SSRIs **Exclusion criteria:** contraindication to rTMS, previous rTMS exposure, ongoing psychotherapy for BN, pregnancy **Funding**: No	**Program name/Treatment type:** rTMS ***N***: 23 **Age:** 27 (range: 19-38) **% female:** 100% **Attrition rate:** Not reported **Program name/Treatment type:** sham rTMS ***N***: 24 **Age:** 30 (range: 19-40) **% female:** 100% **Attrition rate:** Not reported	Primary outcomes (number of binges) and secondary outcomes (binge episode features, number of binge-free days, craving before a binge, mood and number of vomiting episodes) were evaluated for the 15 day period following program completion. There were no significant differences between real and sham rTMS on any measure.
First author, year: Milano, 2013 **Country:** Italy **Setting:** Outpatient **Population:** Females with BN **Number randomised:** 60 **Length:** 10 weeks **Follow-up:** Post-treatment **Design:** Parallel, ITT **Inclusion criteria:** DSM-IV BN diagnosis **Exclusion criteria:** Not reported **Funding**: No	**Program name/Treatment type:** 60mg of fluoxetine/day (Fluox) ***N***: 20 **Age:** Not reported **% female:** 100% **Attrition rate:** Not reported **Program name/Treatment type:** 200mg of fluvoxamine/day (Fluv) ***N***: 20 **Age:** **% female:** 100% **Attrition rate:** Not reported **Program name/Treatment type:** 100mg of sertraline (Ser) ***N***: 20 **Age:** Not reported **% female:** 100% **Attrition rate:** Not reported	At the post-treatment follow-up, participants receiving Fluox had a 68% reduction in bulimic episodes, and participants receiving Fluv demonstrated a 59% reduction in bulimic episodes. Participants receiving Ser did not demonstrate a significant reduction in bulimic episodes. Body weight reduced by an average of 7% in the Fluox group and by 5% in the Fluv group. Not reductions in body weight were demonstrated by the Ser group. Fluox was associated with the most significant adverse effects including anxiety and insomnia, while Fluv was associated with sedation and insomnia.

Study Features	Study Groups	Summary of outcomes
First author, year: Rigaud, 2011 **Country:** Not specified **Setting:** Not specified **Population:** Ambulatory female adults displaying binge/purge behaviours **Number randomised:** 103 **Length:** 4 months for CBT group, 6 months for CBT+ tube feeding group **Length:** 4 months for CBT group, 6 months for CBT+ tube feeding group **Follow-up:** Post-treatment and 3-, 6- and 12-month follow-ups **Design:** RCT, ITT **Inclusion criteria:** Binge/purge behaviour at least 5x per week for previous 6 months, AN or BN diagnosis, no response to previous therapy (including pharmacological therapy) **Exclusion criteria:** Males, significant psychiatric co-morbidity, previous suicide attempt(s), no previous treatment. **Funding**: No	**Program name/Treatment type:** CBT ***N*:** 51 **Age:** 27.9 (SD = 6.2) **% female:** 100% **Attrition rate:** 2% **Program name/Treatment type:** CBT + 2 months of tube feeding (CBT + TF) ***N*:** 52 **Age:** 27.4 (SD = 8.1) **% female:** 100% **Attrition rate:** 4%	Outcome measures were changes in binge/purge behaviour, weight gain, quality of life, depression and anxiety. This study found at that both post-treatment and 12-month follow-ups, CBT+TF was significantly more successful in reducing B/P behaviours compared to CBT alone (-79% vs. -38% at post-treatment, and -68 vs. – 53% at 12-months, respectively). Abstinence from B/P behaviour was slightly higher for participants presenting with AN compared to BN. CBT+TF also resulted in statistically greater improvements in quality of life compared to CBT alone (F = 6.7; P < .001). Muscle mass significantly increased in participants receiving CBT+TF compared to those receiving CBT alone. However fear of eating, weight gain and food obsession did not change significantly within or between treatment groups at any follow-ups. No serious adverse effects were reported although one patient suffered from sinusitis and was treated successfully with antibiotics.

Binge Eating Disorder in Adults

Study Features	Study Groups	Summary of outcomes
First author, year: Brownley, 2013 **Country:** USA **Setting:** Not reported **Population:** Overweight or obese adults **Number randomised:** 24 **Length:** 6 months **Follow-up:** 3 month mid-treatment, 6 months post-treatment, 3 month follow-up **Design:** RCT, ITT **Inclusion criteria:** DSM-IV criteria for BED, no other major psychiatric conditions, BMI 25 - 45 **Exclusion criteria:** Pregnancy, medication to control glucose, and medication effecting appetite **Funding**: Yes	**Program name/Treatment type:** High dose of 1000 mcg chromium/day (Ch-1000) ***N*:** 8 **Age:** 41.4 (SD = 8.4) **% female:** 83% **Attrition rate:** Not reported **Program name/Treatment type:** Moderate dose of 600 mcg chromium/ day (Ch-600) ***N*:** 9 **Age:** 35.1 (SD = 12.5) **% female:** 83% **Attrition rate:** Not reported **Program name/Treatment type:** Placebo pill ***N*:** 7 **Age:** 37.9 (SD = 10.8) **% female:** 83% **Attrition rate:** Not reported	Compared to the control group, both Ch-1000 and Ch-600 resulted in significantly greater reductions in binge frequency at post-treatment and the 3-month follow-up, however there were no significant differences between the treatment groups. There were significant declines in eating, weight and shape concerns of participants receiving Ch-1000 compared to the control group, and significant reductions in weight concern by participants in the Ch-600 compared to the control group. No significant differences in eating, weight and shape concern were found between Ch-1000 and Ch-600. Depression symptoms declined for both treatment groups compared to the control group, and both treatment groups lost a small but significant amount of weight compared to the control.

Study Features	Study Groups	Summary of outcomes
First author, year: Grilo, 2012 **Country:** USA **Setting:** Not specified **Population:** Obese individuals **Number randomised:** 90 **Length:** 16 sessions over 24 weeks **Follow-up:** Post-treatment, 6 and 12 months **Design:** RCT **Inclusion criteria:** Individuals who met the DSM-IV BED criteria, BMI ≥ 30 **Exclusion criteria:** Medical conditions, severe psychiatric conditions, concurrent treatments or medications for eating/weight problems and pregnancy **Funding**: Yes	**Program name/Treatment type:** CBT ***N*:** 45 **Age:** 44.89 (SD = 9.48) **% female:** 62% **Attrition rate:** Not reported **Program name/Treatment type:** Behavioural weight loss therapy (BWL) ***N*:** 45 **Age:** 44.89 (SD = 9.48) **% female:** 62% **Attrition rate:** Not reported	Outcome measures were rapid response to treatment (defined ≥70% reduction in binge eating by the fourth treatment week) with regards to binge eating frequency, binge eating remission, ED psychopathology, and % of BMI lost. Of all participants, 56.7% displayed a rapid response to treatment at the post-treatment follow-up, 42.2% at the 6 month follow-up and 43.3% of the 12 month follow-up. Across treatments, rapid response predicted greater improvements across all outcome measures compared to participants that did not respond rapidly to treatment. Patients who received CBT did comparably well regardless of rapid response in terms of reduced binge eating and ED psychopathology but did not achieve weight loss. Among patients receiving BWL, those without rapid response failed to show subsequent improvements. However, those with rapid response were significantly more likely to achieve binge-eating remission (62% v. 13%) and had greater reductions in ED psychopathology and weight loss through 12-month follow-up.
First author, year: Grilo, 2012 **Country:** USA **Setting:** Not specified **Population:** Adults with BED **Number randomised:** 81 **Length:** 4 months of acute treatment **Follow-up:** Post-treatment, 6 and 12 months **Design:** RCT, ITT **Inclusion criteria:** Individuals with DSM-IV BED diagnosis, 100% - 200% of IBW **Exclusion criteria:** Concurrent treatment for eating, weight, or psychiatric problems, medical conditions that influence eating/weight and pregnancy **Funding**: No	**Program name/Treatment type:** 60mg fluoxetine (FL) ***N*: 27** **Age:** 44.2 (SD = 8.6) **% female:** 94% **Attrition rate:** 28.4% **Program name/Treatment type:** 60mg fluoxetine + CBT (FL+CBT) ***N*: 26** **Age:** 44.2 (SD = 8.6) **% female:** 94% **Attrition rate:** 28.4% **Program name/Treatment type:** CBT + Placebo (CBT+PLA) ***N*: 28** **Age:** 44.2 (SD = 8.6) **% female:** 94% **Attrition rate:** 28.4%	At 6 months both FL+CBT and CBT+PLA produced significantly greater improvements in binge eating remission compared to FL alone, and these results were sustained at the 12-month follow-up. CBT+FL and CBT+PLA did not differ significantly in their effect on binge eating remission. Both treatment groups that included CBT were superior to the FL-only group on a range of other outcome measures including dietary restraint, reduced binge frequency, and weight, shape and eating concerns – although there were no significant differences in the outcomes between CBT groups. None of the treatments resulted in significant changes to BMI scores.
First author, year: Grilo, 2013 **Country:** USA **Setting:** Primary care **Population:** Obese individuals with BED, aged < 65 years **Number randomised:** 48 **Length:** 4 months **Follow-up:** Post-treatment **Design:** RCT, ITT **Inclusion criteria:** Obese individuals with a DSM-V BED diagnosis, BMI ≥ 30 **Exclusion criteria:** BMI ≥ 50, aged > 65 years, antidepressants, current weight loss treatment, significant medical problems **Funding**: Yes	**Program name/Treatment type:** Self-help CBT (shCBT) ***N*:** 24 **Age:** 45.0 (SD = 11.8) **% female:** 88% **Attrition rate:** 0% **Program name/Treatment type:** Usual care (UC) ***N*:** 24 **Age:** 46.5 (SD = 10.2) **% female:** 71% **Attrition rate:** 0%	Outcomes were binge eating remission and frequency, ED psychopathology and depression. The study found that participants in both the shCBT and UC groups experienced significant reductions in binge eating frequency, with participants in the shCBT group reporting significantly greater reductions in binges (-1.4 OBEs) than those receiving UC (-0.4 OBEs). Participants in both groups also reported significant improvements in ED psychopathology and depression scores, although there were no significant differences between treatment groups.

Study Features	Study Groups	Summary of outcomes
First author, year: Grilo, 2014 **Country:** USA **Setting:** Primary care **Population:** Obese adults with BED **Number randomised:** 104 **Length:** 16 weeks **Follow-up:** 6 and 12 months **Design:** RCT **Inclusion criteria:** DSM-V BED diagnosis, BMI 30 – 50 **Exclusion criteria:** Current use of anti-depressant medication, medications effecting weight, severe psychiatric conditions and medical comorbidities **Funding**: Yes	**Program name/Treatment type:** Sibutramine (sib) at 15mg/day ***N*:** 26 **Age:** 43.9 (SD = 11.2) **% female:** 73% **Attrition rate:** 27% **Program name/Treatment type:** Placebo (PLA) ***N*:** 27 **Age:** 43.9 (SD = 11.2) **% female:** 73% **Attrition rate:** 15% **Program name/Treatment type:** Self-help cognitive behavioural therapy + Sibutramine at 15mg/day (shCBT + sib) ***N*:** 26 **Age:** 43.9 (SD = 11.2) **% female:** 73% **Attrition rate:** 12% **Program name/Treatment type:** Self-help cognitive behavioural therapy + placebo pill (shCBT+PLA) ***N*: 25** **Age:** 43.9 (SD = 11.2) **% female:** 73% **Attrition rate:** 16%	Outcome measures were binge eating frequency and remission, percentage of weight loss, and ED psychopathology and depression. This study found that all treatment groups (including the PLA only) resulted in small, but statistically significant improvements in BED remission at 6 and 12 month follow-ups, however there were no significant differences between treatment groups. No time or group effects were found for the outcome measures of depression and ED psychopathology, although both treatment groups that included Sibutramine (sib and shCBT+sib) resulted in a significantly greater % of weight loss at post-treatment compared to those that did not (-4.8lbs and -14.5lbs, respectively). This weight was regained after treatment stopped, and % of weight loss did not differ at 6 or 12 month follow-ups. *Note: this medication has been withdrawn from the market
First author, year: Grilo, 2015 **Country:** USA **Setting:** Primary care **Population:** Obese adults with BED **Number randomised:** 104 **Length:** 4 months **Follow-up:** Post-treatment, 6 and 12 months **Design:** RCT **Inclusion criteria:** DSM-V BED diagnosis, BMI 30 – 50 **Exclusion criteria:** Current use of anti-depressant medication, medications effecting weight, severe psychiatric conditions and medical comorbidities **Funding**: Yes	**Program name/Treatment type:** Sibutramine (sib) at 15mg/day ***N*:** 26 **Age:** 43.9 (SD = 11.2) **% female:** 73% **Attrition rate:** 27% **Program name/Treatment type:** Placebo (PLA) ***N*:** 27 **Age:** 43.9 (SD = 11.2) **% female:** 73% **Attrition rate:** 15% **Program name/Treatment type:** Self-help cognitive behavioural therapy + Sibutramine at 15mg/day (shCBT + sib) ***N*:** 26 **Age:** 43.9 (SD = 11.2) **% female:** 73% **Attrition rate:** 12% **Program name/Treatment type:** CBT + Placebo (CBT+PLA) ***N*:** 28 **Age:** 44.2 (SD = 8.6) **% female:** 94% **Attrition rate:** 28%	Rapid response, defined as ≥ 65% reduction in binge eating by the fourth treatment week, was used to predict outcomes. Outcomes were binge eating remission and frequency, ED psychopathology, depression and % of weight loss. This study found that 47% of all participants demonstrated a rapid response to treatment. Rapid response was significantly and robustly associated prospectively with remission from binge eating, greater decreases in binge-eating frequency, eating-disorder pathology, depression, and greater percent weight loss through 12-month follow-ups

Study Features	Study Groups	Summary of outcomes
First author, year: Hilbert, 2012 **Country:** USA **Setting:** Outpatient **Population:** Overweight individuals with BED **Number randomised:** 90 **Length:** 20 weekly, 90 min sessions **Follow-up:** : Post-treatment, 1 and 4 years **Design:** RCT, ITT **Inclusion criteria:** Met DSM-IV BED criteria **Exclusion criteria:** Not reported **Funding**: Yes	**Program name/Treatment type:** Group CBT (CBT) ***N*:** 45 **Age:** 45.73 (SD = 9.86) **% female:** 80% **Attrition rate:** 24.3% **Program name/Treatment type:** IPT ***N*:** 45 **Age:** 44.02 (SD = 10.49) **% female:** 79% **Attrition rate:** 24.3%	Both CBT and IPT were effective for achieving BED remission in 52% and 76.7% of participants at post-treatment follow-up, respectively. However at the 1 and 4 year follow-ups the CBT was less effective in maintaining these remissions. Both treatments also resulted in significant improvements in ED pathology (including improvements in weight and shape concern, and ED behaviours and attitudes) as well as depression at post-treatment, one and four year follow-ups – with the size of these effects being large and moderate, respectively. BMI remained stable throughout and at post-treatment and long-term follow-ups.
First author, year: Hilbert, 2015 **Country:** USA **Setting:** University **Population:** Overweight or obese individuals with BED **Number randomised:** 208 **Length:** 24 weeks **Follow-up:** Post-treatment, 6-, 12-,18- and 24 month follow-ups **Design:** RCT,ITT **Inclusion criteria:** Individuals ≥ 18 years, BMI 27 – 45 and individuals who met the criteria for DSM-IV BED **Exclusion criteria:** Major psychiatric and medical comorbidities **Funding**: No	**Program name/Treatment type:** CBT guided self-help (CBTgs) ***N*:** 66 **Age:** 50.3 (SD = 13.6) **% female:** 82% **Attrition rate:** 18.2% **Program name/Treatment type:** Interpersonal therapy (IPT) ***N*:** 75 **Age:** 48.7 (SD = 11.2) **% female:** 85% **Attrition rate:** 12% **Program name/Treatment type:** Behavioural weight loss therapy (BWL) ***N*:** 64 **Age:** 46.2 (SD = 10.9) **% female:** 89% **Attrition rate:** 20.3%	Outcomes measured were a rapid response (defined as a reduction in binge eating 70% by the 4th week of treatment) from binge eating, binge eating remission and ED psychopathology. This study found that there was a significantly greater remission of BED symptoms in rapid compared to non-rapid responders in CBTgs but not in IPT and BWL groups.
First author, year: McElroy, 2011 **Country:** USA **Setting:** Outpatient **Population:** Individuals with BED **Number randomised:** 40 **Length:** 10 weeks **Follow-up:** Post-treatment and 1-week follow-ups **Design:** RCT **Inclusion criteria:** Met DSM-IV criteria for BED, weight ≥ 85% of the midpoint of IBW and experienced ≥3 binge eating episodes per week **Exclusion criteria:** Diagnosed with another ED, major psychiatric or medical comorbidities, weight management program in previous 3 months **Funding**: No	**Program name/Treatment type:** 333mg of acamprosate, daily ***N*:** 20 **Age:** 46.2 (SD = 12.2) **% female:** 80% **Attrition rate:** 5% **Program name/Treatment type:** Placebo pill ***N*:** 20 **Age:** 45.8 (SD = 9.1) **% female:** 90% **Attrition rate:** 10%	Outcome measures were binge eating frequency, weight, BMI, eating pathology and depression. This study found that at post-treatment and 1-week follow-ups, participants receiving acamprosate experienced significantly greater reductions in binge days, and improvements in eating pathology compared to those in the placebo group. The size of these effects was moderate. There were no significant differences in depression outcomes, although quality of life scores improved significantly for the acamprosate group but not the placebo group. Interestingly, the placebo group lost significantly more weight overall compared to the acamprosate group (-2.68kg vs. -0.19kg, respectively).

Study Features	Study Groups	Summary of outcomes
First author, year: McElroy, 2013 **Country:** USA **Setting:** Outpatient **Population:** Obese individuals with BED **Number randomised:** 62 **Length:** 6 weeks **Follow-up:** Post-treatment and 2-week follow-up **Design:** RCT, ITT **Inclusion criteria:** BMI ≥ 30, met the DSM-IV criteria for BED and individuals who displayed ≥ 3 binge days per week **Exclusion criteria:** Symptoms of AN or BN, another major psychiatric disorder, participation in weight loss program 3 months prior, medication effecting weight and pregnancy **Funding**: No	**Program name/Treatment type:** 10mg daily of the opioid antagonist ALKS-33 ***N*:** 26 **Age:** 40.6 (SD = 11.2) **% female:** 88% **Attrition rate:** **Program name/Treatment type:** Placebo pill ***N*:** 26 **Age:** 48.6 (SD = 10.2) **% female:** 92% **Attrition rate:** 10%	Both groups had moderate reductions in binge eating frequency at post-treatment and the 2-week follow-up; however there were no significant differences between groups on binge frequency or any other measure. Mild to moderate adverse effects were experienced by participants in the ALKS-33 group including nausea, dizziness, palpitations, somnolence and visual hallucinations.
First author, year: Patakay, 2013 **Country:** Finland, France, the Netherlands, Portugal, Sweden, Switzerland and USA **Setting:** Active centres **Population:** Obese individuals with BED **Number randomised:** 289 **Length:** 6 months **Follow-up:** Monthly assessments during treatment, and post-treatment follow-up **Design:** RCT, ITT **Inclusion criteria:** BMI 30 – 45, DSM-IV BED diagnosis **Exclusion criteria:** Obesity drugs or surgery, major psychiatric or medical co-morbidities, medication that effects binge eating **Funding**: No	**Program name/Treatment type:** Rimonabant 20mg/day ***N*:** 145 **Age:** 43.2 (SD = 10.5) **% female:** 91% **Attrition rate:** 29% **Program name/Treatment type:** Placebo pill ***N*:** 144 **Age:** 43.2 (SD = 10.5) **% female:** 91% **Attrition rate:** 29% *Note: Rimonabant has been discontinued from the market	Rimonabant resulted in statistically and clinically significant weight loss compared to the control (4.2%, -0.4% respectively). Participants in both groups experienced a reduction in binge eating episodes over the course of treatment, with no significant differences between the two groups. Rimonabant resulted in significantly greater reductions in binge eating scores at the post-treatment follow-up compared to the placebo group (-40.9% vs. -29.9% respectively), however no other significant differences were found on other measures of eating behaviour. Rimonabant was associated with a number of adverse effects ranging from mild to moderate in severity. These included nausea, nasopharyngitis, diarrhoea, insomnia, anxiety, depression and vomiting.

Abbreviations: AN: anorexia Nervosa; BN: bulimia nervosa; BED: binge eating disorder; ED: eating disorder; EOT: end of treatment; FBT: family-based therapy; IBW: ideal body weight; ITT: intention to treat analysis

Appendix G

Summary of Past and Present Eating Disorder Prevention Studies

Prevention Approach	Degree Evaluated		Magnitude of Effect	
	Past	Present	Past	Current
Universal Prevention				
Cognitve behavioural therapy	Moderate	Some	Low	Low-Moderate
Cognitive dissonance	None	Some	N/A	Low-Moderate
Healthy weight intervention	Some	Moderate	Low	Moderate-Substantial
Media literacy	Moderate	Moderate	Substantial	Moderate-Substantial
Multicomponent	Moderate	Moderate	None	Moderate-Substantial
Psychoeducation	Some	None	Low	N/A
Self-esteem enhancement	Moderate	None	Low	N/A
Selective Prevention				
Cognitve behavioural therapy	Moderate	Substantial	Substantial	Low-Moderate
Cognitive dissonance	Moderate	Substantial	Substantial	Substantial
Healthy weight intervention	Some	Substantial	Low	Moderate
Media literacy	Moderate	Moderate	Moderate	Moderate
Mindfulness	None	Some	N/A	Moderate
Multicomponent	Moderate	Moderate	Moderate	Moderate
Perfectionism	Some	None	Low	N/A
Psychoeducation	None	Moderate	None	Moderate
Self-esteem enhancement	Some	None	Low	N/A
Indicated Prevention				
Acceptance & commitment therapy	None	Some	N/A	Moderate
Cognitive behaviorual therapy	Moderate	Substantial	Substantial	Substantial
Cognitive dissonance	Moderate	Moderate	Substantial	Moderate
Health education	None	Some	N/A	Low-Moderate
Healthy weight	Moderate	Some	Low-Moderate	Moderate
Interpersonal psychotherapy	None	Some	N/A	Low-Moderate
Media literacy	Some	None	None-low	N/A
Mental health literacy	Some	None	None-low	N/A
Mindfulness	None	Some	N/A	Low
Motivational enhancement therapy	None	Some	N/A	Low
Perfectionism	Some	None	Low	N/A
Psychoeducation	Moderate	Some	Low	Low-Moderate
Yoga & meditation	Some	None	None	N/A

Appendix H

Summary of Past and Present Eating Disorder Treatment Studies

Treatment Approach	Degree Evaluated		Magnitude of Effect	
	Past	Present	Past	Current
Anorexia Nervosa in Young People				
Cognitive behavioural therapy	None	Some	N/A	Moderate
Complementary therapies	None	Some	N/A	Some
Ego-oriented therapy	Some	None	Moderate	N/A
Family-based treatment (Maudsley)	Moderate	Moderate	Susbtantial	Substantial
Hormone replacement therapy	None	Moderate	N/A	Low-Moderate
Individual adolescent supportive psychotherapy	None	Some	N/A	Moderate
Inpatient psychiatric treatment	Some	Some	Low	Moderate
Inpatient treatment for medical stabilisation	None	Some	N/A	Moderate
Parent-focused treatment	None	Some	N/A	Low
Physical therapy	None	Moderate	N/A	Low
Refeeding	None	Some	N/A	Moderate
Specialised outpatient treatment	Some	Some	Moderate	Moderate
Systemic family therapy	None	Some	N/A	Moderate
Anorexia Nervosa in Adults				
Behavioural therapy	Some	None	None	N/A
Cognitive analytic therapy	Some	Moderate	Low	None
Cognitive behavioural therapy	Moderate	Substantial	Low	Moderate
Cognitive interpersonal therapy (MANTRA)	None	Some	N/A	Moderate
Cognitive remediation therapy	None	Moderate	N/A	Low-Moderate
Complementary therapies	None	Moderate	N/A	Some
Exposure and response prevention	None	Some	N/A	Some
Family-based therapy (Maudsley)	Some	Some	Low	Moderate
Interpersonal psychotherapy	None	Some	N/A	None
Interpersonal psychotherapy	Some	Some	Low	None
Medications	None	None	N/A	N/A
Antidepressants	Moderate	Moderate	None	Low
Antipsychotics	Moderate	Substantial	Moderate	Low
Anxiolytics	None	Some	N/A	None
Endocannabinoid agonists	None	Some	N/A	Moderate
Hormone replacement therapy	Moderate	Substantial	None-Low	Low-Moderate
Psychodynamic or psychoanalytic therapy	Some	Moderate	Low	Moderate
Refeeding	Some	None	Moderate	None
Repeated transcranial magnetic stimulation	None	Some	N/A	Low
Specialist supportive clinical management	None	Moderate	N/A	Moderate

Bulimia Nervosa in Young People				
Cognitive behavioral therapy	None	Some	N/A	Some
Family-based treatment (Maudsley)	Some	Some	Moderate	Some
Bulimia Nervosa in Adults				
Active light	Some	None	None	N/A
Cognitive behavioural therapy	Moderate	Substantial	Substantial	Substantial
Cognitive behavioural therapy guided self-help	Moderate	Some	Substantial	Substantial
Cognitive behavioural therapy pure self-help	Some	None	Low	N/A
Crisis intervention	Some	None	None	N/A
Exposure therapy	None	Moderate	N/A	Moderate
Guided imagery	Some	None	Moderate	N/A
Healthy weight program	Some	Some	Moderate	Moderate
Medication	None	None	N/A	N/A
Anticonvulsant medication	Moderate	None	Low	N/A
Antidepressant medication	Moderate	Some	Moderate	Moderate
Serotonin antagonist	Some	None	Moderate	N/A
Multimodal day program	Some	None	Moderate	N/A
Multimodal inpatient program	Some	None	Moderate	N/A
Nutritional management	Some	Some	Moderate	Low
Physical exercise	None	Some	N/A	Moderate
Repetitive transcranial magnetic stimulation	Some	Some	None	None
Stress management	Some	None	Moderate	N/A
BED in adults				
Behavioural weight loss	Some	Moderate	Moderate	Low-Moderate
Behavioural weight loss guided self-help	Some	Some	Low	Low
Cognitive behavioural therapy	Moderate	Substantial	Substantial	Substantial
Cognitive behavioural therapy guided self-help	Moderate	Substantial	Moderate	Low-Moderate
Cognitive behavioural therapy pure self-help	Moderate	Moderate	Moderate	Low
Dialectical behavioural therapy	Some	Substantial	Moderate	Moderate
Interpersonal psychotherapy	Some	Moderate	Substantial	Moderate
Medication	None	None	N/A	N/A
Anticonvulsant medication	Moderate	Moderate	Low-Moderate	Moderate
Antidepressant medication	Moderate	Moderate	Moderate	Low-Moderate
Central nervous system stimulants	None	Moderate	N/A	Substantial
Endocannabinoid agonists	None	Some	N/A	Moderate
Glutamate agonists	None	Some	N/A	Low
Norepinephrine reuptake inhibitors	None	Some	N/A	Moderate
Nutritional supplements	None	Some	N/A	None
Obesity medication	Moderate	Some	Moderate	Moderate
Opioid antagonists	None	None	N/A	N/A
Mindfulness	None	Some	N/A	Moderate
Motivational interviewing	None	Some	N/A	Low
Obesity treatment	None	Some	N/A	Moderate
Psychodynamic interpersonal therapy	Some	Some	Moderate	Moderate
Virtual-reality based therapies	Some	Moderate	Low	Moderate

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The National Eating Disorders Collaboration (NEDC) is funded by the Australian Government Department of Health.