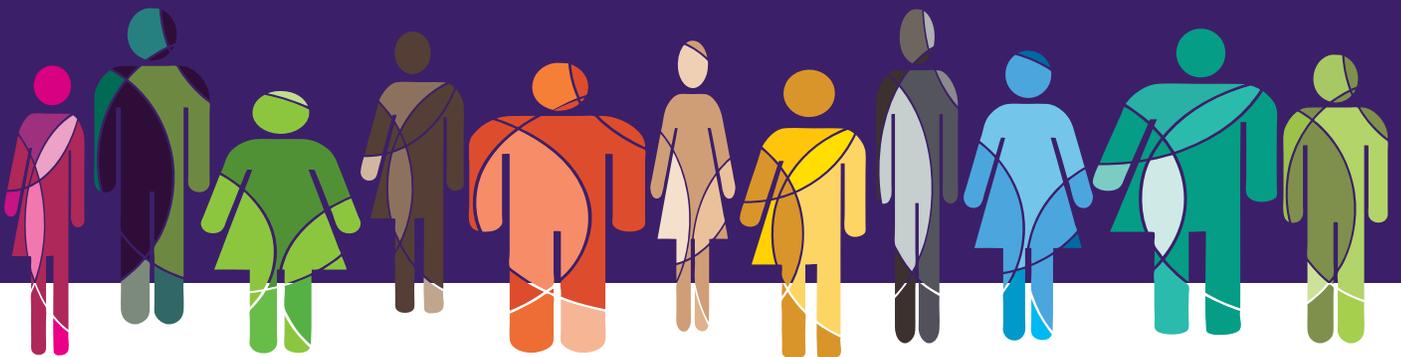


# GUIDEBOOK for **NUTRITION TREATMENT** of EATING DISORDERS



Authored by  
ACADEMY FOR EATING DISORDERS  
NUTRITION WORKING GROUP



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## 1. INTRODUCTION TO THIS GUIDE

This publication, created by the Academy for Eating Disorders Nutrition Working Group, contains basic information regarding elements of nutrition care for individuals with eating disorders (EDs). The guideline is intended as a resource to clinicians who are providing nutritional interventions as part of a multi-disciplinary team or are otherwise involved in the care of these individuals. It is not intended to be a comprehensive nutrition therapy guide. The information provided is based on available research and current best practices. The basic goal of nutrition therapy in the treatment of all EDs diagnoses is achievement of normal eating behaviors meeting nutritional needs in a regular, balanced, sustainable way without fearful, negative, and distorted thoughts about food, body, and self.

## 2. INTRODUCTION TO EATING DISORDERS

For the purpose of this document, we will focus on the most common diagnosed EDs including:

**1. Anorexia Nervosa (AN):** Restriction of energy intake relative to an individual's requirements, leading to a significantly low body weight in the context of age, sex, developmental trajectory, and health status. AN is usually accompanied by disturbance of body image, an intense fear of gaining weight, lack of recognition of the seriousness of the illness and/or behaviors that interfere with weight gain.

Nutrition issues in AN: The diets of individuals with AN are typically low in calories, limited in variety, and marked by avoidance or fears about foods high in fat, sugar, and/or carbohydrates. Initially there may be no obvious indicators of malnutrition because of the body's ability to maintain biological homeostasis even when food intake is inadequate. Regardless of current body weight, eventually starvation leads to a host of complications including negative energy balance, weight loss, inadequate macro- and micro-nutrient intake, organ system failure, and death. Individuals with extreme and extended food restriction should be evaluated for the potentially fatal refeeding syndrome (see Refeeding Syndrome Section). In children and adolescents, interruption of expected growth and development is common. As AN progresses, signs and symptoms of starvation become more evident.

### ICD-10-CM Code

F50.0

F50.01 Restricting Type

F50.02 Binge-Eating/Purging Type

**2. Bulimia Nervosa (BN):** Binge eating, defined as eating a large amount of food in a relatively short period of time with a concomitant sense of loss of control in association with purging/compensatory behaviors (e.g. self-induced vomiting, laxative or diuretic abuse, insulin misuse, excessive exercise, diet pills) once a week or more for at least three months. Individuals experience an intense fear of weight gain with self-evaluation unduly influenced by body shape

and weight. Lack of recognition of the seriousness of the illness may also be present.

Nutrition issues in BN: In early stages of BN, there may be no signs or symptoms of nutritional compromise. In a prolonged course, purging behaviors lead to multiple medical issues (e.g., electrolyte abnormalities, dental erosion, esophagitis, gastritis, ulcers, and arrhythmias). Lack of food variety and food misperceptions are common. Food intake is often disorganized; meals may be low in calories, fat, and carbohydrates. Binge eating episodes usually include foods that are typically avoided and are high in calories, fat, and carbohydrates.

#### **ICD-10-CM Code**

F50.2

**3. Binge Eating Disorder (BED):** Binge eating, in the absence of compensatory behavior, once a week for at least three months. Binge eating episodes are associated with a sense of loss of control, eating rapidly, eating in the absence of hunger, and/or eating until extremely full. Generally, these episodes are associated with depression, shame, or guilt.

#### **ICD-10-CM Code**

F50.81

Nutrition issues in BED: In the early stages of BED, there may be no obvious nutrition consequences. In a prolonged course, weight gain can occur which may affect health in some individuals. Food misperceptions are common. As in BN,

food intake is often disorganized; meals may be low in calories, fat, and carbohydrates. Binge eating episodes typically include foods that are usually avoided and are high in calories, fat, and carbohydrates.

#### **4. Other Specified Feeding and Eating**

**Disorder (OSFED):** OSFED is the diagnosis for EDs that do not meet full criteria for one of the above diagnoses. Individuals with OSFED engage in specific disordered eating behaviors such as restricting intake, purging and/or binge eating. Examples are: Atypical Anorexia Nervosa (significant weight loss and food restriction though BMI for age and gender is in normal range or higher), Bulimia Nervosa (low frequency or limited duration), Binge Eating Disorder (low frequency or limited duration), Purging Disorder (recurrent purging in the absence of binge eating), and Night Eating Syndrome (recurrent episodes of night eating, such as eating after awakening from sleep or by excessive food consumption after the evening meal).

#### **ICD-10-CM Code**

F50.89

#### **5. Unspecified Feeding or Eating Disorder**

**(UFED):** In UFED, ED behaviors cause clinically significant distress or impairment, but do not meet full criteria for an ED. This diagnosis is used when there is insufficient information to make a more specific diagnosis (e.g., in emergency rooms).

#### **ICD-10-CM Code**

F50.9

## 6. Avoidant/Restrictive Food Intake

**Disorder (ARFID):** ARFID is characterized by one or more of the following: Significant weight loss, nutritional deficiency, dependence on nutritional supplements or marked interference with psychosocial functioning associated with caloric and/or nutrient restriction, but without weight or shape concerns. Individuals with ARFID may limit food intake and variety for many reasons, most commonly due to 1) an apparent lack of interest in eating or food; 2) avoidance based on the sensory characteristics of food (e.g., appearance, smell, and/or texture), and 3) concern about aversive consequences of eating with a history of abdominal discomfort, and/or fear of vomiting or choking. These three classic ARFID presentations do not appear to be mutually exclusive, but instead may co-occur in the same individual.

### ICD-10-CM Code

F50.82

Nutrition concerns in OSFED, UFED and ARFID: Inadequate nutrient intake, interruption of expected growth in the pediatric population, food misperceptions, and fear of eating.

Consult [aedweb.org](http://aedweb.org) for diagnostic code handout, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5®) (American Psychiatric Association, 2013), and ICD-10 for full diagnostic descriptions.

## IMPORTANT FACTS ABOUT EATING DISORDERS

- ▶ All EDs are serious disorders with serious disturbances in eating behaviors with potentially life-threatening physical and psychological complications.
- ▶ All EDs can be associated with serious medical complications affecting every organ system of the body.
- ▶ All EDs are associated with higher rates of suicide.
- ▶ The medical consequences of EDs can go unrecognized, even by an experienced clinician.
- ▶ EDs do not discriminate. They can affect individuals of all ages, genders, ethnicities, body shapes and weights, sexual orientations, and socioeconomic backgrounds.
- ▶ EDs have a strong heritability factor, though genes alone do not predict who will develop EDs.
- ▶ Weight is not the only clinical marker of an ED. People who are at low, average, or high weights can have an ED, and individuals at any weight may be malnourished and/or engaging in ED behaviors.
- ▶ Individuals with an ED may not recognize the seriousness of their illness, and/or may be ambivalent about changing their eating or other behaviors.
- ▶ All instances of dramatic changes in eating and/or precipitous weight loss or gain in otherwise healthy individuals should be investigated for the possibility of an ED, as rapid weight fluctuations can be an indicator of a possible ED.
- ▶ In children and adolescents, failure to gain expected weight or height, and/or delayed or

interrupted pubertal development may indicate an ED.

- ▶ Individuals and their families are not to be blamed for causing an ED. Families and other supporters can be an individual's and providers' best allies in treatment.
- ▶ Full recovery from an ED is possible. Early detection and intervention are important.

### PRESENTING SIGNS AND SYMPTOMS

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Individuals with EDs may present with a variety of indicators or without obvious physical signs or symptoms. The following behavioral, physical, and neuropsychiatric signs are commonly found in EDs. These signs stem from the consequences of restricted food or fluid intake, nutritional deficiencies, binge-eating, and inappropriate compensatory behaviors, such as purging and excessive exercise.

### BEHAVIORAL SIGNS

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- ▶ Rigid dieting
- ▶ Refusing to eat certain foods
- ▶ Avoiding mealtimes or situations involving food
- ▶ Dependence on oral nutritional supplements
- ▶ Food rituals
- ▶ Hiding food
- ▶ Fasting
- ▶ Episodes of eating large quantities of food
- ▶ Self-induced vomiting, misuse of laxatives, diuretics, or other medications, spitting
- ▶ Excessive, rigid exercise despite weather,

fatigue, illness, or injury

- ▶ Marked increase in exercise patterns

### PHYSICAL SIGNS

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- ▶ Weight and Growth
  - Marked weight loss, gain, fluctuations

### UNEXPLAINED CHANGE IN GROWTH CURVES OR BMI PERCENTILES IN A CHILD OR ADOLESCENT

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- ▶ Oral and Dental
  - Oral trauma/lacerations
  - Perimyolysis (dental erosion on posterior tooth surfaces)
  - Dental caries (cavities)
  - Parotid gland enlargement
- ▶ Cardiorespiratory
  - Weakness
  - Fatigue or lethargy
  - Hot flashes, sweating episodes
  - Hypothermia, feeling colder than others
  - Presyncope (dizziness)
  - Syncope (fainting)
  - Chest pain
  - Heart palpitations
  - Orthostatic hypotension (a decrease in blood pressure when going from sitting or lying to standing)
  - Bradycardia (heart rates of 50 bpm or lower)
  - Tachycardia (heart rates of 80 bpm or greater)
  - Dyspnea (shortness of breath)
  - Edema (swelling)

## ► Gastrointestinal

- Epigastric discomfort
- Abdominal bloating
- Lack of appetite/hunger
- Early satiety
- Gastroesophageal reflux (heartburn)
- Hematemesis (blood in vomit)
- Hemorrhoids and rectal prolapse
- Constipation

## ► Endocrine

- Amenorrhea or oligomenorrhea (absent or irregular menses)
- Low testosterone
- Loss of libido
- Infertility
- Stress fractures due to low bone mineral density/osteoporosis

## ► Dermatologic

- Lanugo hair
- Hair loss
- Carotenoderma (yellowish discoloration of skin)
- Russell's sign (calluses or scars on the back of the hand)
- Poor wound healing
- Dry brittle hair and nails

## ► Neuropsychiatric Signs

- Body dysmorphia
- Depression/Anxiety
- Obsessive/compulsive thoughts and/or behaviors

- Memory loss
- Poor concentration
- Seizures
- Insomnia
- Self-harm
- Suicidal thoughts, plans or attempts

## EARLY RECOGNITION

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Early recognition is key to successful treatment. Consider evaluating an individual for an ED who presents with any of the following:

- Precipitous weight changes (significant weight lost or gained) or fluctuations
- Sudden changes in eating behaviors (e.g., recent vegetarianism/veganism, gluten-free, lactose free, elimination of certain foods or food groups, eating only "healthy" foods, uncontrolled binge eating, lack of appetite)
- Sudden changes in exercise patterns, excessive exercise, or involvement in extreme physical training
- Body image disturbances
- Desire to lose weight despite low or normative weight
- Extreme dieting behavior regardless of weight status
- Abdominal complaints in the context of weight loss behaviors
- Electrolyte abnormalities without an identified medical cause (especially hypokalemia, hypochloremia, or elevated CO<sub>2</sub>)
- Hypoglycemia

- ▶ Bradycardia
- ▶ Amenorrhea or menstrual irregularities
- ▶ Unexplained infertility
- ▶ Type 1 diabetes mellitus with poor glucose control or recurrent diabetic ketoacidosis (DKA) with or without weight loss
- ▶ Use of compensatory behaviors (i.e., such as self-induced vomiting, dieting, fasting or excessive exercise) to influence weight after eating or binge eating
- ▶ Inappropriate use of appetite suppressants, caffeine, diuretics, laxatives, enemas, ipecac, artificial sweeteners, sugar-free gum, prescription medications that affect weight (insulin, thyroid medications, psychostimulants, or street drugs) or nutritional supplements marketed for weight loss

### 3. WORKING WITH INDIVIDUALS AND SUPPORT SYSTEMS

Work with individuals' support systems can take many forms in ED treatment. Support systems can include family, friends, and other individuals in the individual's life. "Family" refers broadly to biological parents, or other family members, who provide care for a child, adolescent, or adult with an ED. Family might also refer to one's spouse or other supportive individuals in a person's life. One crucial aspect of treatment is education of family members and others who are in a supportive role, and determination of how they can be most effective. For the purposes of this guide, supportive individuals in an individual's life

will be referred to as "supporters." Dietitians educate supporters by explaining the nature of EDs, discussing etiology, describing levels of care, explaining health and nutritional concerns, and describing how to support a person with an ED, without inadvertently accommodating the ED. Treatment approaches focused on teaching support people about EDs and how to help, such as the well-established Family Based Treatment (FBT) (Lock and Le Grange, 2019), and more recently Temperament Based Treatment with Supports (Hill et al., 2016; Wierenga et al., 2018), and Emotion-Focused Family Therapy (Strahan et al., 2017), provide evidence that working with the individual's support system improves outcomes.

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## 4. NUTRITIONAL ASSESSMENT FOR EATING DISORDERS

Nutrition assessment involves evaluating several domains. Nutritional status is assessed utilizing data from medical providers and from nutrition-focused physical examinations (Malone & Hamilton, 2013). Other domains such as dietary intake, activity level, food environment, and ED behaviors are assessed via individual interviews. Nutrition assessments clarify treatment goals by evaluating current physical condition compared to pre-morbid physical growth, development, and status; reviewing laboratory data; exploring limitations to adequate ingestion and absorption of nourishment; and assessing current and historic routes of nutrition procurement and physical activity level. A person can be poorly nourished despite consuming an ample diet if they have certain medical conditions, such as diabetes, malabsorption, or an endocrine disorder. Nutrition assessment can help determine whether certain physical conditions, such as bradycardia, are due to undernutrition or athleticism.

Assessment of dietary intake is a crucial part of the nutrition assessment; obtain clear and relevant data from an individual or another person speaking for an individual via interview. Dietitians need to be knowledgeable about the food supply, components of food, food preparation methods, and typical measurements used to quantify food intake. During assessment of dietary intake,

dietitians obtain details about quantity, type, and amount of food consumed.

Access to food is an essential component of nutritional assessment. Assess for the presence of reliable food storage, food preparation facilities, financial resources, transportation, and stability of living situations; all can have an impact on nutritional status. If resource constraints are identified, connect the individual to available social and public assistance programs. Assess the individual's experience of shopping, food handling, eating in public, and eating with others, as these might point to other areas for support and intervention. Associations between food insecurity and ED behaviors are increasingly necessary to identify (Becker, 2017; Becker, 2019).

## Nutritional Assessment for Eating Disorders

ASSESSMENT COMPONENT	TOOLS AVAILABLE
<p><b>Environmental limitations</b></p> <ul style="list-style-type: none"> <li>▶ Food security</li> <li>▶ Ability to purchase food</li> <li>▶ Ability to prepare food</li> <li>▶ Home environment</li> <li>▶ Ways ED interferes purchase or preparation of food</li> </ul>	<p>USDA Food Security Assessment</p>
<p><b>Physical evaluation</b></p> <ul style="list-style-type: none"> <li>▶ Vital signs, temperature</li> <li>▶ Nutrition focused physical exam parameters</li> <li>▶ Weight history</li> <li>▶ Weight suppression</li> <li>▶ Historic growth, development</li> <li>▶ Genetic predisposition for height</li> </ul>	<p>Nutrition Focused Physical Exams  <a href="https://www.eatrightstore.org/product-type/pocket-guides/pediatric-nutrition-focused-physical-exam-pocket-guide">https://www.eatrightstore.org/product-type/pocket-guides/pediatric-nutrition-focused-physical-exam-pocket-guide</a>  <a href="https://www.eatrightstore.org/product-type/ebooks/nutrition-focused-physical-exam-pocket-guide-second-edition-ebook">https://www.eatrightstore.org/product-type/ebooks/nutrition-focused-physical-exam-pocket-guide-second-edition-ebook</a>            CDC Growth Charts  <a href="https://www.cdc.gov/growthcharts/clinical_charts.htm">https://www.cdc.gov/growthcharts/clinical_charts.htm</a>            Predicting expected adult height using mid-parental height            Male child = (mother's height in cm + 13 cm) + father's height in cm/2            Female child = mother's height in cm + (father's height in cm - 13 cm)/2</p>
<p><b>Physical activity assessment</b></p> <ul style="list-style-type: none"> <li>▶ Historic physical activity level</li> <li>▶ Current level of physical activity</li> <li>▶ Role of exercise/activity ED</li> </ul>	<p>RED-S CATTM (Mountjoy et al., 2015)            Female Athlete Screening Tool (FAST) (McNulty et al., 2001)            Exercise Dependence Scale-Revised (Symons Downs et al., 2004)</p>
<p><b>History of reliance of alternate routes of nutrition support</b></p>	<p>Ask about use of meal replacement drinks and bars, tube feedings.</p>

## Nutritional Assessment for Eating Disorders

ASSESSMENT COMPONENT	TOOLS AVAILABLE
<p><b>Assessment of dietary intake</b></p> <ul style="list-style-type: none"> <li>▶ Usual intake</li> <li>▶ Unusual eating behaviors, food rituals or concoctions</li> <li>▶ Assessed nutritional needs</li> <li>▶ Comparison of actual vs assessed needs</li> </ul>	<p>24-hour recall</p> <p>Food Frequency Questionnaire</p> <p>NIH Food Frequency Questionnaire</p> <p>3-5 day food records</p> <p>Mobile- and web-based program applications</p> <p><a href="https://www.recoveryrecord.com">https://www.recoveryrecord.com</a></p> <p><a href="https://www.recoverywarriors.com/app/">https://www.recoverywarriors.com/app/</a></p> <p>Dietary Assessment Instruments</p> <p><a href="https://www.nal.usda.gov/fnic/dietary-assessment-instruments-research">https://www.nal.usda.gov/fnic/dietary-assessment-instruments-research</a></p> <p>Diet, Anthropometry and Physical Activity (DAPA) Measurement Toolkit</p> <p><a href="http://www.measurement-toolkit.org/">http://www.measurement-toolkit.org/</a></p> <p>Dietary Reference Intakes</p> <p><a href="https://ods.od.nih.gov/Health_Information/Dietary_Reference_Intakes.aspx">https://ods.od.nih.gov/Health_Information/Dietary_Reference_Intakes.aspx</a></p>
<p><b>Assessment of Eating related attitudes</b></p> <ul style="list-style-type: none"> <li>▶ Attitudes about food</li> <li>▶ Food rules</li> <li>▶ Nutrition beliefs including overreliance on nutrition information to make eating decisions</li> <li>▶ Family of origin eating attitudes</li> <li>▶ Family of origin eating patterns</li> <li>▶ Family of origin nutrition beliefs</li> </ul>	<p>Eating Disorder Inventory</p> <p><a href="https://www.parinc.com/Products/Pkey/103">https://www.parinc.com/Products/Pkey/103</a></p> <p>Eating Attitudes Test</p> <p><a href="https://psychology-tools.com/test/eat-26">https://psychology-tools.com/test/eat-26</a></p>
<p><b>Assess use of nutritional supplementation</b></p> <ul style="list-style-type: none"> <li>▶ Vitamins, minerals, dietary supplements</li> <li>▶ Herbals or teas to enhance metabolism</li> <li>▶ Natural cathartics, emetics</li> </ul>	<p>Include in 24-hour recall</p>

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## WEIGHT ASSESSMENT

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The major determinant of body weight is genetic (Song et al., 2018). A “biologically appropriate weight” is a weight that is easily maintained without need for dieting or inappropriate food and exercise behaviors, and reflects pre-morbid weight, normal physical and psychological function, genetic predisposition ethnicity, gender, and family history (Herrin & Larkin, 2013). In young individuals, a “biologically appropriate weight” is associated with normal historical development. In adults, a “biologically appropriate weight” is where weight settles when enough food is consumed to attain all required nutrients, and the person is physically and emotionally satisfied. In individuals who

lived in higher weight bodies before the onset of their ED, such as those with atypical anorexia, refeeding and weight restoration should proceed with premorbid usual weight taken into account in determining weight restoration goals. In all people, body weight fluctuates day to day about 5-6 pounds (3 kg) due to level of hydration, contents of bowel and bladder, time of day, and time of month for menstruating females.

In most US medical settings, adult weights of White, Hispanic, and Black adults are assessed using the US National Institute of Health/World Health Organization Body Mass Index (NIH/WHO BMI) weight categories (Weir CB, Jan A, 2019). NIH/WHO BMI categories have come under criticism because they do not portray an accurate picture of health for individuals. These BMI categories underestimate the health risks associated with weights classified as underweight and overestimate the health risks associated with weights classified as overweight (Flegal et al., 2018; Flegal et al., 2013). Furthermore, BMI weight categories were developed to assess health risk in populations, not in individuals (Nuttall, 2015). Recent studies of the differences in health risks associated with weight, particularly for Asians and South Asians, supports the need for the development of additional BMI categories (Klatsky et al., 2017).

For children up to the age of 19, the Center for Disease Control (CDC) BMI-for-age percentile growth categories are used world-wide and are

very similar to the World Health Organization (WHO) Child Growth Standards.

As with adults, stature-for-age and weight-for-age and BMI-for-age percentile categories are problematic when applied indiscriminately to children and adolescents because they do not take into account an individual's genetic predisposition and race-ethnicity, and are not predictive of health risks (Vanderwall et al., 2018). Furthermore, childhood BMI % categories are based on population data from over 50 years ago (Flegal et al., 2011). Nevertheless, weights inconsistent with a child's pre-morbid growth curve are not likely to be associated with healthy function and growth, adequate nutrition, and improvements in eating disordered behaviors and cognitions. A return to a child's pre-morbid growth curve is usually the most appropriate goal in treatments aimed at weight restoration. BMI growth curves are best at tracking whether an individual is growing at average velocity. If the curve crosses centiles up or down, the individual is growing faster or slower than average (Cole, 2012). Keep in mind, for example, that a child can be perfectly healthy at the 95th percentile for BMI for age if they are naturally stocky or muscular. CDC percentiles are most helpful for identifying children who are at risk of malnutrition and failure to thrive due to weight loss (i.e., children and adolescents diagnosed with low-weight anorexia, or ARFID). CDC provides a BMI-for age percentile calculator and clinical charts for tracking stature-for-age and weight-for-age and BMI-for-age.

## CHARACTERISTICS OF A “BIOLOGICALLY APPROPRIATE WEIGHT”

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- ▶ Absence of:
  - Restricting or dieting
  - Bingeing
  - Obsessive or compensatory exercising
- ▶ Supportive of:
  - Normal physical and psychological function
  - Normal growth in young individuals
- ▶ Consistent with:
  - Pre-morbid weight
  - Gender
  - Ethnicity
  - Family history

## WEIGHT AND HEIGHT MONITORING

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Weight (and height in pediatric individuals) are anthropometric measurements used for tracking growth, monitoring fluid retention and refeeding risk, and indicating whether food intake is adequate. When weight restoration is a goal of treatment, weight changes are essential indicators of medical status and treatment progress. Weight and/or height monitoring is standard practice in the treatment of children and adolescents diagnosed with AN or ARFID and is an integral aspect of FBT (Family Based Treatment) and CBT (Cognitive Behavior Treatment) approaches.

If weight has been determined to be clinically important to monitor, the team member who conducts weight monitoring should keep other

team members up to date. If weight is monitored by someone other than the dietitian, it is imperative that arrangements be made for the data to be received before nutrition visits. When individuals are referred by health providers for “medically necessary weight loss,” dietitians are encouraged to discuss the evidence of poor outcomes for intensive weight loss interventions (Greaves et al., 2017). Dietitians can suggest treatment strategies that focus on improvements in eating behaviors that enhance diet quality.

Weight monitoring should be sensitively introduced and conducted. All discussions about weight monitoring and assessment should be based on the tenets of body positivity and similar approaches that embrace acceptance and appreciation of all body types (see the [Weight Stigma](#) and [Body Image](#) sections.)

“Frontwards” weight checks (checks that permit individuals to see the weight) allow for therapeutic discussions about weight and can help dispel related misconceptions. “Frontwards” weight checks are standard protocol in FBT and CBT. In FBT, weights are also shared with family and other support people. Weight checks are also conducted with the individual standing backwards on the scale (also called “blind or backwards” weight checks) so that the number on the scale is not observed. This type of weight check is intended to make body weight and weight checks more neutral, reducing the focus on the number. If this approach is used, the dietitian should

be ready to discuss actual weight data later in the treatment process. Pros and cons of each of these approaches should be discussed with the individual.

A regularly calibrated scale should be used for weight monitoring. Ideally, weight should be measured after individuals void, and at about the same time of day, and in the same clothes. It is important to be alert for behaviors that can artificially increase weights, such as water loading, bulky clothes, and hiding weights in clothes. Weight assessments may need to account for:

- ▶ Full bladder and colon: 1 – 2 lbs
- ▶ Time of day: Weight increases up to 5 lbs over course of day
- ▶ Clothes: hospital gowns 0.3 – 0.5 lbs, women’s street clothes 2 lbs, men’s street clothes 3 – 4 lbs
- ▶ Menses: 3 – 5 lbs

## MONITORING HEIGHT

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Height is checked regularly in children and adolescents and at the beginning of treatment, and then periodically, in adults. Height should be taken using a portable or fixed stadiometer, in stocking or bare feet, using proper positioning (feet flat, together, and against the wall; legs straight, arms at sides, shoulders level) ([https://www.cdc.gov/healthyweight/assessing/bmi/childrens\\_bmi/measuring\\_children.html](https://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/measuring_children.html)). Height measurements are rarely provocative and are shared with individuals.

In the treatment of children and adolescents, measure height every three months. As height increases, weight targets need to be adjusted. In children and adolescents, expected changes in height with age can be suppressed by undernutrition. When food intake and weight improve, height may also improve. Children and adolescents may be particularly motivated to engage in treatment when they see their “stature-for-age” curve indicates their height has been inhibited and encouraged when improvement in height can be demonstrated.

Height should be taken at the initiation of treatment in adults. Self-reported height is discouraged, as it may be inaccurate and contribute to inaccurate calculation of BMI, BMI%, or target weight ranges.

## 5. WEIGHT STIGMA

When discussing weight issues with individuals, it is critical to be aware of weight stigma. Weight stigma is also referred to as sizeism, weight/size oppression, weightism, weight/size bias, and weight-based discrimination. Weight stigma occurs when a person is discriminated against or stereotyped based on their weight, size, or shape. It is a representation of internalized beliefs and attitudes one has about another person's body type. Weight stigma, both overt and implicit, is particularly prevalent in health care service delivery, including health care for people with EDs. It is critical to be aware of institutional as well as one's own internalized weight stigma, and how weight stigma impacts people with EDs.

Weight stigma can affect people in all body shapes and sizes. There are subtle and not so subtle messages in the media, in daily interactions with strangers, interactions with various health care providers, and family members. The most detrimental effects are experienced by people living in higher weight bodies, especially when health professionals imply that size and health are irrefutably related. It is imperative that clinicians working with people with all EDs diagnoses consider how weight bias and weight stigma may overtly or inadvertently influence language, attitudes, and clinical recommendations. Examine your language for weight bias that can lead to ineffective education, counseling, or communication regarding weight,

body image concerns, and eating. Adopting neutral language around these topics can improve clinical impact. Explore your weight bias with this interactive tool: <https://implicit.harvard.edu/implicit/>.

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## 6. BODY IMAGE CONCERNS (BIC)

Body image concerns (BIC) include over-evaluation of shape and weight and their control, body avoidance (e.g., avoidance of mirrors, weighing, wearing tight clothing, and being photographed), and body checking (e.g., obsessive weighing and shape checking, including pinching or touching body parts of concern, looking at mirrors and reflective surfaces, measuring body parts, and assessing the tightness of clothes or accessories) (Pellizzer, et al., 2018). In addition, when individuals repeatedly compare themselves to unrealistic cultural body ideals, they will experience an increase in negative emotions, including shame (Cassone et al., 2016). Tylka and Wood-Barcalow's (2015) review quantitative and qualitative research, and conclude that positive body image includes body appreciation, body acceptance, conceptualizing beauty broadly, adaptive investment in appearance, and inner positivity, and is shaped by social identities.

BIC are associated with EDs, except in ARFID, in which no evidence of body image disturbances is a distinguishing characteristic. The DSM-5 (American Psychiatric Association, 2013) outlines the BIC in EDs: dissatisfaction with weight/shape, overvaluation of weight/shape, preoccupation with weight/shape, and fear of weight gain. In AN, one's experience of body weight or shape is altered so that perception of body size is exaggerated (Keizer et al., 2013). This distortion has an excessive influence on self-assessment, as

body weight and shape is over-valued. Even after significant weight loss, many individuals with AN feel generally overweight, or are concerned that certain body parts are too large. Many individuals with BN have even greater body-image disturbances than those with AN, with self-assessment and self-esteem overly affected by disapproving thoughts about body shape and weight, which also initiate binge eating episodes (Grilo et al., 2019a). Although BIC are not currently included among the DSM-5 diagnostic criteria for BED, consensus is that many individuals with BED, but not all, are preoccupied with overvaluation of shape and weight (Lydecker et al., 2017; Grilo et al., 2013). Research is mixed on whether BIC are associated with binge-eating frequency (Grilo et al., 2019b; Ojserkis et al., 2012).

Over-evaluation of shape and weight is addressed by identifying and enhancing other areas of life that are important (e.g., family, friends, school, work, hobbies, political issues), and fostering body size and shape acceptance (Fairburn, 2008; Murakami et al., 2015). Body acceptance interventions focus on appreciation of the functionality of the body, and on acknowledgement of the genetic determinants of body size and shape. Cognitive restructuring techniques are useful in treating body image issues (Cassone et al., 2016). These techniques include reframing thoughts (choosing positive alternative thoughts) and changing self-talk (unspoken internal conversations) from negative to positive.

In early stages of treatment, dietitians focus on

normalizing weight and eating, and providing accurate feedback about body weight and explanation of the genetic determinants of body size. BIC for some individuals resolve or improve as weight issues resolve, and/or with a return to normal eating. For this reason, more intensive treatment on BIC is usually focused on later in treatment in collaboration with a mental health provider. On the other hand, recent work by Calugi and Dalle Grave (2019) shows improvement in body image concerns and other eating disordered variables at one-year follow-up when BIC are focused on at the beginning of treatment.

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## Body Image Resources

### WEBSITES

Association for Size Diversity and Health	<a href="https://www.sizediversityandhealth.org/">https://www.sizediversityandhealth.org/</a>
Be Nourished	<a href="https://benourished.org/">https://benourished.org/</a>
The Body Positive	<a href="https://www.thebodypositive.org">https://www.thebodypositive.org</a>
National Eating Disorders Association	<a href="https://www.nationaleatingdisorders.org/body-image-0">https://www.nationaleatingdisorders.org/body-image-0</a>

### PODCASTS

Food Psych	<a href="https://christyharrison.com/foodpsych">https://christyharrison.com/foodpsych</a>
The Mindful Dietitian	<a href="https://www.themindfuldietitian.com.au/podcast">https://www.themindfuldietitian.com.au/podcast</a>
Dietitians Unplugged	<a href="https://dietitiansunplugged.libsyn.com">https://dietitiansunplugged.libsyn.com</a>
Body Kindness	<a href="https://www.bodykindnessbook.com/podcast/">https://www.bodykindnessbook.com/podcast/</a>
Body Love	<a href="https://www.jessihaggerty.com/blppodcast">https://www.jessihaggerty.com/blppodcast</a>
Love Food	<a href="https://www.juliedillonrd.com/lovefoodpodcast/">https://www.juliedillonrd.com/lovefoodpodcast/</a>
All Fired Up	<a href="https://untrapped.libsyn.com">https://untrapped.libsyn.com</a>

### BOOKS

Embody: Learning to Love Your Unique Body (and quiet that critical voice!)	Sobczak, C. (2014). Carlsbad, CA: Gürze Books.
Body Kindness	Scritchfield, R. (2016). Workman Publishing.
Things No One Will Tell Fat Girls	Baker, J. (2015). Berkeley, CA: Seal Press.
The Body Image Workbook for Teens: Activities to help girls develop a healthy body image in an image-obsessed world	Taylor, J. V. (2014). Oakland, CA: Instant Help Books, an imprint of New Harbinger Publications, Inc.

## 7. LABORATORY VALUES RELATED to NUTRITION STATUS

It is important to note that individuals with EDs may present with normal laboratory findings, and a normal physical exam, despite a serious ED, because of the body's ability to compensate in the face of malnutrition. Abnormal lab values, therefore, are cause for serious concern. Lab values should be evaluated in collaboration with medical

professionals and addressed accordingly. The table below includes lab values typically assessed in the treatment of EDs.

### Laboratory Values Related to Nutrition Status

Symbols: ↑ increased ↓ decreased

LAB VALUES	LAB VALUE RANGES	POSSIBLE EXPLANATIONS FOR ABNORMAL FINDINGS	NUTRITION INTERVENTIONS	OTHER POSSIBLE EFFECTS ON LAB VALUE
Glucose	70-145 mg/dL	↓ Poor nutrition, postprandial hypoglycemia, depleted glycogen stores, low gluconeogenesis; ↑ in BED, insulin resistance; ↓ hyper-insulinemia	Regular pattern of eating with adequate macronutrients	Insulin resistance
Sodium	135-145 mEq/L	↓ Laxatives, diuretics, water loading; may be high; ↓ or normal with vomiting	Assess for adequate hydration; replenish sodium if necessary	
Potassium	3.5-5.0 mEq/L	↓ Vomiting, laxatives, diuretics	May need IV or oral replacement; cessation of all purging behaviors	
Chloride	98-108 mmol/L	↓ Vomiting, laxatives, diuretics	Cessation of purging behaviors	
Blood Bicarbonate	22-30 mmol/L	↑ Vomiting diuretics; ↓ or ↑ with laxatives	Cessation of purging behaviors; adequate dietary intake	

LAB VALUES	LAB VALUE RANGES	POSSIBLE EXPLANATIONS FOR ABNORMAL FINDINGS	NUTRITION INTERVENTIONS	OTHER POSSIBLE EFFECTS ON LAB VALUE
Blood Urea Nitrogen (BUN)	7-20 mg/dL	↑ Dehydration ↓ Malnutrition, very low protein diet, water loading	Re-hydrate if needed	Renal Function
Creatinine	0.5-1.2 mg/dL	↑ Dehydration, renal dysfunction, muscle wasting	Adequate protein; adequate calorie intake	Renal Function
Calcium	9.0-10.5 mg/dL; low serum calcium is a medical emergency	Serum calcium is rarely low, maintained at the expense of bone	Adequate dietary calcium or calcium supplements protects bone density	
Phosphorus	2.4-4.1 mg/dL	↓ Starvation poor nutrition	Evaluate for refeeding syndrome risk	
Magnesium	1.7-2.2 mg/dL	↓ Poor nutrition, laxative use	Adequate dietary intake	
Total Protein/ Albumin	6.0-8.0 mg/dL	↑ In early malnutrition ↓ in later malnutrition	Adequate dietary protein and calories; cessation of restriction	Trauma, inflammation
Prealbumin	Adults: 15 to 36 mg/dL Children: 1-5 yo 14 to 30 mg/dL 6 to 9 yo 15 to 33 mg/dL; 10 to 13 yo 22- 36 mg/dL; 14 to 19 yo 22 to 45 mg/dL	↓ In protein-calorie malnutrition	Adequate dietary protein; adequate calories	Trauma
Urine Specific Gravity	1.010-1.030	↑ With dehydration; ↓ with water loading	Adequate hydration	Impaired renal function

Symbols: ↑ Increased. All other symbols (^, ~, =) connect a specific medication with a side effect, use in EDs, and/or need to monitor. For example, topiramate+ should be monitored for +abuse potential for weight loss.

LAB VALUES	LAB VALUE RANGES	POSSIBLE EXPLANATIONS FOR ABNORMAL FINDINGS	NUTRITION INTERVENTIONS	OTHER POSSIBLE EFFECTS ON LAB VALUE
Hemoglobin	13.2-16.9 g/dL	↓ In iron deficiency anemia	Increase dietary iron; iron supplements	Bone marrow compromise, kidney disease, low B12 or folate
Hematocrit	38.5-49%	↓ In iron deficiency anemia; ↓ in other types of anemias	Iron supplementation	Acute blood loss, kidney disease, bone marrow disorders, low folate, low B12
Mean Corpuscular Volume	80-97 fL	↓ In iron deficiency anemia, thalassemia, copper deficiency; ↑ in vitamin B12 deficiency, folate deficiency, hypothyroidism, liver disease	Correct nutrient deficiencies	Alcohol misuse, chemotherapy, lead poisoning
Ferritin	Men 24 -336 mcg/L; Women 11-307 mcg/L	↓ In iron deficiency anemias	Iron supplements; increase dietary iron	↑ in hemochromatosis
Aspartate Aminotransaminase (AST)	10-40 IU/L	↑ Starvation	Adequate dietary intake	Liver diseases, alcoholism
Alanine Aminotransaminase (ALT)	9-60 IU/L	↑ Starvation	Adequate dietary intake	Liver diseases, alcoholism
Estrogen/Estradiol	Varies widely with age, stage of fertility	↓ Starvation, excess exercise	Weight restoration; adequate dietary intake	Age, stage of menstrual cycle, pregnancy, menopause
Testosterone	Total-300-1200 ng/dL (male) 8-60 ng/dL (female)	↓ Starvation	Weight restoration; adequate dietary intake	Age

Symbols: ↑ Increased. All other symbols (^, ~, =) connect a specific medication with a side effect, use in EDs, and/or need to monitor. For example, topiramate+ should be monitored for +abuse potential for weight loss.

LAB VALUES	LAB VALUE RANGES	POSSIBLE EXPLANATIONS FOR ABNORMAL FINDINGS	NUTRITION INTERVENTIONS	OTHER POSSIBLE EFFECTS ON LAB VALUE
Growth Hormone	0.01-0.97 ng/mL (male); 0.01-3.61 ng/mL (female)	↑ Starvation	Weight restoration; adequate dietary intake	Age
Thyroid Hormones	TSH-0.5-5.0 mIU/L, Total T4-5.5-12.5 µg/dL, Total T3-70-200 ng/dL	In starvation: low normal T4 and T3, normal TSH, ↑ reverse T3	Weight restoration; adequate dietary intake	Secondary hypothyroidism
Cortisol	8am-5-25 µg/dL 4pm-2-14 µg/dL	↑ Starvation	Adequate dietary intake	Time of day, stress level
Aldosterone	1-21 ng/dL	↓ Starvation ↑ with cessation of laxatives, diuretics	Weight restoration; adequate dietary intake; cessation of purging behaviors	Adrenal dysfunction, Pseudo-Barter's Syndrome
Complement Component 3	0.8 to 1.6 gm/L	↓ Starvation	Weight restoration; adequate dietary intake	Age, immune-compromised conditions
Cholesterol	< 200 mg/DL-adults <170 mg/DL-children	↑ Starvation	Weight restoration; adequate dietary intake	Genetic predisposition, alcohol misuse, dietary intake
Triglycerides	8.9-13.7 <150 mg/dl=normal; 150-199 mg/dl=borderline high; 200-499 mg/dl=high	↑ High dietary intake of fat, carbohydrates, heavy alcohol use	See Below*	Age, diuretic use, metabolic syndrome, Type 2 diabetes, genetics
Fasting Insulin	Adults < 200 mg/dl;	Children < 170 mg/dl	See below*	Insulin resistance
Erythrocyte Sedimentation Rate	Men < 22 mm/hr; women < 29 mm/hr	↓ Starvation ↑ BED	↓ Binge episodes; adequate dietary intake	

LAB VALUES	LAB VALUE RANGES	POSSIBLE EXPLANATIONS FOR ABNORMAL FINDINGS	NUTRITION INTERVENTIONS	OTHER POSSIBLE EFFECTS ON LAB VALUE
HA1c	Normal 4 to 5.6%; pre-diabetes 5.7-6.4%; diabetes 6.5% and up		Treat diabetes if present; see below	*
C-Reactive Protein	< 3.0 mg/L		See below*	Inflammatory conditions
White Blood Cells	4,500 to 10,000 cells/mcg/L	↑ In infection, inflammation, emotional stress, smoking, excess exercise; ↓ In malnutrition, HIV, immuno-suppressant drug use	Correct malnutrition, especially folate and B12	Infection, trauma, tissue damage, inflammation
Red Blood Cells	Men 4.5 million to 5.9 million cells/mcg/L; women 4.1 million to 5.1 million cells/mcg/L	Malnutrition, anemia	Correct malnutrition, provide iron supplementation, if needed	↑ In dehydration
Platelets	150,000 to 450,000 platelets per mcg/L	Low folate, low B12	Correct malnutrition and anemia	Malnutrition, alcohol misuse, toxic chemicals, leukemia

Symbols: ↑ Increased. All other symbols (^, ~, =) connect a specific medication with a side effect, use in EDs, and/or need to monitor. For example, topiramate+ should be monitored for +abuse potential for weight loss.

\*Binge-eating behaviors may or may not be associated with markers of metabolic syndrome (Mitchell, 2016). When laboratory markers of metabolic syndrome are present, treatment needs to proceed with consideration of the possible impact on binge eating behaviors if individuals

receive the likely medical advice to reduce body weight. A thorough conversation with individuals about their goals is recommended. Such conversations should include whether a weight loss approach could potentially interfere with recovery from binge eating behaviors. Best treatment

practices focus instead on establishing regular eating patterns (see section 12. Food Plans) and activity (see section 13. Exercise and Activity). While discussing metabolic syndrome-related lab values, the dietitian can outline modifications such as increases in fruit, vegetable, and fiber intake, decreases in saturated fat and sodium, and the addition of moderate exercise intake, which may have an impact on lab values (Fabiani et al., 2019). With younger individuals, dietitians can educate parents about the benefits of regular meals and organized snacks. The aim of this approach is to improve laboratory markers by shifting from a focus on weight loss, to focusing on dietary and exercise modifications.

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## 8. REFEEDING SYNDROME

Refeeding syndrome is a complex, biological response to increased food intake after significant nutritional depletion. The mineral phosphorous, essential for all intracellular processes, is required to maintain the structural integrity of cell membranes, and for the manufacturing of the high-energy storage molecule, ATP. During the early stages of refeeding, surges in insulin trigger intracellular movement of glucose, fluid, and electrolytes, and can lead to dangerously low blood levels of phosphorus. Hypophosphatemia,

the hallmark biochemical feature of refeeding syndrome, is caused by the anabolic state that occurs within three to four days of initiation of refeeding in malnourished individuals. Early signs of refeeding syndrome are diarrhea, generalized weakness and fatigue, edema in legs or feet, shortness of breath, rapid breathing, and confusion. Seizures, cardiac failure, and sudden death can occur.

### WHO IS AT RISK FOR REFEEDING SYNDROME?

While refeeding syndrome can occur in any individual who has lost significant weight, or who has severely restricted intake for five days or more; the greater the amount of weight lost, and the lower the recent intake, the greater the risk (Gaudiani et al., 2012; Mehler et al., 2010; Golden, 2015; Bargiacchi et al, 2019). The risk of developing refeeding syndrome is the highest during the first week of improved food intake (Bargiacchi et al, 2019).

## Identifying Refeeding Risk

### At Risk

- ▶ Adults: <18.5 BMI
- ▶ Children & adolescents: % mBMI\* 80-90
- ▶ Very little intake for greater than 5 days

### High Risk

#### The individual has one or more of the following:

- ▶ Adults: BMI less than 16kg/m<sup>2</sup>
- ▶ Children & adolescents: % mBMI\* 70-79
- ▶ Unintentional weight loss greater than 15% within the previous 3 – 6 months
- ▶ Very little nutritional intake for greater than 10 days
- ▶ Low levels of potassium, phosphate, or magnesium prior to feeding

#### Or the individual has two or more of the following:

- ▶ BMI less than 18.5kg/m<sup>2</sup>
- ▶ Unintentional weight loss greater than 10% within the previous 3-6 months
- ▶ Those with very little intake for greater than 5 days
- ▶ A history of alcohol abuse or drugs including insulin, chemotherapy, antacids, or diuretics (interpret with caution)

### Extremely High Risk

#### The individual has either of the following:

- ▶ Adults: BMI less than 14kg/m<sup>2</sup>
- ▶ Children & adolescents: % mBMI less than 70
- ▶ Negligible intake for greater than 15 days

\*Percent median body mass index (%mBMI) is calculated by dividing an individual's current BMI by 50th percentile BMI for age and gender.

## REFEEDING RECOMMENDATIONS IN INDIVIDUALS AT RISK FOR REFEEDING SYNDROME

Although there is little consensus in initial refeeding calorie levels and rates of advancement, below are generally agreed upon approaches based on literature to date. Relatively aggressive energy restoration has been demonstrated to be safe in mildly malnourished individuals, providing electrolytes are monitored adequately, and phosphorus is supplemented if necessary (Koutsavlis et al, 2017). Individuals at risk for refeeding syndrome should be under the care of a medical provider who is aware of the risks and the required monitoring.

### Overview of Refeeding Guidelines

#### Monitor

- ▶ Monitor serum phosphorus and electrolytes every 24-48 hours for the first 1-2 weeks of refeeding
- ▶ Correct serum phosphorus levels if low
- ▶ Clinically monitor for medical complications

#### Food Intake

- ▶ Increase intake by 300-400 calories every 3-4 days until adequate for weight gain

### Monitoring for Refeeding Syndrome

#### Monitor

- ▶ Monitor serum phosphorus and electrolytes every 24-48 hours for the first 1-2 weeks of refeeding
- ▶ Correct serum phosphorus levels if low
- ▶ Clinically monitor for medical complications

#### Food Intake

- ▶ Increase intake by 300-400 calories every 3-4 days until adequate for weight gain

Symbols: ↑ Increased. All other symbols (^, ~, =) connect a specific medication with a side effect, use in EDs, and/or need to monitor. For example, topiramate+ should be monitored for +abuse potential for weight loss.

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## 9. MEDICATIONS WITH NUTRITION IMPLICATIONS

Only two medications are currently approved by the Food and Drug Administration (FDA) to be prescribed to directly treat an ED. Fluoxetine may be prescribed to treat BN and lisdexamfetamine may be prescribed to treat BED. Outside of these two medications, most psychiatric medication prescribed to individuals with EDs is intended to treat a co-existing condition (e.g., depression and/or anxiety), or to relieve distress. Medications that are prescribed in the treatment of EDs are listed in the table below, along with nutrition related side-effects, any food-drug interactions, and monitoring guidelines that are important for dietitians. Common side-effects were compiled as listed on the US Food & Drug Administration (FDA) website: <https://www.fda.gov/drugs/drug-safety-and-availability/medication-guides>. Since Monoamine Oxidase Inhibitors (MAOIs) are less utilized in EDs care due to the significant dietary limitations required, they are not included in the table. The authors wish to credit Maria LaVia, MD, Chapel Hill, NC, for her assistance with and review of the following information.

Symbols: ↑ increased. All other symbols (^, ~, =) connect a specific medication with a side effect, use in EDs, and/or need to monitor. For example, topiramate+ should be monitored for +abuse potential for weight loss.

Medication Class	Specific Medications	Common Side-Effects	Use in EDs	Monitoring
<b>Antidepressants</b> Selective Serotonin-Reuptake Inhibitors (SSRI)	Citalopram, escitalopram, fluoxetine, fluvoxamine, paroxetine, sertraline	Gastrointestinal (GI) distress (often resolves when taken with food)	Fluoxetine is FDA approved for treatment of BN. Commonly used for treatment of co-occurring depression/anxiety. SSRIs are not effective in underweight individuals (Kaye et al., 2001).	
Selective and partial Serotonin Receptor Agonist	Vilazodone	Diarrhea, nausea	Commonly used for co-occurring treatment of depression/anxiety. SSRIs are not effective in underweight individuals.	
Serotonin/Norepinephrine Reuptake Inhibitors (SNRI)	Desvenlafaxin, venlafaxine, duloxetine, levomilnacipran, milnacipran	GI distress (often resolves when taken with food)	Commonly used for treatment of co-occurring depression/anxiety.	
Norepinephrine-Dopamine Reuptake Inhibitors	Bupropion	Decreased appetite, weight loss, constipation	Contraindicated with purging; lowers seizure threshold.	
Serotonin Antagonist/ Reuptake Inhibitors	Trazodone <sup>^</sup> ~, nefazodone <sup>=</sup>	<sup>^</sup> Drowsiness, <sup>~</sup> orthostatic hypotension, <sup>=</sup> elevated liver function tests (LFTs)	Mostly used for sleep but may see nefazodone used for depression and anxiety.	<sup>=</sup> Monitor liver function tests.
Tetracyclic Antidepressant	Mirtazapine	Weight gain, drowsiness, $\boxtimes$ appetite, constipation	May be used to treat co-morbid depression and anxiety. Also, may be used to treat insomnia and chronic pain.	

Symbols:  $\uparrow$  Increased. All other symbols (<sup>^</sup>, <sup>~</sup>, <sup>=</sup>) connect a specific medication with a side effect, use in EDs, and/or need to monitor. For example, topiramate<sup>+</sup> should be monitored for <sup>+</sup>abuse potential for weight loss.

Medication Class	Specific Medications	Common Side-Effects	Use in EDs	Monitoring
Tricyclic Antidepressants & Related Compounds	Amitriptyline, clomipramine, desipramine, doxepin, imipramine, Nortriptyline, protriptyline	Weight gain, cardiac conduction, abnormalities, drowsiness, most have cholinergic effects, orthostatic hypotension	Rarely used in the treatment of depression or anxiety but use can be seen for co-morbid insomnia and chronic pain.  Clomipramine may be 2nd or 3rd line for treatment of co-morbid obsessive-compulsive disorder (OCD).	Clomipramine, desipramine & imipramine blood levels can be monitored for antidepressant efficacy.
<b>Anti-anxiety Agents</b> Benzodiazepines	Alprazolam, diazepam, lorazepam, oxazepam, temazepam, clonazepam	Drowsiness	Used to treat co-occurring anxiety often around meals.	High addictive potential. Alcohol contraindicated. Grapefruit juice may decrease metabolism of benzodiazepines.
Non-Benzodiazepines	Buspirone	Nausea, constipation, dizziness	Used to treat co-occurring anxiety.	Grapefruit juice may decrease metabolism of buspirone.
Antihistamines	Diphenhydramine hydroxyzine	Dizziness, orthostatic hypotension	Used to treat co-occurring anxiety.	Monitor blood pressure.
Anti-hypertensives	Propranolol, prazosin	Dizziness, hypotension, orthostatic hypotension, bradycardia	Used to treat co-occurring anxiety. Prazosin is commonly used for the treatment of PTSD.	Propranolol should be taken on an empty stomach as high-protein foods affect bioavailability.

Symbols: ↑ Increased. All other symbols (^, ~, =) connect a specific medication with a side effect, use in EDs, and/or need to monitor. For example, topiramate+ should be monitored for +abuse potential for weight loss.

Medication Class	Specific Medications	Common Side-Effects	Use in EDs	Monitoring
<b>Antipsychotics</b> 2nd Generation (Atypical)	Olanzapine	Higher incidence of weight gain, hyperglycemia, sedation, hyperlipidemia, elevated LFTs, orthostasis	Used to target extreme psychological distress around eating & body image. Olanzapine & quetiapine studied the most in AN. Evidence to date is for use during the acute phase of care in AN (Dunican & DelDotto, 2007).	Monitor glucose and lipid levels. Monitor weight and be alert for appetite changes especially in normal weight individuals, monitor for orthostasis.
	lloperidone, quetiapine, risperidone	Moderate incidence of weight gain & orthostasis for all, quetiapine can be sedating, agranulocytosis	Risperidone & quetiapine most often used in EDs to treat comorbid anxiety.	Monitor weight & be alert for appetite change. Monitor for orthostasis. Monitor complete blood counts (CBC).
	Aripiprazole, asenapine, lurasidone, paliperidone, ziprasidone	Lower incidence of weight gain, moderate incidence of orthostasis	Often more accepted by ED individuals due to lower weight related side-effects. Aripiprazole supported in case series on ED.	Monitor for orthostasis.
1st Generation (Typical)	Chlorpromazine, haloperidol, loxapine, thioridazine, thiothixene	Sedation, extrapyramidal effects, cholinergic effects, orthostasis	Rarely used and poorly accepted by individuals due to side-effects.	Monitor weight & be alert for appetite changes. Monitor for orthostasis. Be alert for signs of tardive dyskinesia.
<b>Other:</b> Mood Stabilizers	Topiramate+, lamotrigine, gabapentin Naltrexone Lisdexamfetamine Methylphenidate,	Anorexia, paresthesia, cognitive dysfunction, drowsiness, nausea, decreased serum bicarbonate	Often used to treat comorbid mood and anxiety symptoms. + May be used to manage binge symptoms (Brownley et al., 2016).	+ Monitor weight and be alert for appetite suppression. + Monitor serum bicarbonate. + Abuse potential for weight loss.

Medication Class	Specific Medications	Common Side-Effects	Use in EDs	Monitoring
Opioid Antagonists	Naltrexone	Nausea, vomiting, headache, diarrhea, elevation CPK, ALT & AST	May be used to manage binge impulses but little consensus on effectiveness in the literature.	Monitor for elevated CPK, ALT, ALT.
CNS Stimulant	Lisdexamfetamine	Anorexia, depression, anxiety, decreased appetite, decreased weight, decreased growth in children/adolescents. diarrhea, dizziness, dry mouth, irritability, insomnia, nausea, upper abdominal pain, and vomiting	FDA approved to treat Binge Eating Disorder. May be used to treat comorbid ADHD (Brownley et al., 2016; McElroy et al., 2016).	Abuse potential. Monitor growth in children/adolescents. Monitor for serotonin syndrome when taken with serotonergic agents. Screen for use of ascorbic acid, tryptophan or St. John's wort supplements.
	Methylphenidate, dextroamphetamine	Anorexia, depression, anxiety, decreased appetite, decreased weight, decreased growth in children / adolescents, diarrhea, dizziness, dry mouth, irritability, insomnia, nausea, upper abdominal pain, and vomiting	Not FDA approved to treat Binge Eating Disorder. May be used to treat comorbid ADHD.	Abuse potential. Monitor growth in children/adolescents. Monitor for serotonin syndrome when taken with serotonergic agents. Screen for use of ascorbic acid, tryptophan or St. John's wort supplements.

Symbols: ↑ Increased. All other symbols (^, ~, =) connect a specific medication with a side effect, use in EDs, and/or need to monitor. For example, topiramate+ should be monitored for +abuse potential for weight loss.

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## 10. NUTRITIONAL THERAPY FOR EACH DIAGNOSIS

Comprehensive ED treatment involves a multidisciplinary team. Individuals who enter treatment via a visit with a dietitian are typically also referred for psychotherapy and for medical management, and vice versa. Nutrition therapy is usually necessary for psychological and psychiatric interventions to be effective. While there are common nutritional therapy principles (assisting individuals in meeting nutritional needs in a regular, balanced, sustainable way, free from fear, and negative and distorted thoughts about food, body, and self) across all ED diagnoses, there are unique treatment elements for each diagnosis which are outlined below. When individuals in treatment for EDs present with

possible dietary-related co-morbidities (such as elevated cholesterol, triglycerides, glucose, A1C, and blood pressure) for which dietary alterations are standard prescriptions, nutrition treatment should first focus on improving eating disordered behaviors. If co-morbid conditions, do not resolve, consultation with the individual and the medical provider is recommended before progressing to approaches that require dietary restrictions.

Dietitians use evidence-based nutrition practice guidelines to direct approaches used to normalize food behavior, restore healthy nutrition state, and decrease eating disordered behavior, such as those provided by the Academy of Nutrition and Dietetics (Papoutsakis, 2017), and the research-based clinical approaches described by Herrin and Larkin (2013). Consensus across all disciplines associated with the treatment of EDs is that medical stabilization and nutritional restoration are necessary first steps in treating EDs. Both early behavior change, and (when weight gain is necessary), early weight gain predict symptom remission (Nazar et al., 2017). Consumption of higher energy density and greater food variety is predictive of better outcomes in AN (Schebendach et al., 2012).

It is essential that dietitians be familiar with and utilize techniques and practices derived from evidence-based treatment approaches for EDs. The current (2020) identified evidence-based practices from the field of psychology are Cognitive Behavioral Therapy-Enhanced (CBT-E) for adult AN,

BN, and BED, and Family Based Treatment (FBT) for child and adolescent AN. Emerging therapies (which have some evidence and treatment manuals) are Dialectical Behavioral Therapy (DBT) for adult BN and BED (which has the most evidence); FBT for adolescent BN and ARFID; CBT-E for adult ARFID; and Acceptance and Commitment Therapy (ACT) for adult AN, BN, and BED. Techniques from exposure and response prevention (ERP), a behavioral therapy developed to treat anxiety disorders, show promise for treating EDs, despite the lack of significant empirical evidence (Reilly et al., 2017). Steinglass et al. (2010), Kennedy et al. (1995), and Dumont et al (2019), reported pilot studies that show repeated exposures to food stimulus increased food intake in individuals with AN, BN, and ARFID. Steinglass et al. (2012) describes a manualized ERP intervention. In dietetic practice, individuals are presented with feared and/or avoided food items, and are prevented from compensatory behaviors such as avoidance, binge eating, and purging, while encouraging awareness of the discrepancy between the individual's expected outcome, and actual outcome and tolerance of anxiety (Reilly et al., 2017). [See Emerging Therapies section below for complete list of references.]

Clinical trials and research document the efficacy of some of the treatment protocols discussed above. There is also less mentioned foundational evidence that informs many of the current treatment protocols. This evidence includes the necessity for medical stabilization and nutritional

restoration as a first step, and that treating an ED effectively as soon as possible results in better prognosis. There is evidence that higher energy density and greater food variety for those needing to gain weight is associated with better prognosis. Nutrition professionals keep this type of evidence in mind as part of the treatment process.

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## **NUTRITIONAL APPROACH IN THE TREATMENT OF AN**

Initial and primary focus of nutrition therapy in AN is safely improving caloric intake and improving body weight. It is well established in outpatient and higher levels of care that early and steady weight gain is associated with good prognosis (Lebow et al., 2019; Makhzoumi et al., 2017). Once weight is improving with inclusion of foods with higher energy density, focus shifts to initiating improvements in nutrient intake and variety. In individuals who lived in higher weight bodies before the onset of the ED, such as those with atypical anorexia, refeeding and weight restoration should proceed with premorbid/ usual weight taken into account in determining weight restoration goals. Individuals with AN often have quickly escalating energy needs during the re-nourishment process, requiring frequent increases in calories consumed (see [Food Plan section](#)). A focus on energy density in food selection assists individuals in tolerating the increasing amount of food needed to meet energy needs. Neurobiological research indicates individuals with AN have significant difficulties making decisions, and to perceive their actual needs for calories and nutrients (DeGuzman et al., 2017; Knatz et al., 2015; Kaye et al., 2013; Smith et al., 2018; Wierenga et al., 2015). Structured eating approaches ease decision making, helping individuals restore weight, and improve nutrient

intake (see [Food Plan section](#)). As individuals make progress, nutrition therapy focuses on supporting increased flexibility in food selection, and challenging eating-related fears.

In adults with AN, no one treatment approach has demonstrated long-term superiority. CBT-E, Maudsley Model of Anorexia Nervosa Treatment for Adults (MANTRA), and Specialist Supportive Clinical Management for Anorexia Nervosa (SSCM) all show significant improvements in BMI and eating disordered behaviors and cognitions, but rates of relapse are significant (Zeeck et al., 2018). Dietitians are well advised to study the following approaches, as all focus on nutritional rehabilitation as a primary intervention.

CBT-E focuses on addressing weight-control behaviors and concerns about eating, shape, and weight. CBT-E uses self-monitoring as a therapeutic tool (Frostad et al., 2018).

MANTRA focuses on improving food intake, dietary quality, and personal relationships, while identifying potential support people. MANTRA uses motivational interviewing tools (Schmidt, 2014).

SSCM focuses on weight gain, resumption of normal eating, and issues identified by the individual as important (Schmidt et al., 2015).

In children and adolescents with AN, research evidence supports the use of FBT techniques.

FBT has shown some efficacy in young adults but has not yet been investigated in adults. FBT is not appropriate for every family or individual. Some families/supporters are not interested or are unable to devote the time and effort required; some individuals do not respond to FBT. FBT is contraindicated in families in which parents/supporters have been physically or sexually abusive, or neglectful. CBT-E techniques are the most logical alternative to FBT for those in which FBT is not appropriate (e.g., some older teens, and for adults, and any individuals that have experienced abuse or neglect) (NICE, 2017).

In FBT, the clinician assists parents in the first phase with actively restoring their child to a healthy weight at home by taking charge of their child's eating; preparing and monitoring all meals and snacks. With weight restoration and improvements in food behaviors, age-appropriate food selection and portioning is gradually returned to the child/adolescent in the second phase.

FBT in its manualized form does not utilize dietitians (Lock, & Le Grange, 2015). Instead, well trained mental health providers advise and support parents/supporters as they refeed their child at home. As many parents/supporters desire support from dietitians with the refeeding process, dietitians are having success incorporating FBT principles and strategies into their practices (Crosbie & Sterling, 2019; Herrin & Larkin, 2013). Principles of FBT can also be effectively applied in dietetic treatment of all EDs, such as externalization of the illness to help individuals and others understand that these disorders are not a choice, and affected people are not to be blamed for having the illness. When working with adults, dietitians can encourage the adult to enlist those who can be supportive and involve them in treatment.

Regardless of which therapeutic intervention is utilized, nutritional restoration is a critical part of recovery from AN. Dietitians working with

### FBT Principles

- ▶ Maintain agnostic stance: It is not known what causes EDs. EDs are not triggered by parents.
- ▶ Externalize illness: Separation of the illness from the individual. EDs are not the individual's fault.
- ▶ Non-authoritarian stance: Provide consultation rather than give directions.
- ▶ Prioritize weight restoration: Intervention is focused first on weight gain and disordered eating behaviors. Psychological symptoms improve with weight restoration and cessation of disordered behaviors. Body weight is assessed and shared with parents and the individual at the outset of each session.
- ▶ Empower parents/supporters: To take charge of the individual's eating in the first phase. Transition control of eating back to the child or adolescent when weight is restored, and eating behaviors are age-appropriate and normal for a particular family, in the second phase.

individuals with EDs need to develop competency with the aforementioned psychological strategies so they may apply them within the scope of nutrition practice and ensure cohesive team treatment. Clinical supervision from an experienced ED dietitian is strongly recommended.

## REFEEDING STRATEGIES

Consensus is that refeeding of individuals with AN with higher calories, and faster increases in calorie intake with normal macronutrient ranges (25-35% calories from fat, 15-20% protein, and 50-60% carbohydrates), is most beneficial. Exceptions are in cases of severely malnourished and chronically ill individuals who may benefit from lower calorie approaches with slow advancement and lower sodium intakes (Garber et al., 2016). Garber et al. (2016) provide the guidelines below for refeeding malnourished individuals in higher level of care settings:

Current Recommendations for Feeding Malnourished Individuals with Anorexia Nervosa		
Nutritional Status	Pace of Refeeding	Refeeding Methods
Mild (%mBMI* 80 – 90%) & Moderately Malnourished (% mBMI 70 – 79%) individuals	Begin at 1400 to 1800 kcal/day and increasing at a pace of ~400 kcal/day until pace of weight change meets treatment goals while monitoring for signs of refeeding syndrome. Pace of weight change: 1 – 5 lbs. or 1 – 2 kg/week.	<ul style="list-style-type: none"> <li>▶ Oral meals and/or nutritional supplements with recommended nutrient composition</li> <li>▶ Oral meals with the addition of NG feeding may be needed to meet robust calorie needs in hospitalized individuals</li> </ul>
Severely Malnourished Inpatients (BMI < 15 kg m22 in Adults or mBMI < 70% in Adolescents)	Begin with 1000 to 1200 kcal/day or 20 – 25 kcal/kg/day increasing ~200 kcal every other day until positive energy balance is achieved and pace of weight change meets treatment goals while monitoring for refeeding syndrome (see <a href="#">Food Plan</a> section). The pace of weight change is more conservative at 2 – 3 lbs. or 1 kg/week.	<ul style="list-style-type: none"> <li>▶ Close medical monitoring with electrolyte correction is recommended to prevent refeeding syndrome</li> <li>▶ Total Parenteral Nutrition (TPN) is NOT recommended unless no other form of feeding is possible</li> </ul>

\*\*Percent median body mass index (%mBMI) is calculated dividing the individual's current BMI by 50th percentile BMI for age and gender.

There is less empirical data available, or agreement on, pace of refeeding and caloric intake guidelines for individuals who are beginning treatment at home with outpatient treatment support. Though on the question of the recommended weight gain per week in outpatient settings, there is considerable agreement with recommendations ranging from .5 to 1 pound per week (Hilbert et al., 2017). From a clinical standpoint, appreciating the challenges of rapidly increasing caloric intake in free-living individuals, it is recommended to start with the individual's current food intake, and making stepped calorie adds (300-500 kcals every 3-4 days), depending on changes in body weight. Increasing caloric intake in this manner allows individuals to adjust to increased food intake while steadily gaining weight (Marzola et al., 2013). Individuals with abnormal vital signs (see Laboratory Values Related to Nutrition Status section) who have not made progress with lower levels of care, and/or who are suicidal, or have other severe psychiatric symptoms, should be admitted to an inpatient facility (Sachs et al., 2015; Garber et al., 2016).

## USE OF NUTRITION SUPPORT

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Nutrition support via nasogastric or jejunostomy tube feeding are not frequently used in the treatment of EDs. Nasogastric feeding is used

occasionally in higher level of care (HLOC) settings in the initial treatment of individuals with acute food refusal, or who are severely malnourished and require rapid weight restoration (Agostino et al., 2013). Total parenteral nutrition is rarely used in ED treatment, except in specialized medical centers for individuals with severe EDs, who are unable to consume food via the oral route due to gastrointestinal complications or compromise (Mehler & Andersen, 2017, pp. 106-107; Mehler & Weiner, 2007).

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## **NUTRITIONAL APPROACH IN THE TREATMENT OF BULIMIA NERVOSA (BN)**

Nutritional rehabilitation in BN involve providing guidance on establishing regular patterns of adequate food intake. The basic premise in treatment of BN is that deprivation is behind the binge eating associated with BN. Individuals with BN benefit from assistance in food planning so that meals and snacks are consumed regularly throughout the day. Food plan recommendations range from three meals per day; three meals plus two to three snacks per day; going no more than four hours between eating episodes; or simply “no skipping meals” (Fairburn, 2008). Other approaches rely on detailed plans that offers guidance on the types and amounts of food to be eaten at each meal and snack (Herrin & Larkin, 2013).

Regular meals and snacks providing adequate energy and nutrients mitigates swings in hunger and satiety reducing urges to binge eat and/or purge. Regular eating also improves mood and decreases obsession with food. Over time, foods commonly consumed during a binge (known as “binge foods”, “trigger foods”, or “fear foods”), are incorporated into food plans. Reintroduction of these foods is most successful with graduated exposure over time approached. Other effective approaches are developing coping skills to distract after meals from CBT (Fairburn, 2008) and practicing tolerating distress from DBT (Safer, 2017).

Purging behaviors (the most common being self-induced vomiting) should be addressed early in treatment. Reducing binge eating as described above often leads to a reduction in purging behaviors. Purging behaviors, however, often are independent of binge-eating and will need to be addressed directly through targeted psychoeducation and behavioral assignments (see Treating Purging Behaviors section).

The inadequate and unbalanced food intake associated with alternating restricting, bingeing, and purging can have significant physiological impact. Emerging neurobiological research in BN indicates dysregulation of hunger and appetite pathways in the brain and heightened responses to taste and reward of food (Wierenga et al, 2014; Ely et al, 2017). These findings support the use of

structured meal plans, careful reintroduction of binge foods, and employing coping and distraction techniques to resist urges to binge and purge.

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## NUTRITIONAL APPROACH TO THE TREATMENT OF BED

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BED is characterized by overeating, eating in the absence of hunger, feelings of loss of control, and marked distress. Neurobiological research demonstrates that individuals with BED have an exaggerated response to stimuli related to food, particularly highly palatable food, which may in turn contribute to loss of control around food consumption (Ely, 2015; Hebebrand, 2014; Schulte E, 2016).

Nutritional interventions for BN are effective for BED. Regular eating, planning structured

meals and snacks, avoiding long periods of time between eating events, and planned exposure to foods consumed in binge episodes. As treatment progresses, individuals with BED may benefit from instruction in mindful and intuitive eating principles (Bays, 2017; Richards et al., 2017; Tribole & Resch, 2020).

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## NUTRITIONAL APPROACHES IN THE TREATMENT OF ARFID

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ARFID is a relatively new ED diagnosis. It was first included in 2013 in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5). Avoidance of foods in ARFID is characterized by one or more of the following: fear of adverse consequences (e.g., choking), sensitivity to sensory characteristics of food (e.g., smell, texture, or taste), lack of interest in eating or food (e.g., low hunger). To date, there are no evidenced-based treatments, though several treatments for children and adolescents show promise: Cognitive-behavioral treatment (CBT-AR) (Thomas & Eddy, 2018), FBT (Spettigue et al., 2018), and emotional processing of graduated food exposures (Barlow et al., 2011). Treatment approaches for ARFID in adults are lacking.

Nutrition therapy for ARFID is based on the treatment literature outlined above, particularly the work by Thomas and Eddy (2018). Families are included in treatment of children and adolescents. In cases of individuals who exhibit weight loss, or failure to grow as expected, focus is initially on restoring natural body weight. Psychoeducation is concentrated on how avoiding food increases fear, anxiety, and/or lack of interest, and maintains eating problems. Individuals and their families are directed to identify avoided foods. These foods are slowly and steadily reintroduced in treatment sessions and with at-home exposure assignments. Thomas and Eddy (2018) recommend these approaches which are based on the ARFID subtype:

1. Fear of adverse consequences of eating (e.g., choking or vomiting): Hierarchical exposure to feared foods starting with the least adverse.
2. Sensitivity to sensory characteristics of food: Repeated exposure to new foods beginning with sight, touch, smell, and, finally, taste and texture.
3. Lack of interest in eating or food (e.g., low hunger, little enjoyment in eating): Exposure first to most preferred foods and practice and support in tolerating fullness, bloating, and nausea (e.g., drinking water, pushing stomach out, spinning in a chair).

Dietitians begin ARFID treatment with a thorough assessment to establish goals for nutrition therapy. Initially, nutritional needs should be met using the individual's accepted food choices, with no expectation to include new or avoided foods. New/avoided foods are added to the meals and snacks after they have been completely explored via exposure experiences. During exposure experiences, Individuals are directed to slowly noticing what the food looks like, what does it feel like, what does it smell like, what does it taste like, and what is the texture like (Thomas & Eddy, 2018, p. 72). Exposure experiences are intended to directly treat the rigidity of avoided foods and should be approached using a spirit of curiosity with the individual directly participating in the planning and preparation for the exposure. As foods become acceptable, they are incorporated into eating plans, improving balance of nutrients, and reducing anxiety about meals, eating at restaurants, with friends, and so forth.

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## NUTRITIONAL APPROACH TO TREATMENT OF OSFED

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OSFED includes atypical AN, sub-clinical BN and BED, purging disorder, and night eating syndrome. Generally, nutritional treatment proceeds as it would in AN, BN, and BED, with particular attention to the ED behaviors present.

## 11. MANAGING EATING DISORDERED-RELATED BEHAVIORS

The basic treatment goal for nutrition counseling for eating disordered behaviors is to reestablish a healthy state. In the field of ED, a healthy state is generally defined as normalized eating and exercise behaviors, restoration of physical and psychological health, and, in younger individuals, a return to normal development. To support achievement of a healthy state, dietitians provide guidance, support, and strategies for eating disordered individuals aimed at resolving eating disordered-related food and exercise behaviors.

## TREATMENT APPROACHES FOR RESTRICTIVE EATING

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Prepare individuals for the obstacles they may face during weight restoration, such as cognitive, behavioral, and emotional issues, gastrointestinal discomfort, changes in body composition and metabolism, and potential medical concerns. Be watchful of signs (e.g., swelling in the lower extremities) of Refeeding Syndrome in the first two weeks in individuals who have eaten less than 500 calories/day in the last five days, or have lost more than 10% of their body weight in the last few months. Symptoms of Refeeding Syndrome are serious: muscle weakness and cramping, vomiting, seizures, cardiac arrhythmias, seizures, delirium, and death. See the Refeeding Syndrome section for further details on managing refeeding syndrome.

Caloric increases to achieve weight restoration are based on the individual's current intake. Caloric additions are made one to three times a week, adding 300 calories if no weight gain; 500 calories if weight is lost. Once nutrient needs are being satisfied by dietary intake, and the individual is gaining 1-4 pounds a week, no caloric changes are made, unless weight is lost or stymied. Gaining weight at these rates is often associated with gastrointestinal discomfort, due to gastroparesis (delayed gastric emptying), suggesting food relatively low in soluble fiber (fruits and vegetables are high in soluble fiber) and fat can reduce discomfort. When gastrointestinal symptoms hinder recommended rate of weight gain, suggest a consultation

with the medical provider for consideration of prescribing metoclopramide, which improves gastric emptying (Gaudiani, J., 2019, pp. 26-28; Mehler & Andersen, 2017, pp. 120-130). Constipation is associated with restricted eating and contributes to feelings of discomfort with increased food intake. Polyethylene glycol 3350 (trade name, MiraLAX), an osmotic laxative available over the counter, is helpful, and may be needed in doses up to three or four times a day.

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## TREATMENT APPROACHES FOR BINGE EATING

The most direct cause of binge eating is dietary restraint or restrictive eating. Active efforts to lose weight are contraindicated when binge eating behaviors are present. A food plan that provides a schema for regular meals and snacks (see Food Plan section) is at the core of recovery from binge eating. Dietitians and individuals collaborate on a food plan describing when, where, what, and how much to eat. Meals and snacks are well-balanced in carbohydrates, protein, and fat. Food plans should provide variety and flavor for satiety, and adequate calories for weight maintenance or, if necessary, weight gain.

As overvaluation of shape and weight (excessive influence of shape or weight on self-evaluation) is a key risk factor for binge eating behaviors, it is vital that dietitians support body acceptance and health-focused behaviors, rather than weight loss-focused dieting. Individuals often benefit from self-monitoring of food intake, eating behaviors, and thoughts and feelings in a written or digital food journal or app (ex., Recovery Record, Rise Up + Recover). During nutrition counseling sessions, discussions of self-monitoring data are useful in uncovering what may be triggering binge eating, or what purpose the binge eating serves. Individuals may observe that binge eating is often a response to restrictive eating, stress, and/or uncomfortable feelings. Bingeing behaviors may temporarily relieve feelings of boredom, depression, anxiety, and anger. Individuals also rely on binge eating to reduce vague feelings of

uneasiness associated with transitional periods, such as coming home from work or school, getting ready for bed, or beginning a study session. A behavior-chain analysis (Safer et al., 2017) can be used to thoroughly examine binge episodes, starting with the trigger or prompting event and examining associated thoughts, feelings, body sensations, events, and experiences. This information is useful in understanding what increases vulnerability to binge, and how to prevent bingeing in the future.

It is useful to experiment with strategies that help individuals resist urges to binge. These can include: 1) eating only at the table; 2) noticing that urges usually subside after an hour; 3) finding active, enjoyable, and realistic alternatives/ distractions to engage in instead of bingeing, such as going for a walk or a drive, calling a friend, emailing, knitting, or other crafts. Individuals often associate binge eating with the consumption of certain “trigger foods.” These foods should initially be avoided until binge eating is under control, and then should be gradually reintroduced at meals and in previously “safe” environments. If binge eating reappears, reinstitute self-monitoring, increase portion sizes, and identify and address triggers associated with binge eating.

Regular weight monitoring may be part of nutrition treatment for binge eating. Weight monitoring provides assurance that instituting regular meals and snacks does not

result in significant changes in weight. When individuals have chosen to avoid weight checks of any kind, this stance should be respected. Individuals may present to treatment weighing themselves multiple times a day. When weight concerns begin to dominate nutrition sessions, explore whether self-monitoring of weight should be reduced (e.g., from daily to weekly or monthly, or be discontinued), or if in-office weight checks should be instituted.

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## TREATMENT APPROACHES FOR PURGING

Self-induced vomiting and other means of purging (e.g. laxative and diuretic abuse, insulin misuse, excessive exercise, diet pills) can become entrenched and reinforced by an accompanying emotional release. Purging is treated using self-monitoring (see Nutritional Approach in the Treatment of BN section), developing an individualized food (see Food Plan section), and by providing psychoeducation, and behavioral strategies.

**Psychoeducation:** Effective psychoeducational themes focus on the negative effects purging on health and appearance, and its relative ineffectiveness in managing weight. With correction of common misconceptions and the creation of sufficient motivation, individuals often can just stop abusing diuretics, appetite suppressants, and diet pills, even if they have used these substances for a significant period of time.

- Self-induced vomiting, laxative abuse, and diuretic abuse are associated with health complications, including (dehydration, electrolyte alterations, esophagitis, Barrett's esophagus (esophageal malignancy), Pseudo Bartter's syndrome (metabolic abnormalities leading to edema), reflux, heart burn, acid regurgitation, dental erosion, rectal prolapse, renal failure, and cardiac arrest.
- Chronic vomiting will eventually cause teeth to become discolored, worn, ragged, and chipped. Provide advice on how to protect teeth (e.g., after purging, wait several hours before brushing, immediately after a purging, rinse with a fluoridated mouthwash or water).
- Approximately 1200 calories are retained after vomiting regardless of the size of the binge (Kaye, 1993).
- Laxatives and diuretics are ineffective at eliminating calories (Bo-Linn et al., 1983; Lacey & Gibson, 1985).
- Purging gives false signals regarding hunger and satiety, impelling individuals to eat or binge when they are not hungry, or to be hypersensitive to feelings of fullness.

## Behavioral strategies:

- ▶ Swallow back any vomitus spontaneously entering the mouth.
- ▶ Focus on eliminating binge eating before focusing on purging behavior.
- ▶ Avoid “trigger” (always purged) foods initially.
- ▶ Designate “safety meals and snacks” comprised of foods which have never been purged or are hard to purge.
- ▶ Delay purging by engaging in alternative behaviors (e.g., call a friend, go for a walk, do a hobby) for a set amount of time (e.g., 60 minutes).
- ▶ Reduce the amount of laxatives by half per week (Fairburn, 2008, p. 83).
- ▶ In cases of abuse of large amounts of laxatives follow up with a medical professional knowledgeable in the use and cessation of use of laxatives.

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## 12. Food Plans from Prescriptive to Mindful and Intuitive Eating

Food plans are a key tool in the treatment of EDs, providing practical guidance for individuals with EDs and for parents/supporters. Food plans group foods with similar macro and micronutrient and energy content. Effective food plans achieve three ends: meet energy and nutrient needs; provide an organized approach to food consumption; and desensitize feared, binged, or purged foods. The use of a food plan in the treatment of ED is an indispensable behavioral intervention.

## Food plans need to be:

- ▶ Individualized with stepped changes made to the individual's current food intake.
- ▶ Initially focused on meeting energy needs, then macronutrients and micronutrients.
- ▶ Organized around meals and snacks.
- ▶ Simple to understand.
- ▶ Compatible with the step-down plan from higher level of care.
- ▶ More flexible and general as individuals make progress.

## EXAMPLES OF FOOD PLANS

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The **Exchange-based system** is adapted from the Diabetic Exchanges for Meal Planning (Geil, 2008), which is a well-accepted method grouping foods according to nutrient and energy content. Serving sizes within food groups may not reflect normal portions of foods. Exchange-based plans are usually organized into meals and snacks, or individuals are provided a recommended number of servings per food group per day.

The **Rule of Threes system** (Herrin & Larkin, 2013) is based on three normal meals and up to three snacks per day. Normal portions of food are grouped according to nutrient content. Desserts and other foods eaten for pleasure are incorporated into meals.

The **Plate by Plate Approach** (Crosbie & Sterling, 2019) is a visual plan developed for specifically for parents who are plating food for a child with an ED. When weight gain is prescribed for AN or ARFID,

parents are instructed to fill a 10-inch plate with 50% grains/starches, 25% protein, and 25% vegetables/fruits, with sides of fats and dairy. For BN or BED or weight neutral plans, the plate is 1/3 grains and starches, 1/3 protein, 1/3 vegetables and fruits, with sides (foods that are served with an entrée).

The **Entrée and Sides system** (Mitchell & Peterson, 2005.) is based on a normal eating approach to eating that groups food at each meal into a main entrée plus accompanying sides.

**Mindful and Intuitive Eating** (Bays, 2017; Richards et al., 2017; Tribole & Resch, 2020) rely on internally directed eating strategies, recognizing and responding to cues of hunger and fullness, and attention to experiencing the process and substance of eating.

## INITIATING A FOOD PLAN

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Some individuals and families benefit from a specific and quantified food plan. Others are overwhelmed by detailed food plans. Some may benefit from suggested additions to current intake so that over time, intake approximates adequate intake. The dietitian may start with an outline of a "sample day," which incorporates foods currently consumed, and adding one or two challenging foods or increased portions. Food plans should emphasize a progression toward increased variety of foods selected, and inclusion of "feared and avoided" foods. Optimally, as individuals make progress, they move away from specified eating plans towards more internally directed eating.

## TOOLS FOR MANAGING FOOD PLANS

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**Monitoring weight** changes can be an indicator of adequate energy balance. If weight restoration stalls, add 300 calories to daily intake. If weight is lost, add 500 calories to daily intake. Early in weight restoration, increases in calories often need to occur several times per week.

**Food Records** indicate how individuals are implementing a food plan and may encourage adherence. There are a variety of food recording options from simple paper diaries to web or application-based programs, such as <https://www.recoveryrecord.com> and <https://www.recoverywarriors.com/App/>. The value of using food records must be evaluated against any reinforcement of obsessiveness the individual experiences, and the individual's interest in and willingness in doing them.

**Calorie Counting** may assist individuals and parents in achieving prescribed weight gain and allows flexibility in food choices. Careful consideration of the benefits and risks of this tool are essential.

**Monitoring hunger and satiety** cues requires internal assessment of physical sensations prior to and during eating. Hunger and satiety cues are typically not reliable until nutritional restoration is achieved.

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## 13. EXERCISE AND ACTIVITY

Compulsive exercise is defined as one or more of the following characteristics: driven, rigid, perceived inability to control, interference with important activities, occurs at inappropriate times and settings, and continues despite injuries or other health issues. It is present in 30-80% of individuals with EDs (Quesnel et al., 2017). Of note, not all individuals are driven to exercise; some may recognize that they are not well enough to exercise.

Dietitians are often the member of the multidisciplinary team who addresses exercise behaviors and sets exercise limits if necessary.

Dietitians collaborate with individuals to devise individualized exercise or activity prescriptions that do not jeopardize health. It is prudent to severely limit exercise if there are signs of bradycardia, and in very low weight individuals. Individuals who experience unremitting weight loss should be deterred from anything but limited daily tasks. For those who are gaining weight consistently, moderate exercise can help accept associated body changes, decrease drive to compulsively exercise, practice moderate exercise, provide enjoyment, and improve mood. Psychoeducation is focused on challenging distorted beliefs and cognitions about exercise including research and clinical experience that the body adapts to exercise by reducing total energy expenditure maintaining body weight (Pontzer, et al., 2016). Siegel's Positive psychology: Harnessing the power of happiness, mindfulness, and inner strength (2014) provides information on mindful, joyful movement.

Relative Energy Deficiency in Sport (RED-S), also formerly known as the "female athlete triad" when it affects women, can occur in athletes with relatively low-calorie intakes, with or without significant weight loss. RED-S is often associated with eating disorders and has similar detrimental effects on bone health, menstrual function in some women, low testosterone levels in men, metabolic rate, immune function, cardiovascular health, and psychological health (Martinsen & Sundgot-Borgen, 2013). Treatment is like that of restrictive eating disorders and is focused on increased food intake and reduction or cessation of exercise (Mountjoy et al., 2018).

**The following exercise guidelines have been developed for clinicians** (Cook, et al., 2017; Herrin & Larkin, 2013):

- ▶ Team approach. Exercise guidelines should be communicated with treatment team members, parents/supporters, and if appropriate, gym teachers, personal trainers, and coaches.
- ▶ Physically stable. Exercise should not be endorsed until individuals have made sufficient progress in:
  1. Weight stabilization for those in need of weight gain
  2. Physical status as indicated by normalized heart rate, labs and improvement in eating behaviors, such as purging
  3. Nutritional consumption as indicated by normal food intake and sufficient calories
- ▶ Contingent on treatment compliance and progress. For example, exercise added to individual's treatment plan when a certain weight is achieved and maintained.
- ▶ Adherence to exercise limits. Exercise restricted if individual can not comply with exercise plan; exercise sessions may need to be supervised initially.
- ▶ Graded, start low. For example, 15 minutes 3 x week, slow walk. Once an individual is recovered, reasonable exercise practices (Herrin, Larkin, 2013):
  1. No more than an hour a day of exercise
  2. No more than one exercise session per day
  3. No more than five days a week

4. No more exercise than the coach recommends for athletes
5. No more exercise than is typical of someone of similar age and circumstances for children and adolescents

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## 14. VEGETARIANISM AND VEGANISM

As the limited research available indicates that vegetarianism occurs at a higher rate in individuals with EDs, vegetarianism should be addressed as being possibly related to and/or exacerbating an eating disorder (Heiss et al., 2017). When vegetarianism is chosen based on personal views or preferences related to religion, ethics, ecological, health, or taste, it is worth regularly exploring with individuals the rationale and motivations for dietary choices as these may change during treatment. If the individual is a child or a young adolescent, and recently has adopted a vegetarian diet, parents/supporters can be encouraged to disallow this way of eating during treatment. How vegetarianism is addressed in treatment depends on several factors that should be explored with individuals:

- ▶ Religious, ethical, ecological, health, or taste rationales.
- ▶ Originated before, during, after, or exclusively during course of an eating disorder.
- ▶ Related to restricting intake and/or weight loss.
- ▶ Nutrients needs met with current diet.
- ▶ Willing to add variety and volume if necessary.
- ▶ Non-vegetarian foods are feared.
- ▶ Non-vegetarian foods are consumed in binge episodes.

## Nutrition Issues

Meeting nutrient and energy needs during treatment can be complicated by diet limitations, particularly if individuals practice the more restrictive forms of vegetarianism.

### TYPES OF VEGETARIANISM:

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- ▶ Vegetarianism: Diet does not include meat, poultry, or fish.
- ▶ Lacto-ovo vegetarianism: Includes dairy products such as milk, cheese, yogurt, and eggs but excludes meat, poultry, and fish.
- ▶ Lacto vegetarianism: Includes dairy products but excludes eggs and foods containing eggs as well as meat, poultry, and fish.
- ▶ Pescatarian: does not include meat but does contain seafood.
- ▶ Veganism: Diet does not include red meat, poultry, fish, dairy, eggs and possibly other animal-origin foods like gelatin and honey; an associated philosophy that rejects the commodity status of animals and abstains from the use of all animal products like leather.

### SPECIFIC FOOD AND NUTRITION ISSUES TO ADDRESS IN TREATMENT WITH VEGETARIANS INCLUDE:

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- ▶ Accepting increasing food variety.
- ▶ Increasing volume of vegetarian foods (if necessary).
- ▶ Possible amplified gastric distress during weight restoration.
- ▶ Correcting potential nutrient deficiencies.

- ▶ As a vegan, willing to eat a vegetarian food plan (eggs and dairy) during treatment for health reasons.

Vegetarianism requires close attention to achieve adequate protein intake and other nutrients depending on the type of vegetarianism. Vegetarian individuals can benefit from education on food sources (see below) and, if necessary, supplemental sources of nutrients. Laboratory values for the following nutrients should be reviewed for signs of deficiency (Keller, 2019):

- ▶ Protein (Prealbumin)
- ▶ Iron (Hemoglobin; Ferritin for iron stores)
- ▶ Zinc
- ▶ Riboflavin (Vitamin B2)
- ▶ Vitamin B12
- ▶ Vitamin D
- ▶ Omega-3 fatty acids
- ▶ Iodine

### VEGANISM

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Veganism requires much more attention to ensure sufficient essential nutrient intake. The list below is a non-exhaustive list of food sources of essential nutrients in a vegan food plan. Supplements of multiple vitamin-mineral complexes, calcium, and omega-3 (derived from algae) are recommended.

- ▶ Protein: Plant sources of protein (beans, grains, nuts, and seeds) are considered incomplete proteins because they are missing, or do not have enough of, one or more of the essential

amino acids. When two or more plant sources of protein are eaten together, they compensate for each other's lack of amino acids. For example, when grains are eaten with beans or nuts, they form a complete protein. Protein needs of vegans can be met if calorie intake is adequate, and a variety of plant sources of protein are consumed.

- ▶ **Calcium:** Calcium-fortified fruit juices are good sources (Andon et al., 1996). While the bioavailability of calcium carbonate fortified soy milk demonstrated equivalency to cow's milk (Zhao, 2005), the bioavailability of calcium in the array of available fortified plant milks has not been confirmed (Singhal, 2017). Furthermore, fortified plant milks are limited by settling of the calcium that even vigorous shaking cannot keep in suspension (Heaney & Rafferty, 2006, Rafferty et al., 2007). Leafy greens contain calcium, but it is not well absorbed. Supplementation of at least 1000 mg/day or 3 cups/day of foods rich in calcium recommended. Calcium supplements are best absorbed in increments of 500 mg or less at meals (Straub, 2007).
- ▶ **Riboflavin:** Dairy products contribute substantial riboflavin. For this reason, vegans and those who consume little milk are at risk of riboflavin deficiency and should take a supplement that is labeled as 100% of Daily Value.
- ▶ **Iron:** Plant foods contain nonheme iron, which is not as well absorbed as heme iron found in meat, poultry, and fish. Vegetarians may not have low serum hematocrit or hemoglobin levels, as the ability to absorb iron from food varies in individuals. Vegetarians are at higher risk for low iron stores, as indicated

by ferritin levels. Consuming a source of vitamin C while eating plant sources of iron increases absorption; consuming calcium-containing foods decreases iron absorption. Iron supplements are recommended if lab values indicate deficiency.

- ▶ **Vitamin B12:** As this vitamin is found only in animal foods, B12-fortified foods or supplements are necessary for vegans. Vegans should take a supplement that is labeled as 100% of Daily Value.
- ▶ **Vitamin D:** Vitamin D, found only in dairy, eggs, meat, poultry, and fish products, is also synthesized from exposure to sunlight. Supplement with Vitamin D if lab tests indicate deficiency.
- ▶ **Zinc:** Plant foods are naturally low in zinc. In addition, zinc absorption from plant foods is hindered by the presence of phytic acids. Vegetarians should consider getting 100% of Daily Value from a supplement.
- ▶ **Iodine:** High intakes of soy can exacerbate iodine deficiency (Leung et al., 2011).
- ▶ **Omega-3 fatty acids:** Omega-3 fatty acids have poor bioavailability from plant sources besides algae (Lane et al., 2014). Vegans have been found to have low omega-3 fatty acid dietary intakes and blood levels (Saunders et al., 2013). Due to lack of data, recommended daily dietary intakes have not been determined. Algae-based supplements of fatty acids DHA and EPA of 200-300 mg/day are recommended for vegans who are pregnant, lactating, older, or have chronic diseases, such as diabetes and metabolic syndrome (Saunders, 2013).

Nutrients	Vegan Food Sources		
<b>Protein</b>	<ul style="list-style-type: none"> <li>▶ Tofu</li> <li>▶ Tempeh</li> <li>▶ Soy-based products</li> <li>▶ Legumes</li> </ul>	<ul style="list-style-type: none"> <li>▶ Edamame</li> <li>▶ Protein-fortified veggie burgers</li> <li>▶ Nuts</li> </ul>	<ul style="list-style-type: none"> <li>▶ Nut butters</li> <li>▶ Seeds</li> </ul>
<b>Calcium</b>	<ul style="list-style-type: none"> <li>▶ Calcium-fortified soymilk (shake well)</li> <li>▶ Calcium fortified orange juice</li> </ul>	<ul style="list-style-type: none"> <li>▶ Tofu</li> <li>▶ Bok choy</li> <li>▶ Kale</li> <li>▶ Broccoli</li> </ul>	<ul style="list-style-type: none"> <li>▶ Collard greens</li> <li>▶ Mustard greens</li> <li>▶ Almonds</li> <li>▶ Legumes</li> </ul>
<b>Iron</b>	<ul style="list-style-type: none"> <li>▶ Black molasses</li> <li>▶ Cashews</li> <li>▶ Chickpeas</li> </ul>	<ul style="list-style-type: none"> <li>▶ Dried apricots</li> <li>▶ Pistachios</li> <li>▶ Sesame seeds</li> </ul>	<ul style="list-style-type: none"> <li>▶ Spinach</li> <li>▶ Tahini</li> <li>▶ Whole grain bread</li> </ul>
<b>Zinc</b>	<ul style="list-style-type: none"> <li>▶ Soy products</li> <li>▶ Fortified cereals</li> </ul>	<ul style="list-style-type: none"> <li>▶ Legumes</li> <li>▶ Nuts</li> </ul>	<ul style="list-style-type: none"> <li>▶ Wheat germ</li> <li>▶ Whole-grain products</li> </ul>
<b>Riboflavin</b>	<ul style="list-style-type: none"> <li>▶ Avocados</li> <li>▶ Broccoli</li> </ul>	<ul style="list-style-type: none"> <li>▶ Dark-green leafy vegetables</li> <li>▶ Enriched bread and cereals</li> </ul>	<ul style="list-style-type: none"> <li>▶ Nuts</li> <li>▶ Sea vegetables</li> </ul>
<b>Iodine</b>	<ul style="list-style-type: none"> <li>▶ Milk</li> <li>▶ Soymilk</li> </ul>	<ul style="list-style-type: none"> <li>▶ Salt (iodine fortified)</li> <li>▶ Seaweed</li> </ul>	<ul style="list-style-type: none"> <li>▶ Grain</li> </ul>
<b>Omega-3 Fatty Acids</b>	<ul style="list-style-type: none"> <li>▶ Soybeans</li> <li>▶ Tofu</li> <li>▶ Edamame</li> <li>▶ Walnuts</li> </ul>	<ul style="list-style-type: none"> <li>▶ Flax seeds</li> <li>▶ Chia seeds</li> <li>▶ Oils (canola, soybean, flaxseed, walnut)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Hemp</li> <li>▶ Supplements recommended for vegans</li> </ul>

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## 15. NUTRITION CRITERIA FOR A HIGHER LEVEL OF CARE

An individual's ability to meet their nutritional needs, and the support available to them to do so, plays a significant role in determining level of care. The table below provides an overview of components involved in determining the appropriate level of care from a nutritional perspective. Relevant clinical and medical factors should also be considered.

### Nutrition Criteria for Level of Care (APA, 2006; AAP, 2010; SAHM, 2015)

Level of Care Criteria	Outpatient Intensive Outpatient Program Partial Hospital Program	Residential	Inpatient Hospitalization
<b>Medical Criteria</b>	Medically stable, such that more extensive medical monitoring, as outlined in Residential and Inpatient Hospitalization levels of care, is not indicated	Medically stable with no need for IV fluid, nasogastric tube feeding, or daily lab testing	<p><b>For adults:</b> Heart rate &lt;40 bpm; blood pressure &lt;90/60 mmHg; glucose &lt;60 mg/dl; potassium &lt;3 mEq/L; electrolyte imbalance; temperature &lt;97.0°F; dehydration; hepatic, renal, or cardiovascular organ compromise requiring acute treatment; poorly controlled diabetes; medical consequences of malnutrition (e.g., syncope, seizures, cardiac failure, pancreatitis); uncontrollable binging and purging; failure of a lower level of care</p> <p><b>For children and adolescents:</b> Heart rate near &lt;50 bpm while awake or &lt;45 bpm during sleep; arrhythmia; orthostatic blood pressure changes (&gt;20 bpm increase in heart rate or &gt;10 mmHg to 20 mmHg drop); blood pressure &lt;80/50 mmHg; temperature &lt; 96.0° F/35.6° C; hypokalemia, hypophosphatemia, or hypomagnesemia; interrupted growth and development; dehydration; acute food refusal; medical consequences of malnutrition (e.g., syncope, seizures, cardiac failure, pancreatitis); uncontrollable binging and purging; failure of a lower level of care</p>

Level of Care Criteria	Outpatient	Intensive Outpatient	Hospital Program	Residential	Inpatient Hospitalization
<b>Weight Suppression Status</b>	If weight restoration indicated, can be managed by individual or supporters	If weight restoration indicated, generally less than 5-10% NBW to restore	If weight restoration indicated, generally less than 15% NBW to restore	If weight restoration indicated, may need restoration of more than 20% NBW	If weight restoration indicated, may need restoration of more than 25% NBW
<b>Weight Restoration Rate</b>	0.5-1 lbs/week	1+ lbs/week	2+ lbs/week	2-3+ lbs/week	3+ lbs/week
<b>Intake</b>	Insufficient, irregular or excessive intake can be redirected in the home environment	Needs skill development with meals	Needs significant nutritional intervention and skill	Needs intensive nutritional intervention and skill development with meals and snacks and needs professional supervision for all eating occasions. At significant risk for refeeding syndrome	Needs intensive nutritional intervention and skill development with meals and snacks and needs professional supervision for all eating occasions. At significant risk for refeeding syndrome
<b>Eating Behaviors</b>	Needs guidance and support but will consume meals and snacks	Able to apply skills learned under close supervision to consume meals and snacks in the home	Needs close supervision and direction to learn and apply skills needed to	Needs continual supervision and direction to learn and apply skills needed to independently consume meals and snacks with minimal eating disorder behaviors	Needs continual supervision to consume meals and snacks with minimal eating disorder behaviors
<b>Supervision Needed</b>	Supervision needed, can be provided by supporters	Supervision needed can be provided mostly by supporters, with guidance and skills developed in IOP	Needs professional supervision majority of meals and snacks; supervision can be provided by supporters 1 meal/day	Needs professional supervision for all meals/snacks	Needs professional supervision for all meals/snacks
<b>Need For Professionally Supervised Therapeutic Meals/Snacks</b>	None	3-4 meals/week	10-15 meals/week & 5-10 snacks/week	All meals and snacks	All meals and snacks

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## 16. NUTRITION AND MENTAL FUNCTION

Understanding the connection between nutrition and mental health is important when working with individuals with an eating disorder, as irregular or insufficient eating behavior can lead to changes concentration, memory, fear response and cognitive flexibility. An emerging field of nutrition and mental function, also referred to as nutritional psychiatry, is focused on research in several areas, including the psychological benefits of adhering to health-promoting diets (similar to the Mediterranean diet) on depression and other mental health problems, and the role of the gut microbiota in treating mental illnesses, including eating disorders.

Even though individuals with eating disorders are rarely tested for nutrient deficiencies because it is assumed that the body is able to adapt physiologically to inadequate nutrition intake, Hanachi et al. (2019) found, in severely

malnourished hospitalized individuals with AN, deficiencies in zinc, vitamin D, copper, selenium, folic acid, thiamin, and B12. The commonly limited diets associated with EDs in individuals of any weight and size raise the issue of the potential of nutrient deficiencies in these individuals, as well. Hanachi et al. (2019) recommend assessment of micronutrient status before re-feeding in AN.

Other than frank deficiencies (e.g., niacin, glucose) associated with mental function (e.g., delirium, cognitive function), the relation between dietary quality and nutritional deficiencies have only recently been proposed as being central to mental health. Emerging evidence demonstrated a bi-directional association between eating disorders and depression, showing those with depression had increased risk for eating pathology and those with eating disorders were at higher risk for depressive symptoms (Puccio 2016). Since 2013, a number of reviews and meta-analyses have been published that examine the relationship between dietary intake and mental disorders. The results are intriguing and suggest that a diet includes fruits, vegetables, fish, and nuts reduces the rates of depression (Gangwisch et al., 2015, Lassale et al., 2019). Molendijk et al. (2018a), however, found no specific dietary patterns or foods associated with increased incidence of depression. In a recent review, Lassale et al. (2019) concluded that no specific nutritional interventions improve mental health, although observational studies indicate

that adhering to a “healthy diet” (i.e., fruit, vegetables, legumes, cereals) may be associated with improvements in depression scores.

Of note, research on mental health and nutrition is facing criticism. Randomized controlled trials have been criticized for methodological problems that lead to large effect sizes and narrative reviews have been found to overstate the benefits of a healthy diet on depression (Molendijk et al., 2018b; Thomas-Odenthal et al., 2020). Clinicians are encouraged to monitor the research in this area before recommending nutritional interventions aimed at specific mental health diagnoses.

The human gut microbiota is a new area of research that shows promise as a focus for interventions to improve physical and mental health conditions, including eating disorders (Seitz J et al 2019, Bulik 2019). Increasingly, research has shown that intestinal microbiota is affected by long-term dietary patterns and short-term dietary changes (Singh, 2017, Sheflin, 2017). Kleiman et al. (2015) found, in hospitalized individuals with AN, greater depression and anxiety associated with lower bacterial diversity. More recently, Johnson et al. (2019) found that daily microbiome variation is related to food choice and that similar foods have distinct effects on different subjects’ microbiomes. Several clinical trials indicate that the Mediterranean diet may increase gut microbial diversity (Rinninella et al., 2019). In keeping with the core nutritional concepts of balance, variety,

and moderation, helping individuals eat a variety of foods will allow for the inclusion of nutrient-rich foods without the exclusion of highly palatable foods (Ganci et al. 2019, Lam et al. 2017, Sarris et al., 2015, Briguglio et al., 2018). While there are no clinically proven dietary strategies for optimization of the gut microbiome, future research may offer some promising techniques in manipulation of the gut microbiome, via pharmacological and dietary interventions, to reduce “anxiety, depression, and eating disordered cognitions” (Bulik et al., 2019).

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## 17. CONCLUSIONS

The authors of this guide hope that it provides the reader with easy to access, relevant information about the nutritional aspects of EDs. From nutrition counseling techniques, to treatment concepts, laboratory and assessment information, and finally the unique manner with which skilled dietitians treat individuals with various EDs, this guide is meant to inform anyone wishing to expand their knowledge of the field and practice of clinical nutrition, especially as it applies to EDs.

