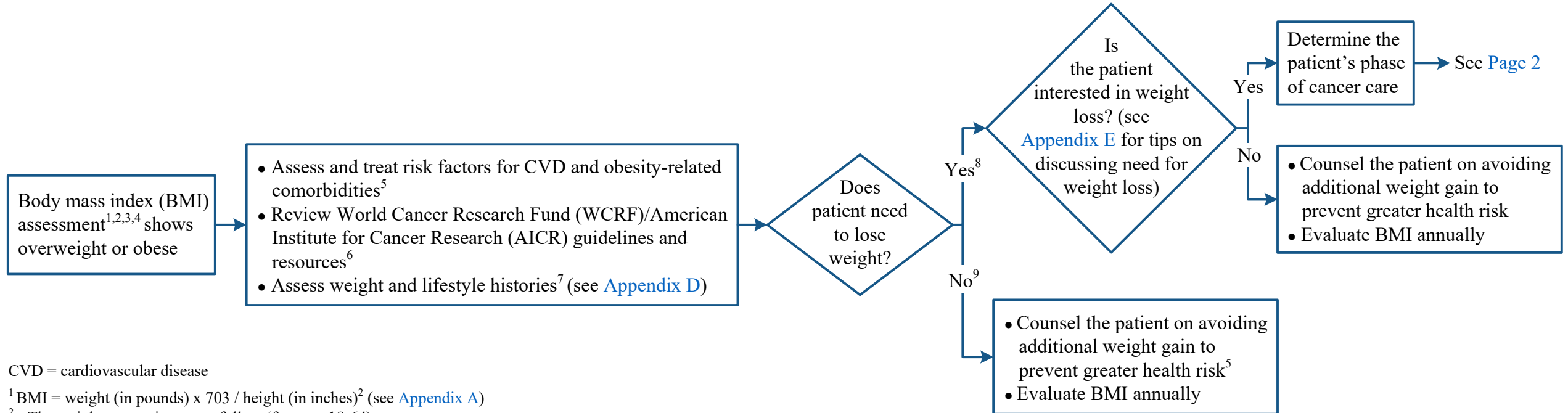Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.*

INITIAL ASSESSMENT   **EVALUATION**   **MANAGEMENT**

Body mass index (BMI) assessment[1,2,3,4] shows overweight or obese

→

- Assess and treat risk factors for CVD and obesity-related comorbidities[5]
- Review World Cancer Research Fund (WCRF)/American Institute for Cancer Research (AICR) guidelines and resources[6]
- Assess weight and lifestyle histories[7] (see Appendix D)

→

Does patient need to lose weight?

Yes[8] →

Is the patient interested in weight loss? (see Appendix E for tips on discussing need for weight loss)

Yes →

Determine the patient's phase of cancer care → See Page 2

No →

- Counsel the patient on avoiding additional weight gain to prevent greater health risk
- Evaluate BMI annually

No[9] →

- Counsel the patient on avoiding additional weight gain to prevent greater health risk[5]
- Evaluate BMI annually

CVD = cardiovascular disease

[1] BMI = weight (in pounds) x 703 / height (in inches)^2 (see Appendix A)

[2] • The weight categories are as follow (for ages 18-64):
  ○ Underweight (BMI < 18.5 kg/m^2)   ○ Normal weight (BMI 18.5-24.9 kg/m^2)
  ○ Overweight (BMI 25-29.9 kg/m^2)
  ○ Obese (BMI 30-34 kg/m^2); Morbidly obese (BMI ≥ 35 kg/m^2 with metabolic syndrome or BMI 40-49 kg/m^2); Super morbidly obese (BMI ≥ 50 kg/m^2)
  • Asian and South Asian population:
  ○ Overweight (BMI 23-24.9 kg/m^2)   ○ Obese (BMI ≥ 25 kg/m^2)
  • The optimal BMI ranges for older adults age > 65 years are not currently agreed upon, however limited data suggests 31-32 kg/m^2 and 27-28 kg/m^2 for female and male respectively

[3] In addition to BMI assessment, consider performing anthropometric measurements such as Waist-Hip Ratio and abdominal circumference. If technology is available, consider performing body composition measurements such as dual-energy x-ray absorptiometry (DEXA) or bioimpedance analysis.

[4] For underweight and normal weight, see Nutrition - Adult algorithm

[5] Diabetes, prediabetes, hypertension, dyslipidemia, elevated waist circumference
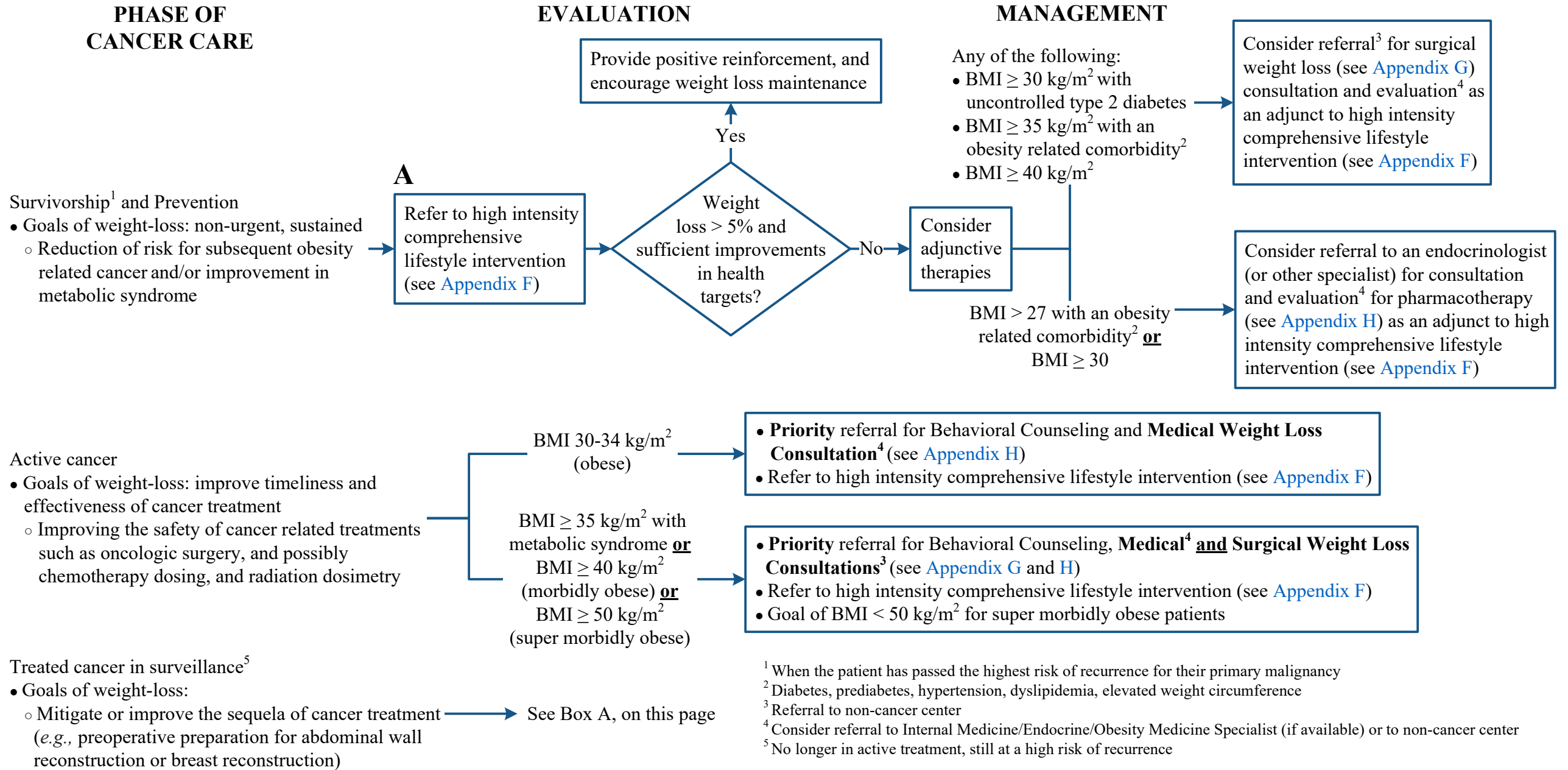
[6] See Appendix B and C

[7] Ask about history of weight gain and loss over time, details of previous weight loss attempts, dietary habits, physical activity, family history of obesity, and other medical conditions or medications that may affect weight. Answers to these questions may provide useful information about the origins of or maintaining factors for overweight and obesity, including success and difficulties with previous weight loss or maintenance efforts.

[8] • BMI 25-29.9 with additional risk factor(s) of increased cardiovascular risk (*e.g.,* diabetes, prediabetes, hypertension, dyslipidemia, elevated waist circumference) or other obesity-related comorbidities **or**
  • Obese (BMI 30-34 kg/m^2); Morbidly obese (BMI ≥ 35 kg/m^2 with metabolic syndrome or BMI 40-49 kg/m^2); Super morbidly obese (BMI ≥ 50 kg/m^2)

[9] Overweight without an obesity-related comorbidity

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PHASE OF CANCER CARE | **EVALUATION** | **MANAGEMENT**

Provide positive reinforcement, and encourage weight loss maintenance

Any of the following:
- BMI $\geq$ 30 kg/m^2 with uncontrolled type 2 diabetes
- BMI $\geq$ 35 kg/m^2 with an obesity related comorbidity[2]
- BMI $\geq$ 40 kg/m^2

Consider referral[3] for surgical weight loss (see Appendix G) consultation and evaluation[4] as an adjunct to high intensity comprehensive lifestyle intervention (see Appendix F)

Survivorship[1] and Prevention
- Goals of weight-loss: non-urgent, sustained
  - Reduction of risk for subsequent obesity related cancer and/or improvement in metabolic syndrome

A

Refer to high intensity comprehensive lifestyle intervention (see Appendix F)

Weight loss > 5% and sufficient improvements in health targets? — Yes / No

Consider adjunctive therapies

BMI > 27 with an obesity related comorbidity[2] **or** BMI $\geq$ 30

Consider referral to an endocrinologist (or other specialist) for consultation and evaluation[4] for pharmacotherapy (see Appendix H) as an adjunct to high intensity comprehensive lifestyle intervention (see Appendix F)

Active cancer
- Goals of weight-loss: improve timeliness and effectiveness of cancer treatment
  - Improving the safety of cancer related treatments such as oncologic surgery, and possibly chemotherapy dosing, and radiation dosimetry

BMI 30-34 kg/m^2 (obese)

- **Priority** referral for Behavioral Counseling and **Medical Weight Loss Consultation**[4] (see Appendix H)
- Refer to high intensity comprehensive lifestyle intervention (see Appendix F)

BMI $\geq$ 35 kg/m^2 with metabolic syndrome **or** BMI $\geq$ 40 kg/m^2 (morbidly obese) **or** BMI $\geq$ 50 kg/m^2 (super morbidly obese)

- **Priority** referral for Behavioral Counseling, **Medical**[4] **and Surgical Weight Loss Consultations**[3] (see Appendix G and H)
- Refer to high intensity comprehensive lifestyle intervention (see Appendix F)
- Goal of BMI < 50 kg/m^2 for super morbidly obese patients

Treated cancer in surveillance[5]
- Goals of weight-loss:
  - Mitigate or improve the sequela of cancer treatment (*e.g.,* preoperative preparation for abdominal wall reconstruction or breast reconstruction) → See Box A, on this page

[1] When the patient has passed the highest risk of recurrence for their primary malignancy
[2] Diabetes, prediabetes, hypertension, dyslipidemia, elevated weight circumference
[3] Referral to non-cancer center
[4] Consider referral to Internal Medicine/Endocrine/Obesity Medicine Specialist (if available) or to non-cancer center
[5] No longer in active treatment, still at a high risk of recurrence

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APPENDIX A: Body Mass Index (BMI)

Weight in Pounds

Height	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265
4' 10"	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
4' 11"	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	53	54
5'	17	18	19	20	21	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
5' 1"	16	17	18	19	20	21	22	23	24	25	26	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	43	44	45	46	47	48	49	50
5' 2"	16	16	17	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	34	35	36	37	37	38	39	40	41	42	43	44	45	46	47	48	48
5' 3"	15	16	17	18	19	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	34	35	35	36	37	38	39	40	41	42	43	43	44	45	46	47
5' 4"	15	15	16	17	18	19	20	21	21	22	23	24	25	26	27	27	28	29	30	31	32	33	33	34	35	36	37	38	39	39	40	41	42	43	44	45	45
5' 5"	14	15	16	17	17	18	19	20	21	22	22	23	24	25	26	27	27	28	29	30	31	32	32	33	34	35	36	37	37	38	39	40	41	42	42	43	44
5' 6"	14	15	15	16	17	18	19	19	20	21	22	23	23	24	25	26	27	27	28	29	30	31	31	32	33	34	35	36	36	37	38	39	40	40	41	42	43
5' 7"	13	14	15	16	16	17	18	19	20	20	21	22	23	23	24	25	26	27	27	28	29	30	31	31	32	33	34	34	35	36	37	38	38	39	40	41	42
5' 8"	13	14	14	15	16	17	17	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	30	31	32	33	33	34	35	36	36	37	38	39	40	40
5' 9"	13	13	14	15	16	16	17	18	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	30	31	32	32	33	34	35	35	36	37	38	38	39
5' 10"	12	13	14	14	15	16	16	17	18	19	19	20	21	22	22	23	24	24	25	26	27	27	28	29	29	30	31	32	32	33	34	34	35	36	37	37	38
5' 11"	12	13	13	14	15	15	16	17	17	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	29	29	30	31	31	32	33	33	34	35	36	36	37
6'	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	28	29	30	31	31	32	33	33	34	35	35	36
6' 1"	11	12	13	13	14	15	15	16	16	17	18	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	28	29	30	30	31	32	32	33	34	34	35
6' 2"	11	12	12	13	14	15	15	16	17	17	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	28	28	29	30	30	31	31	32	33	33	34	34
6' 3"	11	11	12	12	13	14	14	15	16	16	17	17	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	27	28	29	29	30	31	31	32	32	33

Underweight (18.4 or lower)	Normal weight (18.5-24.9)	Overweight (25-29.9)	Obese (30 or higher)

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APPENDIX B: World Cancer Research Fund (WCRF)/American Institute for Cancer Research (AICR) Guidelines

These recommendations for cancer prevention are drawn from the WCRF/AICR Third Expert Report:
- Be a healthy weight
- Be physically active
- Avoid sugary drinks. Limit consumption of energy-dense foods.
- Eat a diet rich in whole grains, vegetables, fruits, and beans/legumes
- Limit consumption of red and processed meats
- Limit consumption of sugar-sweetened drinks
- Limit alcohol consumption
- Limit consumption of "fast foods" and other processed foods that are high in fat, starches, or sugars
- Do not use supplements for cancer prevention
- For mothers[1]: Breastfeed your baby, if you can
- After a cancer diagnosis[1]: Follow the recommendations, if you can

[1] Special population recommendations

APPENDIX C: Resources

American Institute for Cancer Research (AICR): http://www.aicr.org/

Centers for Disease Control and Prevention (CDC): https://www.cdc.gov/obesity/index.html

National Institutes of Health (NIH): https://www.nhlbi.nih.gov/health/overweight-and-obesity

World Health Organization (WHO): https://www.who.int/health-topics/obesity#tab=tab_1

American Society of Clinical Oncology (ASCO): https://ascopubs.org/doi/full/10.1200/JCO.2014.58.4680

American College of Sports Medicine (ACSM): https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8576825/

American Cancer Society (ACS): https://acsjournals.onlinelibrary.wiley.com/doi/full/10.3322/caac.21591

MD Anderson: Patient Education: Weight Management Tools and Resources

MD Anderson: Patient Education: Safe and Successful Weight-management Program: How to Choose

Obesity Medicine Association (OMA): https://obesitymedicine.org/

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APPENDIX D: Assessment of Weight and Lifestyle Histories

Ask patient about:
- History of weight gain and loss over time
- Details of previous weight loss attempts which include focusing on number of weight loss programs attempts, successes, and failures
- Dietary habits
- Physical activity
- Family history of obesity
  - Psychosocial assessment
- Other medical conditions that may affect weight such as:
  - Hypothyroidism
  - Depression
  - Menopause
  - Cushing syndrome or Prader-Willi syndrome
  - Polycystic Ovarian syndrome
- Medications that may affect weight:
  - Antiepileptics
  - Antipsychotics
  - Endocrine therapy such as tamoxifen and aromatase inhibitors
  - Older beta blockers such as atenolol (Tenormin®) and metoprolol (Lopressor®, Toprol-XL®)
  - Steroids
  - Some antidepressants
- Psychological and Behavioral Conditions that may affect weight:
  - Mental stress
  - Depression
  - Anxiety
  - Post-traumatic stress syndrome
  - Binge-eating disorder
  - Night-eating disorder
  - Eating disorders not otherwise specified

Answers to these questions may provide useful information about the origins of or maintaining factors for overweight and obesity, including success and difficulties with previous weight loss or maintenance efforts.

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APPENDIX E: Tips for Talking About Weight Control

As a clinician, you are in an ideal position to talk with patients about weight control. These tips and resources may help you address this sensitive topic with your patients.
- Address the patient's chief complaint first, independent of weight. Many patients want to talk about weight with healthcare professionals who offer respect and empathy for their struggles with weight control. However, before starting a conversation about weight control with your patients, give them a few minutes to discuss other issues affecting their physical or emotional well-being.
- Use non-judgmental/non-stigmatizing language and practice "people first" language (*e.g.,* a person living with excess weight as opposed to an obese person)
- Open the conversation by finding out if your patient is willing to talk about weight or expressing your concerns about how their weight affects health. Then, you might ask your patient to describe their weight. Here are some sample discussion openers:
  - *"What food flavors remind you of home?"*
  - *"What are your food rules?"*
  - *"How are you learning to care more about food in your life?"*
  - *"Mr. Lopez, could we talk about your weight? What are your thoughts about your weight right now?"*
  - *"Mrs. Brown, I'm concerned about your weight because I think it is causing health problems for you. What do you think about your weight?"*
  - *"Mr. Smith, "I'm concerned your weight may be contributing to your knee pain. Can we talk more about that?"*
- Be sensitive to cultural differences that your patients may bring to the discussion regarding weight, food preferences, and related issues. Patients may be more open when they feel respected.
- Use non-offensive terms when discussing weight control. Patients prefer the terms "weight" or "excess weight" and dislike the terms "obesity," "fatness," and "excess fat."
- Decide if your patient is ready to control weight. Ask more questions to determine how ready a patient is to control weight. Some sample questions are below.
  - *"What are your goals concerning your weight?"*
  - *"What changes are you willing to make to your eating and physical activity habits right now?"*
  - *"What kind of help would you like from me regarding your weight?"*
- Patients not yet ready to attempt weight control may still benefit from discussing healthy eating, regular physical activity and how weight affects cancer risk and overall health. You can reassess the patient's readiness to control weight at the next office visit.
- Set a weight goal. A 5- to 10-percent reduction in body weight over six months to a year is a sensible weight-loss goal. One-half to 2 pounds per week is a safe rate of weight loss. A goal of maintaining current weight and preventing weight gain may be appropriate for some patients.
- Recommend healthy eating (see Appendix B and Nutrition - Adult algorithm) and physical activity behaviors (see Physical Activity - Adult algorithm)
- Prioritize increasing energy expenditure
  - Routine aerobic activity may improve body composition, promote modest weight loss, and prevent weight gain
  - Resistance training may improve body composition, prevent muscle loss during weight loss, and increase resting energy expenditure
- Moderate exercise intensity: *"Moderate activity feels somewhat hard. Here are clues that your exercise intensity is at a moderate level:*
  - *Your breathing quickens, but you're not out of breath*
  - *You start to lightly sweat after about 10 minutes of activity*
  - *You can talk to someone, but you can't sing"*
- Vigorous exercise intensity: *"Vigorous activity feels challenging. Here are clues that your exercise intensity is at a vigorous level:*
  - *Your breathing is deep and rapid*
  - *You start to sweat after only a few minutes of activity*
  - *You can't say more than a few words without pausing for breath"*

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APPENDIX F: Description of a High Intensity, Comprehensive Lifestyle Intervention

The most effective behavioral weight loss treatment is a high-intensity (*i.e.,* ≥ 14 sessions in 6 months) comprehensive weight loss intervention provided in individual or group sessions by a trained interventionist.

Key components of a high intensity comprehensive lifestyle intervention include:

- **Moderately reduced-calorie diet prescription**: Overweight or obese individuals are typically prescribed a diet that creates an energy deficit of at least 500 kcal per day to promote weight loss.
- **Increased physical activity**: Individuals are encouraged to engage in 150-300 minutes per week of moderate intensity aerobic activity or 75-150 minutes per week of vigorous intensity aerobic activity, or an equal combination.
- **Behavioral strategies for adherence**: The intervention incorporates behavioral strategies to support participants in sticking to their diet and activity recommendations. This includes regular self-monitoring of food intake, physical activity, and weight. For weight maintenance: Ongoing self-monitoring of body weight (ideally on a weekly basis or more frequently), mHealth interventions, social support, and coaching are recommended.

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APPENDIX G: Bariatric Surgery Procedures

Bariatric Surgery Procedures	Mechanism of Action
Sleeve Gastrectomy	The Laparoscopic Sleeve Gastrectomy, often called the "sleeve," removes approximately 80% of the stomach. The remaining stomach is the size and shape of a banana. The new stomach holds less food and liquid, helping reduce the amount of consumed food (and calories). By removing the portion of the stomach that produces most of the leptin the surgery affects the metabolism. It decreases hunger, increases fullness, and allows the body to reach and maintain a healthy weight and blood sugar control. A sleeve gastrectomy leaves the small bowel untouched, and might be a good option for patients who need future surgery on the small bowel, or who have had previous complex intestinal surgery.
Roux-en-Y Gastric Bypass (RYGB)	RYGB is often called "gastric bypass." The gastric bypass works in several ways. Like many bariatric procedures, the newly created stomach pouch is smaller and can hold less food, meaning fewer calories are ingested. Additionally, the food does not come into contact with the first portion of the small bowel, resulting in decreased absorption. Modifying the food course through the gastrointestinal tract profoundly reduces hunger, increases fullness, and allows the body to reach and maintain a healthy weight. The impact on hormones and metabolic health often improves adult-onset diabetes even before weight loss occurs. The operation also helps patients with reflux (heartburn), and often the symptoms quickly improve. Along with making appropriate food choices, patients must avoid tobacco products and non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and naproxen.
Adjustable Gastric Band (AGB)	The AGB is a silicone device placed around the top part of the stomach to limit the amount of food a person can eat. The feeling of fullness depends upon the size of the opening between the pouch and the rest of the stomach. The opening size can be adjusted with fluid injections through a port underneath the skin. Food goes through the stomach normally but is limited by the smaller opening of the band. It is less successful against type 2 diabetes and has modest effects on the metabolism. Gastric banding is much less common in the current era. Due to previous popularity of this procedure, many patient's with gastric bands exist who require removal of the band and conversion to other bariatric surgical procedures.
Biliopancreatic Diversion with Duodenal Switch (BPD-DS)	BPD-DS begins with creating a tube-shaped stomach pouch similar to the sleeve gastrectomy. It resembles the gastric bypass, where more of the small intestine is not used. The smaller stomach, shaped like a banana, allows patients to eat less. The food stream bypasses roughly 75% of the small intestine. This results in a significant decrease in the absorption of calories and nutrients. Patients must take vitamins and mineral supplements after surgery. Even more than gastric bypass and sleeve gastrectomy, the BPD-DS affects intestinal hormones by reducing hunger, increasing fullness, and improving blood sugar control. The BPD-DS is considered the most effective approved metabolic operation for treating type 2 diabetes. Due to its profound effect on malabsorption and potential complications, BPD-DS is often reserved for patients who require the most weight loss.
Single Anastomosis Duodeno-Ileal Bypass with Sleeve Gastrectomy (SADI-S)	SADI-S is the most recent procedure to be endorsed by the American Society for Metabolic and Bariatric Surgery. While similar to the BPD-DS, the SADI-S is simpler and takes less time to perform as there is only one surgical bowel connection. When the patient eats, food goes through the pouch and directly into the latter portion of the small intestine. The food then mixes with digestive juices from the first part of the small intestine. This allows enough absorption of vitamins and minerals to maintain healthy levels of nutrition. This surgery offers good weight loss, less hunger, more fullness, blood sugar control, and diabetes improvement.

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APPENDIX H: Prescription Medications to Treat Obesity

Weight Management Medication	Mechanism of Action
Orlistat[1] (Xenical®)	• Intestinal lipase inhibitor • Reduces fat absorption by up to 30%
Phentermine-topiramate[1] (Qsymia®)	• Combination sympathomimetic and carbonic anhydrase inhibitor • Decreases appetite and binge eating behaviors
Naltrexone-bupropion[1] (Contrave®)	• Combination of a dopamine and norepinephrine re-uptake inhibitor and mu-opioid receptor antagonist • Decreases appetite and cravings
Liraglutide[1] (Saxenda®)	• GLP-1 receptor agonist • Decreases appetite, increases fullness, increases satiety
Semaglutide[1] (Wegovy®)	• GLP-1 receptor agonist • Decreases appetite, increases fullness, increases satiety
Setmelanotide[1] (Imcivree™)	• Melanocortin-4-receptor agonist • Decreases appetite
Phentermine[1]	• Sympathomimetic • Suppresses appetite
Diethylpropion[1]	• Sympathomimetic • Suppresses appetite
Tirzepatide[1] (Zepbound®)	• GLP-1 receptor agonist • Suppresses appetite, stimulates insulin release from the pancreas

GLP = glucagon-like peptide

[1] Not on MD Anderson Formulary

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