Childhood Obesity in Primary Care
Management and Treatment of Comorbidities of Obesity

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About Dr Huang

- Associate Professor in Pediatrics
- University of California San Diego
- Involved in Pediatric Obesity Prevention efforts over the past decade
- Practicing pediatric gastroenterologist over the past 15 years
Learning Objectives

- Understand the appropriate workup and co-management of the most common comorbidities associated with obesity
- Explain the strategies for Stage 3 and Stage 4 of obesity management
- Define the essential aspects of successful core coordination needed for patients with obesity (with emphasis on the role of the PCP)
Algorithm for the Assessment and Management of Childhood Obesity in Patients 2 Years and Older

This algorithm is based on the 2007 Expert Committee Recommendations, new evidence and promising practices.

Assess Behaviors
Assess healthy eating and active living behaviors

Provide Prevention Counseling
5 (fruits & vegetables) 2 (hours or less of screen time) 1 (hour or more of physical activity) 0 (sugary drinks) every day!

Determine Weight Classification
Accurately determine weight and height, calculate and plot Body Mass Index (BMI) and determine BMI percentile.

Healthy Weight (BMI 5-85th)
- Family History
- Review of Systems
- Physical Exam

Overweight (BMI 85-95th)
- Family History
- Review of Systems
- Physical Exam

Obesity (BMI >95th)
- Family History
- Review of Systems
- Physical Exam

Risk Factors Absent

Risk Factors Present

Routine Care
- Provide ongoing positive reinforcement for healthy behaviors.
- For patients in the healthy weight category, screen for genetic predisposition by obtaining a non-fasting lipid profile for all children between the ages of 9-11 and again between 18-21.
- For patients in the overweight category, obtain a lipid profile.
- Maintain weight: Crossing 2 percentile lines is a risk for obesity.
- Weigh annually.
- Follow up at every well-child visit.

Obesity-related conditions: The following conditions are associated with obesity and should be considered for further work-up. Additional lab tests may be warranted if indicated by the patient’s clinical condition. In 2014, consensus statements from The Children’s Hospital Association described the management of a number of these conditions.1,2

Dermatologic:
- Acneform rashes
- Vitiligo
- Intertigo

Endocrine:
- Polycystic ovarian syndrome (PCOS)
- Precocious puberty
- Prediabetes: Impaired fasting glucose and/or impaired glucose tolerance as demonstrated during a GTT
- Premature adrenarche
- Type 2 Diabetes

Gastrointestinal:
- Childhood anemia
- Constipation
- GERD
- Nonalcoholic fatty liver disease or steatohepatitis

Neuropsychologic:
- Pseudotumor cerebri

Orthopedic:
- Blount’s Disease
- Slipped capital femoral epiphysis (SCFE)

Psychological/Behavioral Health:
- Anxiety
- Binge eating disorder
- Depression
- Self-harming behavior

Lab Screening
- The 2007 Expert Committee Recommendations state that a fasting glucose and fasting lipid profile along with ALT and AST should be obtained.
- Additionally, guidelines from the ADA and Endocrine Society recommend using AIC, fasting glucose or oral glucose tolerance test for diabetes or prediabetes.4
- For patient convenience, some providers are obtaining non-fasting labs.
- Clinical judgment, local preferences and availability of testing should be used to help determine the timing of follow-up of abnormal labs.
- Of note, some subspecialty clinics are screening for Vitamin D deficiency and insulin resistance by obtaining labs for Vitamin D and fasting insulin. The clinical utility and cost-effectiveness of such testing is yet to be determined.
- Currently, there are no guidelines on when to start laboratory testing for patients with obesity. Based upon the patient’s health risk, some experts may start screening patients at 2 years of age.

And Treatment Stages for Patients with Overweight or Obesity

Intensive stage and advance through the stages based upon the response to risks and motivation.

Nutritional counseling style, such as motivational interviewing, should be employed to support stage 1 weight loss.

A patient’s weight loss should not be more than 1 pound/month; older children and adolescents with an average of 2 pounds/week.

Stage 1

Nutritional counseling with a focus on reducing energy intake and increasing physical activity. Weight loss is typically 1-2 pounds/week, 4-6 months.

Stage 2

Nutritional counseling with a focus on reducing energy intake and increasing physical activity. Weight loss is typically 2-4 pounds/week, 4-6 months.

Stage 3

Nutritional counseling with a focus on reducing energy intake and increasing physical activity. Weight loss is typically 2-4 pounds/week, 4-6 months.

Stage 4

Nutritional counseling with a focus on reducing energy intake and increasing physical activity. Weight loss is typically 2-4 pounds/week, 4-6 months.

Multi-disciplinary Intervention

Management of Childhood Obesity

Children who are not meeting weight control goals may benefit from a multi-disciplinary team approach. This can include interventions such as behavioral counseling, medication, and/or surgery. It is important to consult with a multi-disciplinary team to determine the best course of action for each individual patient.

References

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Algorithm for the Assessment and Management of Childhood Obesity in Patients 2 Years and Older

This algorithm is based on the 2007 Expert Committee Recommendations: new evidence and promising practices.

**Assess Behaviors**
- Assess healthy eating and active living behaviors.

**Provide Prevention Counseling**
- 5 (fruits & vegetables) 2 (hours or less of screen time) 1 (hour or more of physical activity) 0 (sugary drinks) every day.

**Determine Weight Classification**
- Accurately determine weight and height, calculate and plot Body Mass Index (BMI) and determine BMI percentile.

**Healthy Weight** (BMI 5-85%)
- Family history
- Review of Systems
- Physical Exam

**Overweight** (BMI 85-94%)
- Augmented obesity-specific
- Family history
- Review of Systems
- Physical Exam

**Obesity** (BMI ≥ 95%)
- Augmented obesity-specific
- Family history
- Review of Systems
- Physical Exam

**Risk Factors Absent**
- Routine Care
  - Provide ongoing positive reinforcement for healthy behaviors.
  - For patients in the healthy weight category, screen for genetic dyslipidemias by obtaining a fasting total cholesterol profile for all children between the ages of 9-11 and again between 15-18.
  - For patients in the overweight category, obtain a lipid profile.
  - Maintain weight: crossing 2 percentage lines is a risk for obesity.
  - Recommence when to start laboratory testing for patients with obesity. Based on the patient’s height, the pediatricians may start screening patients at 2 years of age.

**Risk Factors Present**
- Lab Screening
  - The 2007 Expert Committee Recommendations state that a fasting glucose and fasting lipid profile along with ALT and AST should be obtained.
  - Additionally, guidelines from the AHA and Endocrine Society recommend using AUC fasting glucose and oral glucose tolerance tolerance test for diabetes or prediabetes.
  - For patient convenience, some providers are obtaining non-fasting labs.
  - Clinical judgment, local preferences, and availability of testing should be used to help determine the timing of follow-up of abnormal labs.
  - Off note, some subgroups of children are screening for Vitamin D deficiency and insulin resistance by obtaining labs for Vitamin D and fasting results. The clinical utility and cost effectiveness of such testing is yet to be determined.

**Obesity-related conditions:** The following conditions are associated with obesity and should be considered for further work-up. Additional lab tests may be warranted if indicated by the patient’s clinical condition. In 2004, consensus statements from the Children’s Hospital Association described the management of a number of these conditions.

**Dermatologic**
- Acneiform eruptions
- Hirsutism
- Infections

**Endocrine**
- Polycystic ovarian syndrome (PCOS)
- Precocious puberty
- Prediabetes: impaired fasting glucose and/or impaired glucose tolerance as demonstrated during a GTT
- Premature adrenarche
- Type 2 Diabetes

**Gastrointestinal**
- Childhood constipation
- GERD
- Nonalcoholic fatty liver disease or cirrhosis

**Neurologic**
- Pseudobulbar palsy

**Orthopedic**
- Blount’s Disease
- Slipped capital femoral epiphysis (SCFE)

**Psychologic/Behavioral Health**
- Anxiety
- Anorexia
- Depression
- Bullying

*Based on literature, evidence, and best practice guidelines, in addition to weight classification.*
Management and Treatment Stages for Patients with Overweight or Obesity

- Patients should start at the least intensive stage and advance through the stages based upon the response to treatment, age, BMI, health risks and motivation.
- An empathetic and empowering counseling style, such as motivational interviewing, should be employed to support patient and family behavior change.8,9
- Children age 2 – 5 who have obesity should not lose more than 1 pound/month; older children and adolescents with obesity should not lose more than an average of 2 pounds/week.

Stage 1 Prevention Plus

Where/By Whom: Primary Care Office/Primary Care Provider
What: Planned follow-up themed visits (15-20 min) focusing on behaviors that resonate with the patient, family and provider. Consider partnering with dietitian, social worker, athletic trainer or physical therapist for added support and counseling.
Goals: Positive behavior change regardless of change in BMI. Weight maintenance or a decrease in BMI velocity.
Follow-up: Tailor to the patient and family motivation. Many experts recommend at least monthly follow-up visits. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 2.

Stage 2 Structured Weight Management

Where/By Whom: Primary Care Office/Primary Care Provider with appropriate training
What: Same intervention as Stage 1 while including more intense support and structure to achieve healthy behavior change.
Goals: Positive behavior change. Weight maintenance or a decrease in BMI velocity.
Follow-up: Every 2 – 4 weeks as determined by the patient, family, and physician. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 3.

Stage 3 Comprehensive Multi-disciplinary Intervention

Where/By Whom: Pediatric Weight Management Clinic/Multi-disciplinary Team
What: Increased intensity of behavior changes, frequency of visits, and specialists involved. Structured behavioral modification program, including food and activity monitoring, and development of short-term diet and physical activity goals.
Goals: Positive behavior change. Weight maintenance or a decrease in BMI velocity.
Follow-up: Weekly or at least every 2 – 4 weeks as determined by the patient, family, and physician. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 4.

Stage 4 Tertiary Care Intervention

Where/By Whom: Pediatric Weight Management Centers/Providers with expertise in treating childhood obesity
What: Recommended for children with BMI ≥ 95% and significant comorbidities if unsuccessful with Stages 1 – 3. Also recommended for children >99% who have shown no improvement under Stage 3. Intensive diet and activity counseling with consideration of the use of medications and surgery.
Goals: Positive behavior change. Decrease in BMI.
Follow-up: Determine based upon patient’s motivation and medical status.

References
Comorbidities

- Comorbidities associated with obesity essentially affect all portions of the body
- The risk of any comorbidity with obesity varies by age, SES, and racioethnic status
- A number of comorbidities present with symptoms
- Several major comorbidities are asymptomatic and require laboratory screening for early identification and treatment
Common Co-morbidities

**Obesity-related conditions:** The following conditions are associated with obesity and should be considered for further work-up. Additional lab tests may be warranted if indicted by the patient’s clinical condition. In 2014, a consensus statement from The Children’s Hospital Association described the management of a number of these conditions⁶.

<table>
<thead>
<tr>
<th>Cardiovascular</th>
<th>Gastrointestinal</th>
<th>Psychological/Behavioral Health</th>
<th>Pulmonary</th>
<th>Skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyslipidemia</td>
<td>Cholelithiasis</td>
<td>Anxiety</td>
<td>Asthma</td>
<td>Acanthosis nigricans</td>
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<tr>
<td>Hypertension</td>
<td>Constipation</td>
<td>Binge eating disorder</td>
<td>Sleep Apnea</td>
<td>Hirsutism</td>
</tr>
<tr>
<td>Endocrine</td>
<td>GERD</td>
<td>Depression</td>
<td></td>
<td>Intertrigo</td>
</tr>
<tr>
<td>Polycystic ovarian syndrome (PCOS)</td>
<td>Nonalcoholic fatty liver disease/ Nonalcoholic steatohepatitis</td>
<td>Teasing/bullying</td>
<td></td>
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<tr>
<td>Precocious puberty</td>
<td>Pseudotumor cerebri</td>
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<tr>
<td>Premature adrenarche</td>
<td>Blount’s Disease</td>
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<tr>
<td>Type 2 Diabetes</td>
<td>Slipped capital femoral epiphysis (SCFE)</td>
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</table>
## Hypertension

<table>
<thead>
<tr>
<th>Hypertension</th>
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<tbody>
<tr>
<td><strong>History</strong></td>
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<tr>
<td><strong>Review of systems</strong></td>
</tr>
<tr>
<td><strong>Physical examination</strong></td>
</tr>
<tr>
<td><strong>Laboratory/imaging</strong></td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
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</tbody>
</table>
## Type 2 Diabetes

<table>
<thead>
<tr>
<th>Type 2 Diabetes</th>
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</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
</tr>
<tr>
<td>Maternal diabetes during pregnancy, small for gestational age, intrauterine growth retardation, family history of diabetes</td>
</tr>
<tr>
<td><strong>Review of systems</strong></td>
</tr>
<tr>
<td>Polyuria; polydipsia; nocturia; recurrent vaginal, bladder, or other infections; recent weight loss</td>
</tr>
<tr>
<td><strong>Physical examination</strong></td>
</tr>
<tr>
<td>Acanthosis nigricans</td>
</tr>
<tr>
<td><strong>Laboratory/imaging</strong></td>
</tr>
<tr>
<td>Elevated fasting glucose, glycosuria, positive glucose tolerance test, hyperinsulinemia, hemoglobin A1C</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
</tr>
<tr>
<td>Referral to pediatric endocrinologist for treatment with metformin or insulin or lifestyle change</td>
</tr>
</tbody>
</table>
Type 2 Diabetes Optimal Treatment

- Evidence evolving
- TODAY Trial
  - 699 youth 10-17 years
  - Three arms
    - Metformin
    - Metformin + rosiglitazone
    - Metformin + lifestyle changes
  - Only half achieve normoglycemia
- Health disparities
- High non-adherence rates particularly in adolescents with T2D
### Dyslipidemia

<table>
<thead>
<tr>
<th>Section</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
<td>Family history of lipid disorders, cardiovascular disease</td>
</tr>
<tr>
<td><strong>Review of systems</strong></td>
<td>Asymptomatic; other obesity comorbidities, particularly signs of metabolic syndrome</td>
</tr>
<tr>
<td><strong>Physical examination</strong></td>
<td>No specific signs; acanthosis nigricans may indicate metabolic syndrome</td>
</tr>
<tr>
<td><strong>Laboratory/imaging</strong></td>
<td>Lipid panel</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Referral to lipid specialist, dietary management</td>
</tr>
</tbody>
</table>
Dyslipidemia

<table>
<thead>
<tr>
<th>Category</th>
<th>Acceptable (mg/dL)</th>
<th>Borderline (mg/dL)</th>
<th>High (mg/dL)</th>
</tr>
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<tbody>
<tr>
<td>Total Cholesterol</td>
<td>&lt;170</td>
<td>179-199</td>
<td>&gt;=200</td>
</tr>
<tr>
<td>LDL-C</td>
<td>&lt;110</td>
<td>110-129</td>
<td>&gt;=130</td>
</tr>
<tr>
<td>Non-HDL-C</td>
<td>&lt;120</td>
<td>120-144</td>
<td>&gt;=145</td>
</tr>
<tr>
<td>Triglycerides (y)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>0-9</td>
<td>&lt;75</td>
<td>75-99</td>
<td>&gt;=100</td>
</tr>
<tr>
<td>10-19</td>
<td>&lt;90</td>
<td>90-129</td>
<td>&gt;=130</td>
</tr>
<tr>
<td>HDL-C</td>
<td>&gt;45</td>
<td>40-45</td>
<td>&lt;40</td>
</tr>
</tbody>
</table>

- Atherosclerosis begins in childhood
- Fasting v. Nonfasting lipid panel screening
- Treatment
  - 1\textsuperscript{st} – Lifestyle and Diet modification
  - 2\textsuperscript{nd} – Medications (Statins/Bile acid sequestrants)
Nonalcoholic Steatohepatitis

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<tbody>
<tr>
<td><strong>History</strong></td>
<td>No specific history; some cases have other family members affected</td>
</tr>
<tr>
<td><strong>Review of systems</strong></td>
<td>Possible nausea and upper right quadrant discomfort</td>
</tr>
<tr>
<td><strong>Physical examination</strong></td>
<td>Hepatomegaly</td>
</tr>
<tr>
<td><strong>Laboratory/imaging</strong></td>
<td>Elevated serum aminotransferases, echogenicity of liver on ultrasound</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Referral to pediatric gastroenterologist for evaluation and definitive diagnosis, weight loss</td>
</tr>
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</table>
**GERD**

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<thead>
<tr>
<th>GERD</th>
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<tbody>
<tr>
<td><strong>History</strong></td>
<td>Commonly chest/upper abdominal pain – further questioning reveals heartburn, backwash or sour acid taste in mouth, increased symptoms at night when lying down</td>
</tr>
<tr>
<td><strong>Review of Systems</strong></td>
<td>Can be associated with sleep problems, chronic cough, weight loss, early satiety, dysphagia if severe (suggests needs referral)</td>
</tr>
<tr>
<td><strong>Physical examination</strong></td>
<td>Nonspecific – can come with epigastric tenderness</td>
</tr>
<tr>
<td><strong>Laboratory/imaging</strong></td>
<td>Nonspecific</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Antacid therapy, weight loss</td>
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## Functional Constipation

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<tbody>
<tr>
<td><strong>History</strong></td>
<td>Commonly vague abdominal pain – although can be sharp at times when cramping against hard stool</td>
</tr>
<tr>
<td><strong>Review of systems</strong></td>
<td>Ask about stool soiling; Can be associated with urinary tract infections, early satiety, weight loss and/or vomiting if severe</td>
</tr>
<tr>
<td><strong>Physical exam</strong></td>
<td>Nonspecific – but can find large stool mass particularly at LLQ</td>
</tr>
<tr>
<td><strong>Laboratory/imaging</strong></td>
<td>Nonspecific. KUB’s often used to diagnose but not recommended</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Dietary options, PEG therapies</td>
</tr>
</tbody>
</table>
Cholelithiasis

- Cholesterol gallstones occur 3-6 times as often in morbidly obese persons as compared to controls.
- Occurs owing to increased hepatic secretion of cholesterol.
- Weight loss increases the risk of gallstones in the obese.
## Obstructive Sleep Apnea (OSAS)

<table>
<thead>
<tr>
<th>Sleep Apnea</th>
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<tbody>
<tr>
<td><strong>History</strong></td>
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<tr>
<td><strong>Review of systems</strong></td>
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<tr>
<td><strong>Physical examination</strong></td>
</tr>
<tr>
<td><strong>Laboratory/imaging</strong></td>
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<tr>
<td><strong>Treatment</strong></td>
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Slipped Capital Femoral Epiphysis (SCFE)

<table>
<thead>
<tr>
<th>Slipped Capital Femoral Epiphysis</th>
<th>Knee or hip pain</th>
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<tbody>
<tr>
<td>History</td>
<td>Knee or hip pain</td>
</tr>
<tr>
<td>Review of systems</td>
<td>Knee or hip pain, limp</td>
</tr>
<tr>
<td>Physical examination</td>
<td>Limp, pain in knee or hip</td>
</tr>
<tr>
<td>Laboratory/imaging</td>
<td>Hip and knee films</td>
</tr>
<tr>
<td>Treatment</td>
<td>Immediate referral to pediatric orthopedist</td>
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</table>
## Blount Disease

<table>
<thead>
<tr>
<th><strong>Blount Disease</strong></th>
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<tbody>
<tr>
<td><strong>History</strong></td>
</tr>
<tr>
<td>Bowing</td>
</tr>
<tr>
<td><strong>Review of systems</strong></td>
</tr>
<tr>
<td>Bowing (tibia vera), knee pain, limp</td>
</tr>
<tr>
<td><strong>Physical examination</strong></td>
</tr>
<tr>
<td>Bowing, knee pain, limp</td>
</tr>
<tr>
<td><strong>Laboratory/imaging</strong></td>
</tr>
<tr>
<td>Knee films</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
</tr>
<tr>
<td>Referral to pediatric orthopedist</td>
</tr>
</tbody>
</table>
## Depression

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<thead>
<tr>
<th>Depression</th>
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</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
<td>Family history of depression, history of abuse, psychological trauma, teasing, low self-esteem</td>
</tr>
<tr>
<td><strong>Review of systems</strong></td>
<td>Loss of interest, anger, irritability, sadness, suicidal ideation</td>
</tr>
<tr>
<td><strong>Physical examination</strong></td>
<td>No signs; may have sad, irritable appearance with lack of self-care</td>
</tr>
<tr>
<td><strong>Laboratory/imaging</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Mental health referral for counseling or pharmacologic treatment</td>
</tr>
</tbody>
</table>
Asthma

- Cross sectional studies have demonstrated relationship between:
  - Obesity and wheezing (OR 1.67 (1.25-2.21))
  - Overweight and obesity with airway obstruction
  - Obesity and poorly controlled asthma (OR 1.44 (1.05-1.99))
  - Obesity and longer length of stay for pediatric asthma hospitalizations

- Mechanisms
Treatment of Obesity
Review of Stages for Treatment

Stage 1: Prevention Plus
Stage 2: Structured Weight Management
Stage 3: Comprehensive Multi-disciplinary Intervention
Stage 4: Tertiary Care Intervention
Stage 1 Prevention Plus

Where/By Whom: Primary Care Office/Primary Care Provider

What: Planned follow-up themed visits (15-20 min) focusing on behaviors that resonate with the patient, family and provider. Consider partnering with dietician, social worker, athletic trainer or physical therapist for added support and counseling.

Goals: Positive behavior change regardless of change in BMI. Weight maintenance or a decrease in BMI velocity.

Follow-up: Tailor to the patient and family motivation. Many experts recommend at least monthly follow-up visits. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 2.
Stage 2 Structured Weight Management

Where/By Whom: Primary Care Office/Primary Care Provider with appropriate training

What: Same intervention as Stage 1 while including more intense support and structure to achieve healthy behavior change.

Goals: Positive behavior change. Weight maintenance or a decrease in BMI velocity.

Follow-up: Every 2 - 4 weeks as determined by the patient, family and physician. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 3.
Stage 3 Comprehensive Multi-disciplinary Intervention

**Where/By Whom:** Pediatric Weight Management Clinic/Multi-disciplinary Team

**What:** Increased intensity of behavior changes, frequency of visits, and specialists involved. Structured behavioral modification program, including food and activity monitoring, and development of short-term diet and physical activity goals.

**Goals:** Positive behavior change. Weight maintenance or a decrease in BMI velocity.

**Follow-up:** Weekly or at least every 2 – 4 weeks as determined by the patient, family, and physician. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 4.
**Stage 4 Tertiary Care Intervention**

**Where/By Whom:** Pediatric Weight Management Center/Providers with expertise in treating childhood obesity

**What:** Recommended for children with BMI ≥ 95% and significant comorbidities if unsuccessful with Stages 1 - 3. Also recommended for children > 99% who have shown no improvement under Stage 3. Intensive diet and activity counseling with consideration of the use of medications and surgery.

**Goals:** Positive behavior change. Decrease in BMI.

**Follow-up:** Determine based upon patient's motivation and medical status.
Role of the Pediatrician

- Role of the pediatrician at Stage 3 and Stage 4 very important
- PCP has the long-standing relationship with the child and family
- Care coordinator
- Open communications with the tertiary care team regarding social/compliance issues
Considerations

- Have a contact at the weight management center
- Anticipate family reluctance in transferring care
- Continue to be a resource to the family
- Don’t sign off; understand there may need to be a period of transition
Case Study
Julie is a 10 year old girl with obesity here for her 2 week weight management checkup

Julie’s PCP (your office mate) has been working with Julie’s weight issues for the past 5-6 months (she moved in from out of town)

You have been using the structured weight management (Stage 2) for the past 3 months
Despite detailed instructions to the family for increased support and structure to help Julie manage her eating and physical activity habits, her weight continues to climb.

- The mother’s BMI is in normal range and she is frustrated.
- You decide more intensive approach is necessary and move to Comprehensive Multi-disciplinary Intervention (Stage 3).
Growth Chart
At exam you noticed the following on Julie’s neck
You recognize acanthosis nigricans and send blood screens including:

- A fasting lipid panel
- Liver function tests (ALT)
- A fasting glucose

You also notice another finding when you perform her exam
You recognize signs of Blount disease
You make a referral to the orthopedic surgeon and order Vitamin D level

**Labs**
- Fasting glucose = 130 mg/dL
- LDL-C = 200 mg/dL
- ALT = 50 U/L
- 25-hydroxy Vitamin D = 15 ng/mL
You are concerned about diabetes and make an urgent referral to the Diabetes clinic.
You also refer Julie to the Gastroenterology clinic for her likely fatty liver disease.
You refer Julie to the dietician to initiate the CHILD1 diet for her hypercholesterolemia.
You initiate Vitamin D therapy.
Finally, you refer Julie to your local hospital’s recently established Weight Management Clinic.
It’s been a month and Julie has been following up with the Weight Management Clinic at your local hospital.

You have been receiving results of your prior consultations, which Julie and her mother have been diligent in attending.

Julie is seeing you now for an acute complaint now of a runny nose and sore throat.
At the visit, Julie’s weight is noticeably down which is the first time this has ever happened
She has lost 5 lbs since you saw her which is well within the limits of recommendations (between 1-2 lbs/week)
Julie has been started on metformin by the Diabetes clinic and she is being followed by GI for her liver issues and she has been compliant on the CHILD1 diet
Her orthopedic surgery is scheduled in the upcoming month or two
You congratulate Julie, but notice she is not happy
Frankly, neither is her mother
They complain to you about her care
While they are happy with Julie’s progress, they are completely overwhelmed by the consultations and visits
Julie has been missing a lot of school for her care and is falling behind
You sense that Julie is at high risk for non-compliance or loss to follow-up.

You call the Weight Management Clinic and discuss this with the clinic.

They do have intermittent subspecialty coverage on certain days at the clinic.

Julie can actually follow-up with multiple services at the same time and reduce her school absences.
Julie is now here at your clinic for some abdominal pain 3 months later.

She has been doing well in regards to her comorbidity concerns (blood glucose in normal range, lipid panel normal, ALT = 22 U/L) and got her osteotomy without complications.

Her weight loss has been great and on your weight measurement she is down an additional 30 lbs since you last saw her.
On history her pain is localized to the RUQ and back and intermittent
She is not and denies jaundice
She denies fever and her temperature is normal
She exhibits some pain to palpation at the RUQ
You order an ultrasound
CASE STUDY
Julie has cholelithiasis

You refer her to the surgeon and notify the Weight Management Clinic

Together with her WMC specialists you are able to determine that while Julie’s weight loss has been slightly more than recommended 2-2.5 lb/week –

Actually she had not lost for a while and she had dropped 4 lbs/week over the past 2-3 weeks.
Further evaluation with the dietician demonstrates that Julie has been skipping meals and engaging in binge exercising.

With your input, the team is able to get Julie onto a more healthy weight loss regimen with close follow-up.
CASE STUDY

- Julie is at follow up with you now getting ready for another year of school
- She has lost notable weight within stipulated guidelines
- Her BMI is actually now between 85-95% and she is hoping to hit below 85% in the next 4 months
- Your care coordination with the WMC has been a success!
Summary

✓ The PCP has a very important role in the Staged Management of Obesity even when the primary weight management is occurring off site
✓ Comorbidity management requires both subspecialty and primary care pediatrician input
✓ Open communications between team members is key
Thank you!