CLINICAL PATHWAYS

for Weight and Diet Related Chronic Disease Management

Children's National

Updated: March 29, 2023

Table of Contents

Introduction and Acknowledgments

The following document is the result of a collaborative effort between the FLiP (Family Lifestyle Program) community clinical collaborative with Children's National Health System, the YMCA of Metropolitan Washington, the American Heart Association and DC Health. FLiP is a DC-built, clinical-community initiative that connects families to nutrition, physical activity and community resources to support and maintain their health and wellbeing.

This project is meant to address the medical condition of obesity with sensitivity to the patient and families through recognizing the dangers of weight bias and stigma. The following recommendations recognize the importance of nutrition, activity and environment to reduce the obesity epidemic as well as the complex multifactorial nature of the treatment of an individual with overweight or obesity. This document recognizes the primary care providers' critical role in the early identification and intervention in the disease of obesity and is meant to serve as a guide in utilizing the most current medical evidence and consensus guidelines.

With the expert opinion of Children's National Hospital in-house team of clinicians and specialists we have created a clinical algorithm for the management of obesity and abnormal labs relating to the disease. Throughout this guide you will see clinical management recommendations and protocols shared by national associations and the most current peer reviewed guidelines. However, these clinical pathways also take into account the clinical experience and judgment of our specialists as well as resources available within our institution. Lastly, after a variety of surveys and interviews with local faculty we have responded to another pressing need by developing a comprehensive and dynamic community resource guide that clinicians can use to support their families.

Many aspects of this clinical algorithm are adapted from The Children's Hospital Colorado Clinical Pathway for Pediatric Overweight and Obesity management. We would like to acknowledge the entire Lifestyle Medicine Program at Children's Hospital Colorado led by Renee Porter DNP, PNP, Stacie Schreiner DNP, FNP, and Suzanne Paul MSN FNP. Along with their colleague, Dr. Matthew Haemer, who assisted in the adaptation. In addition, we would like to thank the specialty departments listed below for their clinical expertise to allow for the creation of this project. Lastly, we would like to thank the Children's National Hospital Division Chief of General Pediatrics & Community Health, Mark Weissman, M.D., for his incredible support in the development of meaningful resources to improve the care of our patients and families.

Lead Authors: Alicia Tucker, M.D., FAAP, Dip. Of ABOM; Kofi Essel, M.D., M.P.H., F.A.A.P. Children's National Hospital

Medical Student Authors: Grace Liu; Curran Reilly; Aiesha Basha -The George Washington School of Medicine & Health Sciences

Disclaimer: The clinical pathways are based upon publicly available medical evidence and/or a consensus of medical practitioners at Children's National Hospital and are current at the time of publication. These clinical pathways are intended to be a guide for practitioners and may need to be adapted for each specific patient based on the practitioner's professional judgment, consideration of any unique circumstances, the needs of each patient and their family and/or the availability of various resources at the health care institution where the patient is located.

Contributors and Sponsors

Special thanks to our Children's National Hospital expert contributors & specialists:

Evan Nadler, M.D.
Child and Adolescent Weight-loss Surgery

Michele Mietus-Snyder, M.D.
Preventative Cardiology

Anna Kirkorian, M.D.
Colleen Cotton, M.D.
Dermatology

Doris Estrada, M.D.
Endocrinology and Diabetes

Bernadette Vitola, M.D.
Gastroenterology, Hepatology and Nutrition

Debra Regier, M.D.
Genetics and Metabolism

Claire Lawlor, M.D.
Ear, Nose and Throat (Otolaryngology)

Kofi Essel, M.D., M.P.H.
Alicia Tucker, M.D., Dip. Of ABOM
General & Community Pediatrics

Nazrat Mirza, M.D.
Susma Vaidya, M.D., M.P.H., Dip. Of ABOM
IDEAL Clinic (Obesity)

Celina Brunson, M.D.
Nephrology

Veronica Gomez-Lobo, M.D.
Pediatric and Adolescent Gynecology

Jeffrey Rabin, M.D.
Mi Ran Shin, M.D.
Physical Medicine & Rehabilitation

Eleanor Mackey, Ph.D.
Psychology

Sobia Mirza, M.D.
Diagnostic Imaging and Radiology

Miriam Weiss, CPCP-PC
Sleep Medicine

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FLiP FAMILY LIFESTYLE PROGRAM

the YMCA

FLiP Community Resource Guide

The Family Lifestyle Program (FLiP) community resource guide is a DC-built, clinical-community initiative that connects families to ward-specific nutrition, physical activity and community resources to support and maintain their health and wellbeing. FLiP envisions a District that supports family health and wellness by fulfilling their mission to support lasting health for all residents.

Access FLiP's community resource guide: **www.flipdc.org**

Overview of Resources

Grocery
Farmers Market
Food/Meal Delivery Stores

Nutrition
Cooking Classes
Federal/DC Programs
Food Assistace
Free Food/Free Meals
Gardens
Nutrition Education

Physical Activity
Fitness Dance Classes
General/Multi Physical Activity
Physical and Developmental Disability
Swim Lessons
Recreational Fitness Centers
Yoga
Soccer
Gyms

Digital Wellness
Meditation
Better Sleep
Happiness

FLiP FAMILY LIFESTYLE PROGRAM

Weight Bias And Stigma

What is Weight Stigma?

The devaluation of individuals with overweight or obesity - basing their worth on their weight.

Increased severity of obesity leads to increased psychological distress in children. Therefore, special considerations are necessary.

Consider additional screenings/treatment for:
- Anxiety
- Depression
- Behavioral disorders
- Disordered eating

Dangers of Weight Stigma & Health Impacts

In children and adolescents, weight stigma can have major impacts on quality of life, including:
- Decreased self-esteem and impaired self image
- Stereotyping and victimization as early as toddlerhood
- Social isolation and bullying
- Avoidance of health care services

Perpetuating weight stigma does not motivate individuals to lose weight. Be aware that health care providers have been a source of weight bias for many patients and families.

Strategies to Counter Weight Bias in Clinic

Create a Safe & Judgment Free Space

1. Adopt a zero-tolerance policy regarding derogatory jokes or comments about patients
2. Ensure use of people-first language
   "Patient has obesity vs. patient is obese"
3. Emphasize complex etiology of obesity
4. Avoid focusing on "calories in, calories out" approach
5. Encourage providers to examine and challenge their existing biases and stereotypes regarding weight
6. Refer to obesity as a disease state as opposed to a character or behavior trait
7. Encourage adopting a "healthy lifestyle" as opposed to short term dieting or aesthetic "weight loss"

Ensure you are using people-first language and neutral terminology:

"Weight"
"BMI"
"Unhealthy weight"
"Your weight may be affecting your health"
"You are above the healthy weight/BMI range"

Language to AVOID:

"Fat", "excess fat", "fatness", "large"
"Chubby"
"Obese"
"Morbidly obese"
"Heavy"

Build an Accessible and Positive Clinic Environment

Ensure patients feel comfortable in the waiting room

- Provide sturdy, armless chairs and firm sofas that support higher body weights
- Reading materials that support healthy habits rather than focus on body image and unhealthy habits

Prioritize patient comfort in exam rooms & bathrooms rather than focus on body image and unhealthy habits

- Provide sturdy and wide exam tables that support higher body weights and are not prone to tipping
- Provide a sturdy stool or step with handles to help patients climb onto exam tables
- Provide a split toilet seat and a handled specimen collector

Use appropriately sized medical equipment

- Extra-large patient gowns
- Extra-long needles for blood draws
- Adult-sized or large adult-sized blood pressure cuffs or thigh cuffs
- Weight scales with a wide stepping base and the ability to measure higher body weights

Algorithm for Managing Obesity in Patients 2 to 18 Year-Olds

In all 2 to 18 year-old patients in clinic for a well child visit record height, weight and BMI[1] in patient's growth chart in the medical record

Healthy Weight
BMI ≥ 5th to < 85th percentile

CONDUCT THE FOLLOWING:

1. **Basic patient history**
2. **Lifestyle screening**[3], assessing:
   - Nutrition
   - Physical activity
   - Sedentary behaviors
3. **Physical exam**

- Praise family/patient for positive reinforcement, and **be cautious not to hyperfocus on weight**
- Consider healthy lifestyle counseling
- Offer family/patient age-appropriate nutrition and exercise education materials
- Reassess at annual well child visit or next sick child visit

Overweight
BMI ≥ 85th to < 95th percentiles

Obesity
- Class I: ≥ 95th percentile to < 120% of the 95th percentile
- Class II: ≥ 120% to < 140% of the 95th percentile or BMI ≥ 35, whichever is lower
- Class III: ≥ 140% of the 95th percentile or BMI ≥ 40, whichever is lower

Conduct the following:
Comprehensive patient history[2] Includes **lifestyle screening**[3]
Weight management-specific physical exam[4] (in addition to standard exam)

- Screen for comorbidities with the following lab tests: ***Screening labs start at age 10yo (patients <10yo may require screening based on specific risk factors[9])**
  - **HA1c and/or FPG** (BMI 85-94th% with risk factors present)
  - **ALT**
  - **Lipid panel** (BMI 85-94th% with risk factors present)
- See specific algorithm for exceptions & details
- Consider screening for other weight-related comorbidities[5]
- Offer family/patient age-appropriate nutrition and exercise education materials
- Consider **referral to Physical Medicine and Rehabilitation** if functional status is impairing activity or **referral to General Outpatient Nutrition** if patient has a diet related comorbidity

Offer long-term healthy lifestyle intervention counseling[6] in PCP clinic

Family/patient **DECLINE** counseling

- Follow-up every 3 to 6 months to monitor BMI trajectory
- Reassess family/patient readiness for change over time
- Consider referral to general nutrition or relevant subspecialists if comorbidity present **BUT NOT IDEAL CLINIC** if not interested in weight management

Family/patient **CONSENT** to counseling

- Assess for family/patient readiness for change
- Greater contact hours, either thru the medical home, community resources, or specialists are most effective
  - Consider Dietician referral or community based lifestyle programs for family interested in more intensive intervention
  - Consider the use of pharmacotherapy[10] in patients ≥ 12 years with obesity
  - Consider referral for metabolic bariatric surgery in patients ≥ 13 with class 2 obesity +comorbidity or class 3 obesity[11]
- * **Refer to IDEAL Clinic** if abnormal lab values[7], specific comorbidities[5] AND patient is interested in more intensive behavior support +/- medical weight management

Assess if family behavior or patient weight/BMI percentile changed in the past 6 months

Patient's weight and BMI percentile are **increasing**

Refer to IDEAL Clinic, and collect **required** fasting lab[8] **PRIOR** to referral

Patient's weight and BMI percentile are **maintained** or decreasing

Continue counseling until personalized goals are achieved or comorbidities are alleviated

#	Subject Superscript	Description	
1	Calculating BMI	**BMI** = kg/m^2 where kg reflects weight in kilograms and m^2 reflects height in meters squared	
2	Weight management-specific patient history	• Record **age of onset of overweight or obesity (Class I, II, or III) diagnosis** to help differentiate from genetic etiologies causing excessive weight gain • **Birth history**, including identification of: - LGA - SGA - Gestational diabetes - Excessive maternal weight gain during pregnancy • **Dietary history**, include noting early infant feeding behaviors • **Physical Activity history** • **Medical history**, including medication history to screen for weight-promoting medicines • **Review of systems** to screen for etiologies and comorbidities • **Family history**, including screening for: - Obesity in first-degree relatives - Obesity-related comorbidities in first- and second-degree relatives • **Psychosocial history**, including screening for: - Depression - School and social conflicts - Usage of tobacco and recreational drugs for weight management - Family Conflict - Separation	
3	Components of lifestyle screening	• **Dietary History**, including identification of: - Caretakers feeding child - Meal/snack frequency and portion sizes - Eating patterns - Types of foods being consumed • **Physical Activity History**, including: - Barriers to exercise - Type, frequency, and duration of exercise	• **Sedentary behaviors** - Amount of non-academic screen time • **Sleep History** - Duration and quality • **Social History** - Housing - Food access/screening for food insecurity - School- After school activities/ caretakers /jobs
4	Weight management specific physical exam	**General exam**	• Dysmorphic features, suggestive of genetic syndrome • Fat distribution - Peripheral or truncal fat - Dorsocervical and visceral fat suggests Cushing syndrome - Abdominal adiposity associated with metabolic syndrome • Record blood pressure with proper-sized cuff (adult-sized or large adult-sized cuff)
		HEENT exam	• Microcephaly suggests genetic syndrome • Blurred disc margins suggests idiopathic intracranial hypertension • Nystagmus or visual complaints suggests hypothalamic-pituitary lesion • Retinitis pigmentosa suggests genetic syndrome • Enlarged tonsils or high Mallampati score suggests Obstructive Sleep Apnea
		Stature	Differentiate exogenous obesity vs. genetic/endocrine induced abnormalities
		Skin and Hair	Screen for endocrine disorder etiologies causing weight gain
		Abdominal exam	• Abdominal tenderness suggests gallbladder disease • Hepatomegaly suggests NAFLD

#	Subject Superscript	Description			
4	Weight management specific physical exam (continued)	**MSK exam**	• Nonpitting edema suggests hypothyroidism • Postaxial polydactyly suggests genetic syndrome • Small hands and feet suggests genetic syndrome		
		GU exam	• Undescended testicles, small penis, scrotal hypoplasia suggests genetic syndrome • Small testes suggests genetic syndrome		
		Neurological exam	Cognitive development or delay suggests syndromic cause of excess weight		
5	Weight-related comorbidities	**Common comorbidities** • Hypertension • Dyslipidemia/Hypercholesterolemia • Obstructive Sleep Apnea • Musculoskeletal conditions (Slipped Capital Femoral Epiphysis, Blount disease, fractures) • Non-Alcoholic Fatty Liver Disease • Psychosocial issues • Skin breakdown and infections • Polycystic Ovarian Syndrome • Acanthosis Nigricans • Asthma • Prediabetes and Type 2 Diabetes • Nutritional deficiencies (Vitamin D)		**Less common comorbidities** • Hidradenitis Suppurativa • Gallbladder Disease and Cholelithiasis • Hypercoagulability • Cardiac structural abnormalities (hypertrophic cardiomyopathy or ventricular hypertrophy) • Pancreatitis • Restrictive lung disease • Pulmonary hypertension • Obesity hypoventilation syndrome • Idiopathic Intracranial Hypertension • Nutritional deficiencies (Iron) • Impaired renal function
6	PCP healthy lifestyle intervention counseling	Incorporate **motivational interviewing** and **person-first language** when counseling to promote patient autonomy and provide positive reinforcement. Goal of PCP is NOT to hyperfocus on weight, but to be a trusted partner in the overall health journey of the family.			
7	Indications for IDEAL Clinic referral	**Abnormal lab values** that indicate **referral to IDEAL Clinic** include:			Conditions that benefit from comanagement
		Elevated HbA1c ≥ 6% or **Elevated FPG** ≥ 100	**Dyslipidemia in lipid panel** • LDL-C ≥ 130 mg/dL • TG ≥ 100 mg/dL in < 10 yo • TG ≥ 130 mg/dL in ≥ 10 yo • TC ≥ 200 mg/dL • Non-HDL-C ≥ 145 mg/dL • HDL-C < 40 mg/dL	**Elevated ALT** ≥ 80	**See list of weight related comorbidities above** Referrals may be placed by PCP or subspecialist
8	Fasting labs required to be collected prior to IDEAL Clinic referral	**Fasting Labs:** • Insulin • HbA1c • CMP • Lipid Profile • TSH • Vitamin D			
9	Special Instructions for screening labs for age <10yo	**ALT**	**Lipid Panel**		**HbA1c**
		· BMI ≥ 99th percentile **Consider ALT in this case*	• Positive family history(parent, grandparent, aunt, or uncle at <55 yo for males, <65 yo for females) • myocardial infarction • Angina, • coronary artery bypass graft/stent/ angioplasty, • sudden cardiac death		• BMI ≥ 99thpercentile **AND** • T2DM in 1st degree relative or Gestation DM in patient pregnancy **OR** • Acanthosis or other sign of insulin resistance

#	Subject Superscript	Description			
		Medication	**Formulation**	**Contraindication**	**Side Effects**
10	Currently approved pharmacotherapy for ages 12-17 ***Consider on an individual basis along with close follow up* **AND** *intensive health behavior and lifestyle treatment*	Liraglutide	SC, daily injection	MTC (medullary thyroid cancer), MEN (multiple endocrine neoplasia)	GI effects: nausea/ vomiting/diarrhea/ abd pain
		Semaglutide	SC, weekly injection	MTC, MEN	GI effects: nausea/ vomiting/diarrhea/ abd pain
		Qsymia (phentermine + topiramate)	PO, daily	Glaucoma, hyperthyroid	Dizziness, parasthesia, elevated BP and/ or HR
		Orlistat	PO, TID with meals	Malabsorptive syndrome, severe renal disease	Steathorrhea, flatulence, fecal urgency
		Phentermine (≥ 16yo)	PO, daily	Cardiac arrhythmia, uncontrolled hypertension	Headache, dry mouth, elevated BP
11	Referral to the Children's National Bariatric Surgery Program 202-476-2150	Prior to referral, please consider the following eligibility: BMI of **at least** 35 with an obesity-related medical condition **OR** a BMI of greater than 40 without an obesity-related health condition • Understand the lifelong dietary commitment required after the surgery • Complete all clinically required laboratory and diagnostic tests • Have confirmation from a psychologist or psychiatrist that patient is mature enough to comply with the requirements (this will be done through the bariatric clinical psychology team) • Complete follow-up visits for three years after surgery Referral can be made directly to the bariatric surgery department or the IDEAL clinic. Patients will be evaluated and followed by a multidisciplinary team to determine surgical readiness. ***Insurance restrictions may prevent some patients from accessing bariatric surgery*			

Citations:

- *Children's National Hospital IDEAL Clinic*
- *Children's National Hospital Radiology Department*
- *Skinner et al., N Engl J MedAC, doi:10.1056/NEJMoa1502821*
- *Klish et al., Clinical Evaluation of the Obese Child and Adolescent, UpToDate, Click here for link*
- *De Ferranti et al. Dyslipidemia in Children: Definition, Screening, and Diagnosis, UpToDate, Click here for link*

AAP 2023 Clinical Practice Guidelines for the Evaluation and Treatment of Children and Adolescents with Obesity

General Radiology Considerations

- Consider including the diagnosis of "obesity" in the imaging requisition, as this will help the imaging team prepare for the exam. A radiologist or technologist may contact you to discuss the imaging strategy and may suggest an alternate modality.
- Speak to a radiologist to develop a personalized diagnostic imaging plan. Radiologist may recommend an alternate imaging modality. The radiologist can also answer questions regarding the need for intravenous and/or oral contrast for CT and MRI.
- Questions regarding table weight limits and gantry size are best answered by the imaging technologist, who may be more familiar with the equipment specifications than the radiologist.

TSH lab values are **NOT** recommended as a general obesity screening

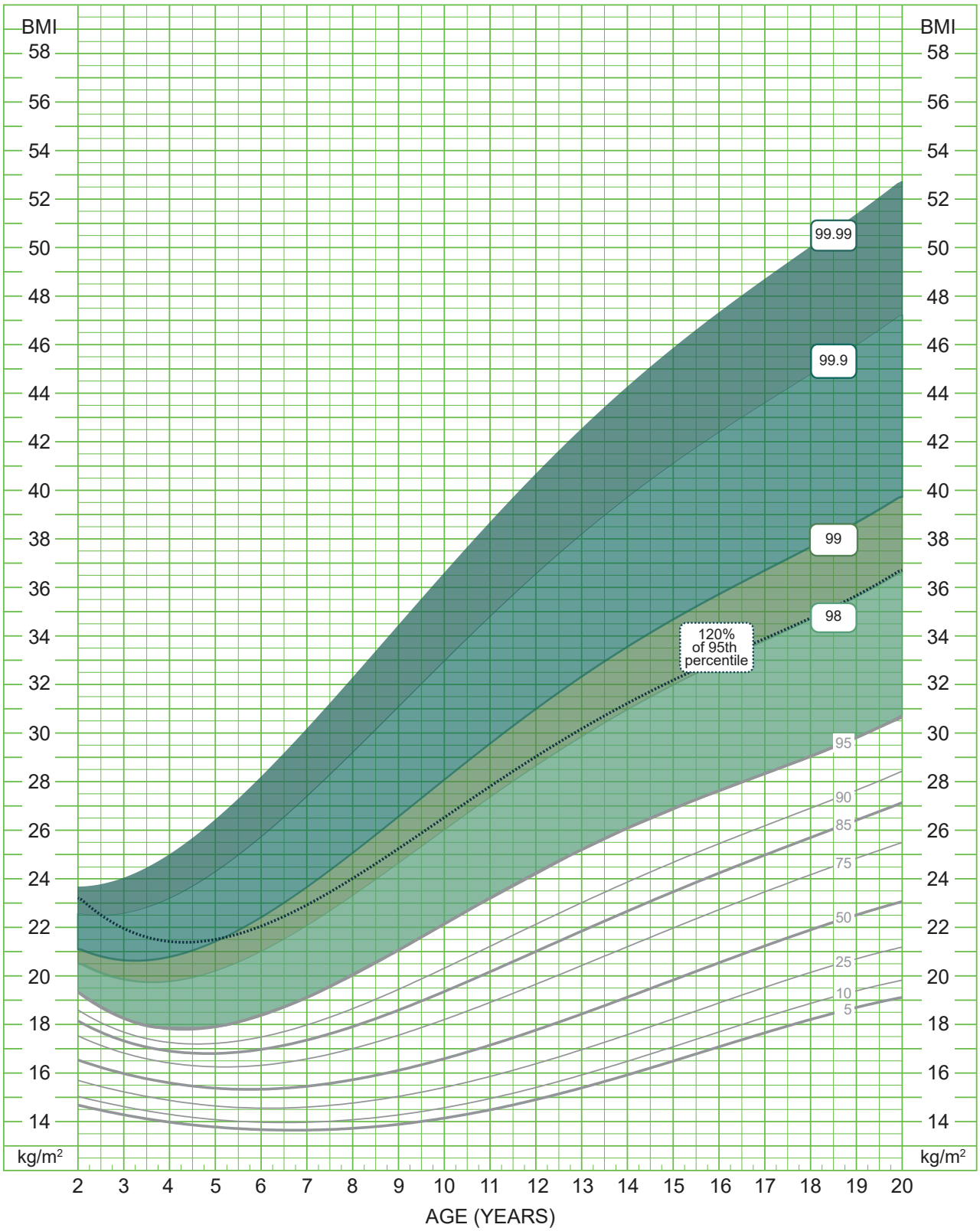
- It is often slightly elevated as a consequence of obesity rather than the other way around.
- Only conduct TSH screenings if there is a suspected endocrine syndrome and if stature and/or height velocity is decreased in relation to the stage of puberty.

Vitamin D concentrations are **NOT** recommended as a general obesity screening

- Only conduct vitamin D screening for patients with suspected disorders associated with low bone mass, such as rickets and/or history of recurrent, low-trauma fractures.
- If a patient with obesity has a history to suggest low vitamin D, providing a vitamin D supplement is recommended without the use of screening/ monitoring vitamin D levels.

Boys: Ages 2–20 years

Body mass index-for-age percentiles



December 15, 2022
Data source: National Health Examination Survey and National Health and Nutrition Examination Survey.
Developed by: National Center for Health Statistics in collaboration with National Center for Chronic Disease Prevention and Health Promotion, 2022.

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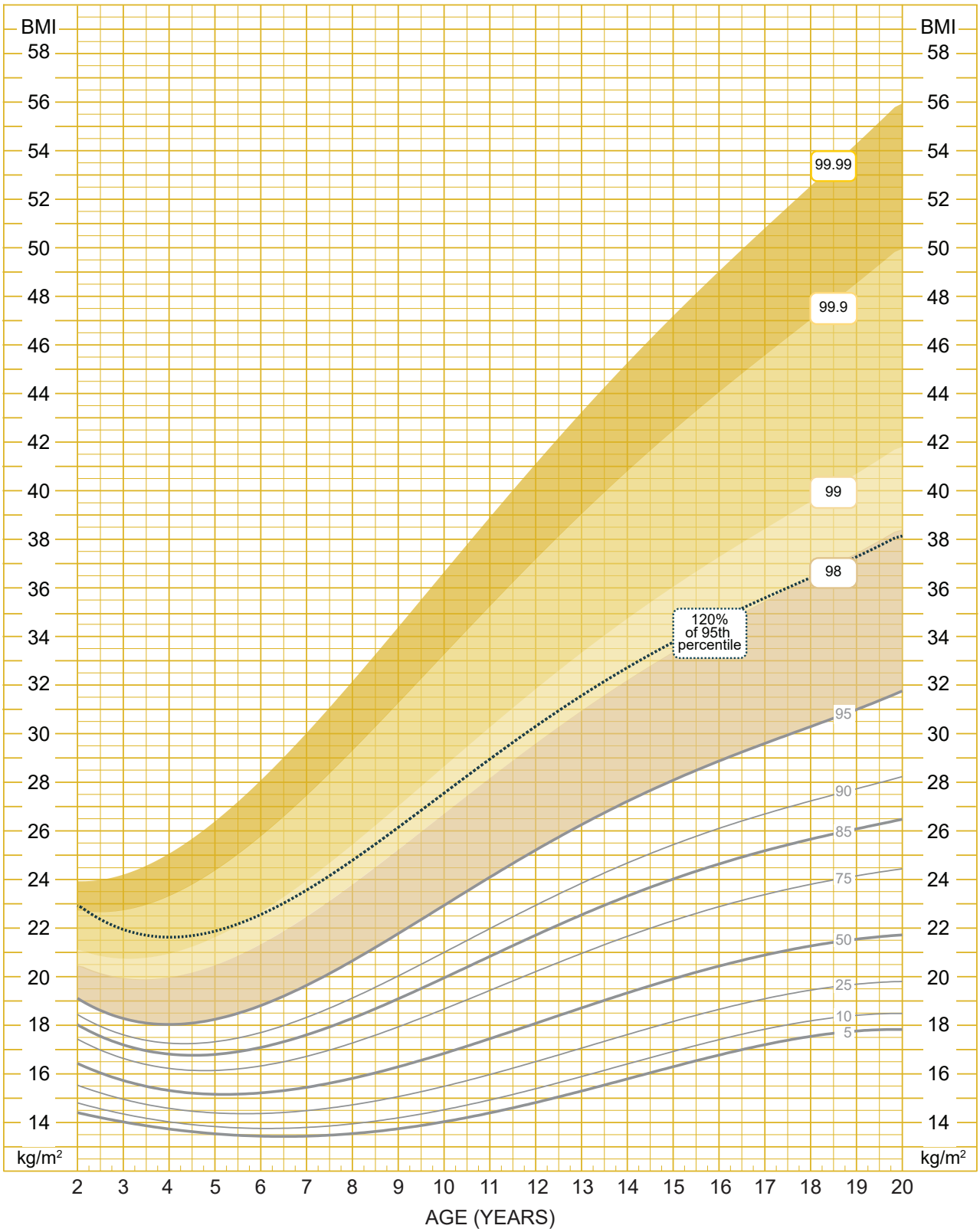
Girls: Ages 2–20 years

Body mass index-for-age percentiles



December 15, 2022
Data source: National Health Examination Survey and National Health and Nutrition Examination Survey.
Developed by: National Center for Health Statistics in collaboration with National Center for Chronic Disease Prevention and Health Promotion, 2022.

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Algorithm for Dyslipidemia in the Pediatric Population

Universal non-fasting lipid screening is recommended for all patients between ages 9-11 and 17-21.
Selective lipid screening recommended for patients based on risk factors.

SCREENING LIPID PANEL STARTING AT AGE 2 FOR HIGH RISK FAMILY HISTORY

[1] *Positive family history of **myocardial infarction, angina, coronary artery bypass graft/stent/angioplasty, sudden cardiac death** in parent, grandparent, aunt, or uncle at <55 yo for males, <65 yo for females*

HIGH LEVEL RISK FACTORS (1 risk factor + age >10)

1. Hypertension requiring therapy) (>99% + 5mmHg)
2. Current cigarette smoker
3. Body mass index (BMI) greater than 97%
4. High risk conditions:
   a. Diabetes mellitus, type 1 or 2
   b. After heart transplant
   c. Chronic kidney disease
   d. End-stage renal disease
   e. After renal transplant
   f. Kawasaki disease with coronary aneurysms

MODERATE LEVEL RISK FACTORS (2 risk factors + age >10)

1. Hypertension not requiring medication
2. Body mass index (BMI) greater than 95% but less than equal to 97%
3. HDL-C < 40 mg/dL
4. Moderate risk conditions:
   a. Chronic inflammatory disease
   b. Human immunodeficiency virus infection
   c. Nephrotic syndrome
   d. Kawasaki disease without coronary aneurysm

Fasting Lipid Panel x2 → Average results

LDL-C ≥ 130, < 190 mg/dL

Target LDL-C

Triglycerides (TG)
< 10 yr: ≥ 100, < 500 mg/dL
10-19 yr: ≥ 130, <500 mg/dL
non-HDL-C ≥ 145 mg/dL

Target TG/non-HDL-C **(see page 13)**

LDL-C ≥ 190 mg/dL | **TG ≥ 500 mg/dL**

Refer to lipid specialist

Start CHILD-1 diet[4], lifestyle modifications x 6 months

LDL-C < 130 mg/dL

- Intensive lifestyle modifications [2,3]
- CHILD-1 diet[3]
- Repeat fasting lipid profile every 12 months

LDL-C ≥ 130-189 mg/dL
No family history **AND**
No other risk factors

- Intensive lifestyle modifications*
- CHILD-1 diet[3]
- Repeat lipid profile every 6 months
- Family history, risk factor updates

LDL-C ≥ 130-159 mg/dL
2 high level risk factors **OR** 1 high level + 2 moderate level risk factors or clinical CVD

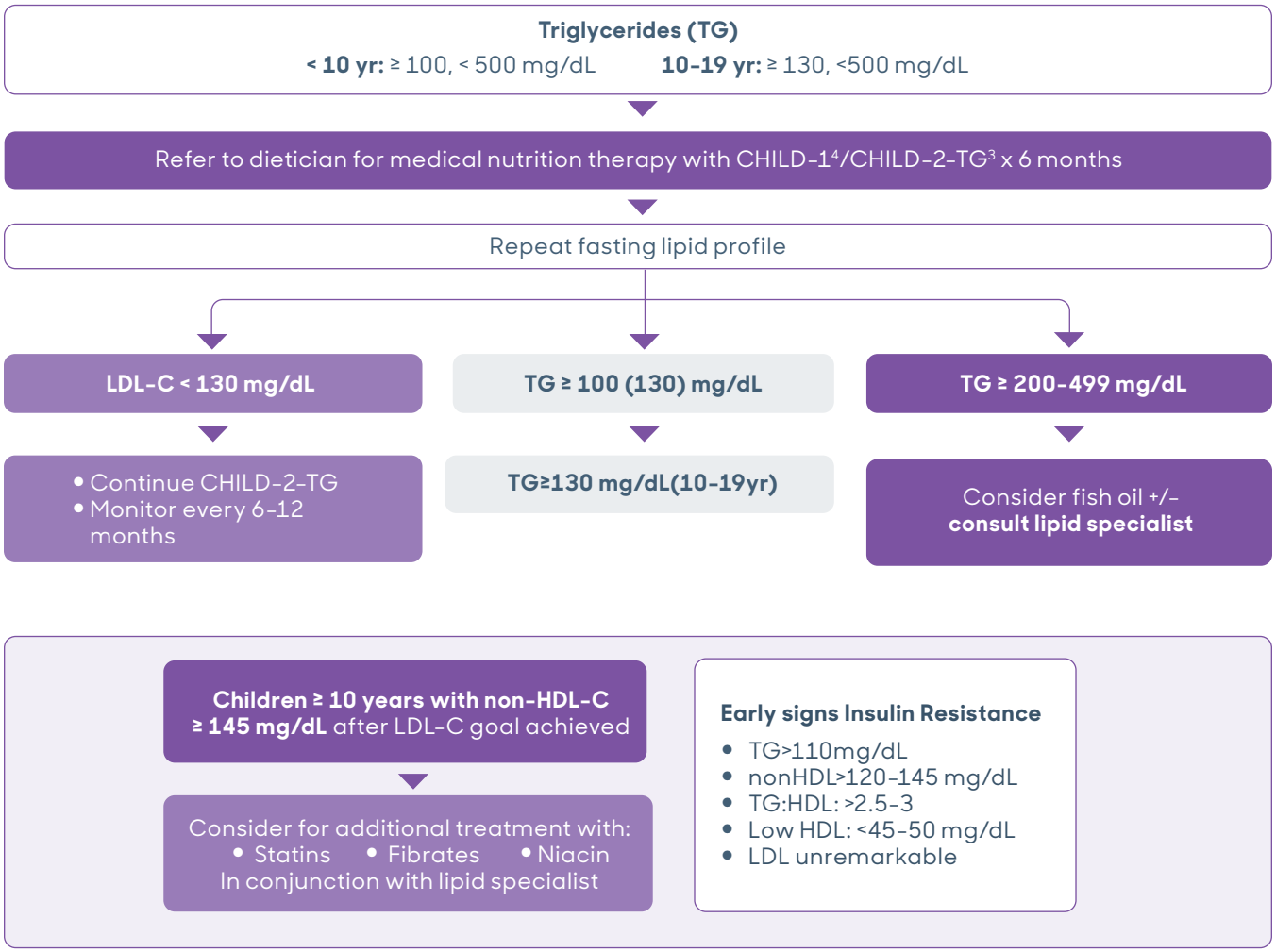
LDL-C ≥ 160 mg/dL
Family history (+) **OR** 1 high level risk factor **OR** ≥ 2 moderate level risk factors

- As an adjunct to lifestyle therapy consider trial of entry dose of statin therapy[5]
- Consider consult with lipid specialist
- If statin not tolerated or LDL stays >130 mg/dL refer to cardiology lipid clinic
- Follow with fasting lipid panels, related chemistries

If normal repeat annually if risk factors remain present. Can obtain non-fasting lipid panel for screening at WCC, if abnormal repeat fasting

(Continued)

Algorithm for Dyslipidemia in the Pediatric Population *(Continued)*



Elevated Triglyceride, non-HDL-C Treatment Guidelines

Age	Treatment
All ages (birth to 18 years)	Take detailed family history of CVD at initial encounter and/or at 3 years, 9-11 years and 18 years Review family history of CVD with young adult patients
Birth – 10 years	Pharmacologic treatment is limited to children <10, **refer to care of a lipid specialist**, with: • Severe primary hyperlipidemia (homozygous familial hypercholesterolemia, primary hypertriglyceridemia with TG ≥ 500 mg/dL) • High risk conditions (see above) • Evident cardiovascular disease
11-21 years	Take a detailed family history of CVD and risk factor assessment required before initiation of drug therapy **under care of lipid specialist.** See TG and non-HDL-c specific algorithms above.

[1] Family History

Family history of early CVD is the highest level risk factor for future risk and patients need annual lipid screening starting at age 2

When there is hyperlipidemia with a family history of early CVD adult guidelines recommend screening for Lipoprotein a - Lp(a)- which is indicative of lifelong risk. Lipid specialists recommend a one time screening for Lp(a) however this is not incorporated into the pediatric guidelines at this time.

Levels are largely determined by genetics and there is minimal change with modifiable lifestyle factors. An elevated level should be considered an independent risk factor within the treatment algorithm.

[2] Exercise Recommendations by Age

Age	Recommendation
Infants	Active several times throughout the day via interactive floor play
Toddlers	Engage in at least 180 minutes per day in free play (walking, playing outside)
3-5 years	At least 180 minutes of physical activity throughout the day (approximately 15 min of every hour awake)
6-17 years	60 minutes of vigorous physical activity every day as well as muscle and bone strengthening activities at least 3 days per week

[3] CHILD-2 Diet (LDL-lowering, TG-lowering)

CHILD-2 LDL-lowering	CHILD-2 TG-lowering
Total fat 25-30% of daily kcal intake	Total fat 25-30% of daily kcal intake
Saturated fat ≤ 7% daily kcal intake	Saturated fat ≤ 7% daily kcal intake
Avoid trans fat	Avoid trans fat
Monounsaturated fat ~ 10% daily kcal intake	Monounsaturated fat ~ 10% daily kcal intake
Cholesterol < 200 mg/day	Cholesterol < 200 mg/day
Encourage at least 1 hour of moderate-to-vigorous physical activity daily while limiting sedentary screen time to < 2 hr/day	• Reduce sugar intake • Replace simple carbohydrates with complex carbohydrates. • Avoid sugar-sweetened beverages
	Increase dietary fish to increase omega-3 fatty acid intake
Translation: Keep saturated fats low and continue to encourage physical activity every day. Emphasize the importance of a heart healthy lifestyle.	**Translation**: Emphasize being more aggressive in decreasing intake of sugar and sugar-sweetened beverages. Focus on complex carbohydrates such as whole grains (brown rice, oatmeal), quinoa, and starchy vegetables (sweet potatoes, corn). Consider increased fish intake.

[4] CHILD-1 (Cardiovascular Health Integrated Lifestyle) Diet

Age	Recommendations
Birth to 6 months	Exclusive breastfeeding until 6 months of age. Donor breast milk or iron-fortified infant formula if maternal breastmilk is unavailable or contraindicated. Supplemental food is not recommended.
6 to 12 months	Breastfeeding continued until at least 12 months of age. Gradual addition of solids; transition to iron-fortified formula until 12 months if maternal breastmilk is unavailable or contraindicated. Fat intake should not be restricted unless medically indicated. No sweetened beverages should be offered; if juice given limit to ≤ 4oz/day; encourage water instead of juice.
12 to 24 months	Transition to unflavored, reduced-fat cow's milk. Fat content (2% to fat free) should be based on child's growth, intake of other nutrient-dense foods, total fat intake, and family history of obesity or cardiovascular disease. Avoid sugar sweetened beverage; limit 100% fruit juice to ≤ 4oz/day; encourage water. Offer table foods with: • Total fat 30% of daily kcal intake • Saturated fat 8-10% daily kcal intake • Avoid trans fat • Mono- and polyunsaturated fat up to 20% daily kcal intake • Cholesterol < 300 mg/day Limit sodium intake
2 to 10 years	Primary beverage should be unflavored, fat-free milk and water. Limit/avoid sugar sweetened beverage; limit 100% fruit juice to ≤ 4oz/day. Encourage water. Dietary fat: • Total fat 25-30% of daily kcal intake • Saturated fat 8-10% daily kcal intake • Avoid trans fat • Mono- and polyunsaturated fat up to 20% daily kcal intake Cholesterol < 300 mg/day Encourage high dietary fiber intake Encourage at least 1 hour of moderate-to-vigorous physical activity daily for children > 5 years
11 to 21 years	Primary beverages should be fat-free unflavored milk and water. Limit/avoid sugar-sweetened beverage; limit 100% fruit juice to ≤ 4oz/day. Dietary fat: • Total fat 25-30% of daily kcal intake • Saturated fat 8-10% daily kcal intake • Avoid trans fat • Mono- and polyunsaturated fat up to 20% daily kcal intake Cholesterol < 300 mg/day Encourage high dietary fiber intake Encourage at least 1 hour of moderate-to-vigorous physical activity daily. Encourage healthy eating habits such as daily breakfast, limiting fast-foods, and eating meals as a family.
Translation	*Decrease overall saturated fats within the diet (fatty meats, dark chicken, whole milk, butter, cheese, sour cream) and avoid trans fats (often found in baked goods, shortening, frozen and refrigerated dough, fried foods) as well as added/processed sugars, especially sugar-sweetened beverages. Decrease sodium intake (frozen meals, fast foods, canned beans). Increase dietary fiber in children > 2 years. Encourage at least 1 hour of physical activity daily.*

Here are some practical ways to counsel parents on incorporating the CHILD diet recommendations into their families:

1. Encourage a diet high in fruits and vegetables, majority of which should be whole, few from juice or concentrate.
   - Low in calories and high in dietary fiber making them great snack options.
   - Frequent exposure is the key to success in effectively increasing your child's overall consumption.

2. Encourage a diet that favors whole grain foods rather than refined/white grain products. Choose wheat breads, wheat tortillas, brown rice and whole wheat pasta.
   - Increased nutritional value compared to refined grain products (i.e. white rice, white bread).
   - Whole grains are higher in fiber and help with satiety and improved vitamin and mineral intake.

3. Beverage choices for your child should include water and white milk only. It is important to minimize your child's intake of fruit juices, sodas, sports drinks, and other sugar-sweetened beverages. Save for special occasions.
   - Sugary beverages contribute to empty calories and can promote weight gain and other poor dietary habits.
   - Dairy recommendation: 2-3 servings per day of fat-free dairy products to meet nutrient needs (i.e. yogurt, cheese, milk).

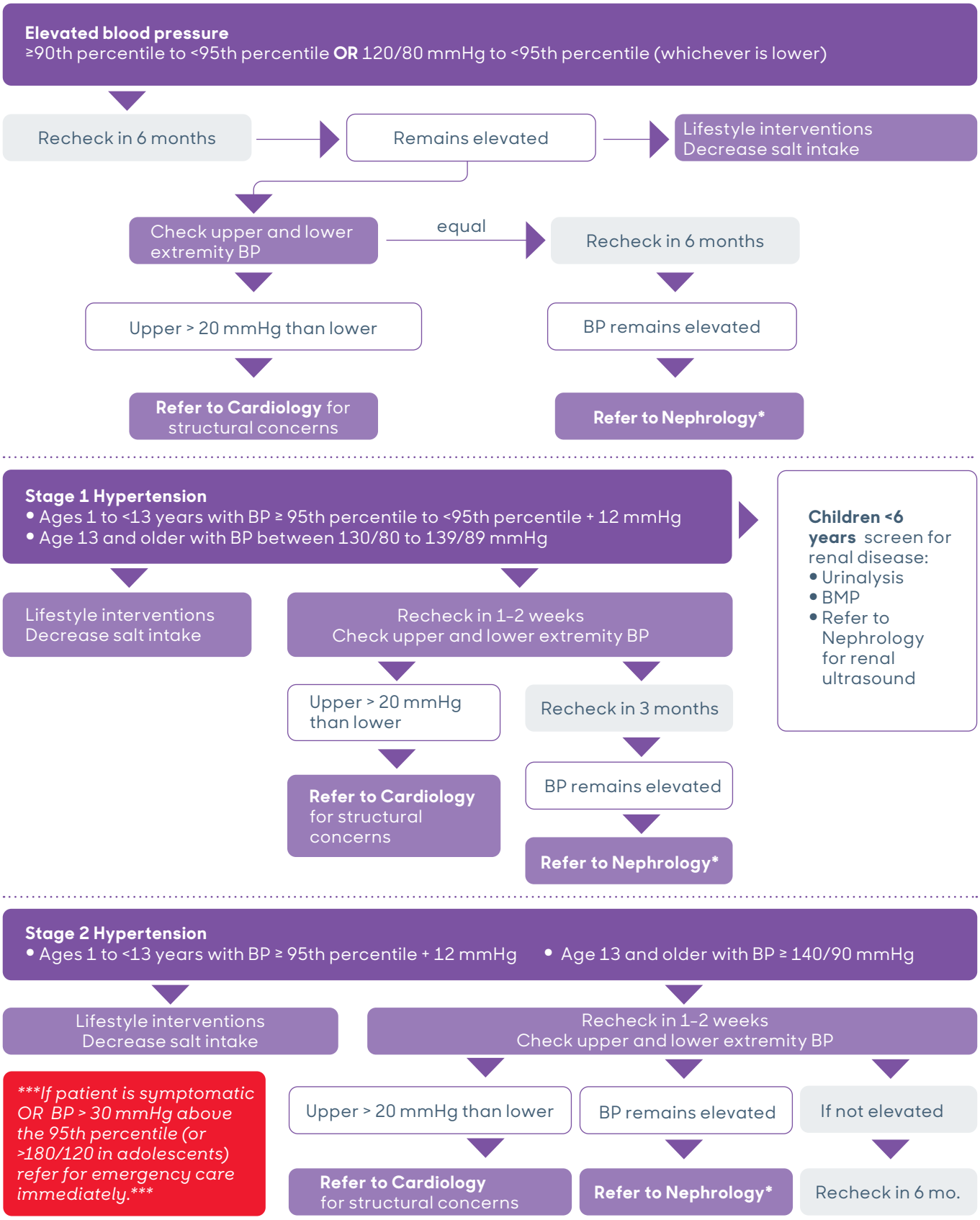
4. Limit the intake of high fat foods (i.e. fried, fast food) and avoid trans fats.
   - How to limit fat?
   - Choose lean proteins like chicken, fish, turkey or lean cuts of beef/pork.
   - Bake, broil, steam or grill foods instead of frying.
   - Limit intake of fast food.

[5] Statin Therapy

- Pravastatin approved for children >8yo with LDL >130 + 2 high level risk factors **OR** 1 high level + 2 moderate level risk factors
- Baseline lipid panel and LFTs prior to starting therapy
- Initial dose 10mg
- Check lipid panel and LFTs 6-8 weeks after starting therapy or making any dose adjustments
  - Monitor lipids every 4-6 months
  - Monitor LFTs annually or as clinically indicated
  - CK only needed if patient having muscle soreness or tenderness
- If LDL remains >130 refer to cardiology lipid clinic for further management

Sources:
- *Children's Hospital Association Consensus Statements for Comorbidities of Childhood Obesity, Estrada et al., Childhood Obesity, doi: 10.1089/chi.2013.0120*
- *Department of Cardiology, Children's National Hospital*
- *Dyslipidemia in children: Definition, screening, and diagnosis, Ferranti et al., UpToDate*
- *Dyslipidemia in children: Management, Ferranti et al., UpToDate*
- *Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents, U.S. Dept of Health and Human Services, https://www.nhlbi.nih.gov/files/docs/guidelines/peds_guidelines_full.pdf*
- *Nutritional Management of Pediatric Dyslipidemia, Williams et al., Endotext, https://www.ncbi.nlm.nih.gov/books/NBK395582/*
- *Pediatric lipid management: an earlier approach, Zachariah et al., Endocinol Metab Clin North America, doi: 10.1016/j.ecl.2014.08.004*

Algorithm for Hypertension in the Pediatric Population



Algorithm for Hypertension in the Pediatric Population *(Continued)*

Children with certain high risk conditions are at greater risk of hypertension. Be sure to consider the following **high risk conditions:**
- Obesity
- Diabetes
- Renal disease (i.e. Chronic kidney disease)
- Premature infants
- Heart defects (i.e. aortic arch obstruction or coarctation)
- Medications known to increase BP

These children should have BP carefully monitored and have BP measured at every health encounter (in addition to every well child visit), including those before age 3.

- Seat child correctly.
- Ensure appropriate cuff size*
- Measure BP manually by auscultation.

If ≥ 90th percentile, remeasure twice and average measurements.

Determine BP percentile according to BP charts.

*Diagnosis of hypertension may be made in an office setting if a child or adolescent has **auscultatory confirmed BP readings ≥ 95th percentile** (≥ 130/80 in adolescents ≥ 13 years) **at 3 different visits.***

*Cuff size:
- Cuff width ≥ 40% of midarm circumference
- Bladder to cover ≥ 80% of the arm circumference

Exclude secondary causes of hypertension (HTN)

Perform complete past:
- Medical history
- Family history
- Sleep history

Review of systems

Physical exam

*Screening Tests (prior to referral to Nephrology)

Patient Population	Screening Tests
All patients	• Urinalysis • BMP • Lipid profile (fasting or non-fasting to include HDL and total cholesterol) • Renal ultrasonography in those <6 years or those with abnormal urinalysis or renal function
In children or adolescents with obesity (BMI >95th percentile), in addition to the above	• Hemoglobin A1c (accepted diabetes screen) • Alanine transaminase (fatty liver screen) • Fasting lipid panel (dyslipidemia screen)
Optional tests to be obtained on the basis of history, physical examination and initial studies	• Fasting serum glucose for those at high-risk for diabetes mellitus • Thyroid-Stimulating hormone • Drug screen • Sleep study (if loud snoring, daytime sleepiness, or reported history of apnea) • CBC, especially in those with growth delay or abnormal renal function

Hypertensive Urgency

Severe elevation in BP without symptoms or evidence of acute target-organ damage ▶ *warrants immediate evaluation*

- Verify by auscultatory BP measurement, if possible
- Repeat 2-3 times

Hypertensive Emergency

Severe elevation in BP with symptoms or evidence of acute target-organ damage

- 30 mmHg > 95th percentile for children less than 13 years
- >180/120 in adolescents

Clinical judgement must be used to gauge severity of hypertension in order to determine the timing and intensity of management due to concern for acute hypertensive end-organ damage that can be life threatening.

Pediatric patients should be referred to an immediate source of care (i.e. emergency department) if BP is at the stage 2 level or > 30 mmHg above the 95th percentile for children < 13 years of age or > 180/120 in an adolescent

Hypertension and Competitive Sports Participation

Hypertension Stage	Participation Level
Any athlete with hypertension should be evaluated by Nephrology to look for signs of end organ damage (specifically LVH on echocardiogram) ▶ **immediate urgent referral if symptomatic**	
Elevated BP	No limitations
Stage 1 HTN	• No limitations in children with no LVH, heart disease • Limit competitive athletics in children with LVH until BP is normalized by appropriate pharmacologic therapy
Stage 2 HTN	Restrict high static activities (gymnastics, martial arts, sailing, sport climbing, water skiing, weight lifting, windsurfing, body building, downhill skiing, skateboarding, snowboarding, wrestling, boxing, kayaking, cycling, decathlon, rowing, speed skating, triathlon) until BP is controlled with lifestyle modification or pharmacologic therapy

Normal BP SBP/DBP at < 90th percentile for age, sex, and height

Simplified Blood Pressure Table for Initial Screening, Blood Pressure Values Requiring Further Evaluation

Age (years)	BP, mmHg			
	Boys		Girls	
	Systolic	Diastolic	Systolic	Diastolic
1	98	52	98	54
2	100	55	101	58
3	101	58	102	60
4	102	60	103	62
5	103	63	104	64
6	105	66	105	67
7	106	68	106	68
8	107	69	107	69
9	107	70	108	71
10	108	72	109	72
11	110	74	111	74
12	113	75	114	75
	120	80	120	80

BP measurements are based on the 90th percentile BP for age and sex for children at the 5th percentile of height

Sources:

- *Approach to hypertensive emergencies and urgencies in children, Uspal et al., UpToDate*
- *Children's Hospital Association Consensus Statements for Comorbidities of Childhood Obesity, Estrada et al., Childhood Obesity, doi: 10.1089/chi.2013.0120*
- *Clinical Overview of hypertensive crisis in children, Wen-Chieh et al., World Journal of Clinical Cases, doi: 10.12998/wjcc.v3.i6.510*
- *Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents, Flynn et al., American Academy of Pediatrics Clinical Practice Guidelines, https://doi.org/10.1542/peds.2017-1904*
- *Department of Nephrology, Children's National Hospital*
- *Evaluation of Hypertension in children and adolescents, Mattoo, UpToDate*

Algorithm for Polycystic Ovarian Syndrome (PCOS) in Children and Adolescents

What is PCOS?
The most common endocrinopathy in reproductive age women with exact etiology unknown.

INDICATIONS FOR PCOS SCREENING

Diagnosis is difficult as the presentation is varied with gynecologic, dermatologic and metabolic manifestations. Consider as a diagnosis of exclusion in patients with the following clinical presentations:
1. Menstrual Irregularities (amenorrhea[1], oligomenorrhea[2] or AUB/HMB[3])
2. Hyperandrogenism (hirsutism[4], acne, male pattern baldness)
3. Metabolic (obesity, acanthosis nigricans, diabetes)

ABSENT

- If BMI ≥ 85th percentile OR signs of insulin resistance[5], closely monitor for development of PCOS symptoms that indicate lab screening
- Consider lifestyle intervention[6], may refer to Dietician or IDEAL Clinic
- Follow-up in primary care clinic every 1-2 months to track progress

PRESENT

SCREENING LABORATORY TESTS[7]

- **ESSENTIAL TESTS**
  - Beta hCG
  - TSH[8]
  - 17-Hydroxyprogesterone
  - Serum total **AND** free testosterone
  - FSH
  - LH
  - DHEAS
- **ADDITIONAL TESTS**
  - If **ANY** irregular menses, screen prolactin

**Goal is to rule out alternative diagnoses in all patients prior to making a diagnosis of PCOS.*

- Serum total testosterone > 55 ng/dL and < 150 ng/dL OR serum free testosterone > 9 pg/mL
- LH:FSH ratio of 3:1 with LH level ≈ 18 mIU/ml and FSH level ≈ 6 mIU/ml
- All other labs are NORMAL:
  - Beta hCG < 5 mIU/mL
  - Prolactin < 25 ng/mL
  - DHEAS < 600 ug/dL
  - Early morning 17-Hydroxyprogesterone < 170 ng/dL

All normal labs and absent menstrual abnormalities

- Total Testosterone >150ng/dL
- DHEAS >600 ug/dL
- Abnormal TSH, prolactin, 17-Hydroxyprogesterone

PRESENT menstrual abnormalities lasting ≥ 2 years

Refer to Endocrinology Department for appropriate evaluation based on lab abnormality[9]

ABSENT menstrual abnormalities
OR
PRESENT menstrual abnormalities lasting < 2 years

DIAGNOSTIC PCOS

- Consider diagnosis of PCOS by 2 of 3 criteria below only after exclusion of other etiologies:
  1. Oligo and/or amenorrhea
  2. Biochemical and/or clinical signs of hyperandrogenism:
     - Total testosterone >70 ng/dL, androstenedione >245 ng/dL, DHEA-S >248 ug/dL
     - clinical: acne, hirsutism, acanthosis nigricans
  3. Polycystic ovaries
- Refer to Adolescent medicine for atypical presentation or if any support needed in diagnosis, treatment, and long-term management
- **Ultrasound is NOT indicated in initial workup**
- Screen for T2DM since PCOS patients are at high-risk regardless of BMI
- Lifestyle intervention therapy is a critical treatment for all patients with PCOS, consider referral to IDEAL Clinic if BMI > 95th percentile
- Recommended to treat irregular menses with medium potency monophasic OCPs
- If concerned with hirsutism or intractable acne, refer to Dermatology

POSSIBLE PCOS

- Closely monitor with follow-up every 3-6 months in primary care clinic as these patients are AT RISK for PCOS
- If menstrual abnormalities develop, reorder screening laboratory tests to determine source of androgen excess
- If BMI ≥ 85th percentile, consider lifestyle intervention[6], possible referral to Dietician or IDEAL Clinic
- Screen for T2DM regardless of BMI

<table>
<tr><th>#</th><th>Subject Superscript</th><th>Description</th></tr>
<tr><td>1</td><td>Amenorrhea classification</td><td>• Primary amenorrhea: the absence of menarche by 15 years old or by 3 years post onset of breast development or by bone age of 15 years old if early pubertal onset.
• Secondary amenorrhea: absence of menses for more than 3 months in girls or women who previously had regular menstrual cycles, or 6 months in girls or women who had irregular menses.</td></tr>
<tr><td>2</td><td>Oligomenorrhea classification</td><td>
<table>
<tr><th>Postmenarcheal Year #</th><th>Cycle length</th><th>Period per year</th></tr>
<tr><td>1</td><td>> 90 days</td><td>< 4 period per year</td></tr>
<tr><td>2</td><td>> 65 days</td><td>< 6 period per year</td></tr>
<tr><td>3</td><td>> 45 days</td><td>< 8 period per year</td></tr>
<tr><td>4 to menopause</td><td>> 38 days</td><td>< 9 period per year</td></tr>
</table>
</td></tr>
<tr><td>3</td><td>Abnormal Uterine Bleeding or Heavy Menstrual Bleeding classification</td><td>• More frequent than every 19 days in postmenarcheal Y1 and every 21 days thereafter
• Prolonged bleeding lasting more than 7 days
• Patient (subjectively) describes heavy period as “bleeding that soaks pads and/or tampons” such that quality of life is disrupted</td></tr>
<tr><td>4</td><td>Ferriman-Gallwey hirsutism scoring</td><td>The Ferriman-Gallwey hirsutism scoring system entails using visual scoring tools in 9 androgen sensitive areas of the body with 0 = absent hair growth and 4 = extensive hair growth. A score of 8 or higher constitutes hirsutism. However, this does not factor ethnic/racial differences. More research needs to be conducted to create a scoring system that standardizes hirsutism classifications according to ethnic/racial differences.</td></tr>
<tr><td>5</td><td>Signs of insulin resistance</td><td>• Acanthosis Nigricans/Skin Tags
• Hypertension
• Dyslipidemia (high TC, high TGs, high non-HDL, high LDL and low HDL)</td></tr>
<tr><td>6</td><td>Lifestyle interventions</td><td>• Nutrition: Create tailored dietary prescription with monthly follow-up to support patients in having a healthy balanced diet - a range of balanced dietary approaches are recommended with no one specific diet showing benefit over another
• Exercise:
- Aerobic exercise 1-hr daily (walk, run, team sports, bike, hike, etc.)
- Strength exercise 3X per week
* Body weight exercises such as push-ups, planks, sit-ups and squats are recommended for children and adolescents
* Resistance band, light free weight and light weight machine exercises are recommended in adolescents with proper training
• Behavior: <2 hours of non-academic screen time is recommended
• Weight loss: If BMI ≥ 85th percentile modest weight loss of 5-10% is recommended as this has been shown to improve menstrual regularity and ovulation in some studies (though currently based on small scale studies)</td></tr>
<tr><td>7</td><td>Differential diagnosis for amenorrhea/ irregular menses and/or hyperandrogenism

**except for pregnancy, if above cut off values refer to endocrinology</td><td>• Beta hCG > 25 mIU/ml --> pregnant
• Elevated FSH --> primary hypogonadism
• Low LH --> secondary hypogonadism
• Prolactin > 25 ng/mL --> prolactinoma
• DHEAS > 600 ug/dL --> virilizing ovarian tumor or virilizing adrenal tumor
• Early morning 17-Hydroxyprogesterone > 170 ng/dL --> non-classical CAH or virilizing tumor
• Serum total testosterone > 150 ng/dL --> ovarian stromal hyperthecosis or tumor
• If acromegaloid features present AND elevated IGF-1 --> acromegaly
If all other labs are normal with clinical features
– Consider Cushing’s syndrome in patients with rapid weight gain, hypertension, elevated glucose, and wide violaceous striae – refer to endocrine for work up
– Consider obtaining chronic disease panel (CRP, CBC, ESR, CMP) as chronic disease state may affect ovulation</td></tr>
</table>

#	Subject Superscript	Description
8	TSH lab interpretation	Mildly elevated TSH (5-10) is common in patients who have overweight or obesity diagnosis, and is reversible with weight management and does not warrant referral. Repeat testing is recommended and if TSH values rising then refer to endocrinology. T4 testing should not be run unless there is an abnormal TSH or there is clinical concern for central hypothyroidism (pituitary or hypothalamic dysfunction)
9	Serum total/ free testosterone lab interpretation	Serum free testosterone is more sensitive for detecting hyperandrogenemia than serum total testosterone.

Citations:

- *Children's National Hospital Endocrinology Department*
- *Dept of Endocrinology, Connecticut Children's Medical Center, Estrada et al., Child Obesity, DOI: 10.1089/chi.2013.0120*
- *Depart of Obstetrics and Gynecology, University of Pennsylvania, Buggs et al., Endocrinol Metab Clin North Am, DOI: 10.1016/j.ecl.2005.04.005*
- *Hatch et al., Am J Obstet Gynecol, DOI: 10.1016/0002-9378(81)90746-8*
- *FIGO Menstrual Disorders Committee, Munro et al., Int J Gynaecol Obstet, DOI: https://doi.org/10.1002/ijgo.12666*
- *The University of Chicago Pritzker School of Medicine, Rosenfield, Pediatrics, DOI: 10.1542/peds.2015-1430*
- *International PCOS Network, Teede et al., Fertil Steril, DOI: 10.1016/j.fertnstert.2018.05.004*
- *Williams et al., Am Fam Physician, PMID: 27419327*

Algorithm for Prediabetes and T2DM in Children and Adolescents

SCREENING INDICATIONS IN ASYMPTOMATIC PATIENTS AGES < 10YO

- BMI ≥ 99thpercentile
  AND
- T2DM in 1st degree relative or Gestational DM in patient pregnancy
  OR
- Acanthosis or other sign of insulin resistance[1]

SCREENING INDICATIONS IN ASYMPTOMATIC PATIENTS AGES ≥ 10YO

- BMI ≥ 95th percentile as a sole risk factor
  OR
- BMI ≥ 85thpercentile
  AND at least 1 risk factor:
  - First or second degree relative with T2DM
  - Identifies with high risk ethnic group[1]
  - Maternal history of gestational diabetes during child's pregnancy
  - Acanthosis or signs of insulin resistance[2]

SCREENING INDICATIONS IN SYMPTOMATIC PATIENTS

- Excessive fatigue
- Increased urination
- Increased thirst
- Blurred vision
- Slow wound healing
- Recurrent candida infections
- Weight loss

Normal[3]
HbA1c: < 5.7%[4]
FPG: < 100 mg/dL
Random Glc: < 140 mg/dL

"Low Risk" Prediabetes[3]
HbA1C[4]: 5.7% to 5.9% **OR**
FPG: ≥ 100 mg/dL and < 125 mg/dL **OR**
Random Glc: 140-200 mg/dL

"High Risk" Prediabetes or "Early" Diabetes[3]
HbA1C[4]: 6.0% to 7% **OR**
FPG: ≥ 100 mg/dL and < 125 mg/dL
Random Glc: 140-200 mg/dL

Diabetes[3]
HbA1C[4]: > 7% **OR**
FPG: ≥ 125 mg/dL **OR** Random Glc: > 200 mg/dL

- Initiate lifestyle intervention[5] in PCP setting, education on symptoms of diabetes
- **Repeat HbA1C AND FPG in 6 months**

- Initiate lifestyle intervention[5] and consider referral to dietitian or IDEAL clinic
- **Repeat HbA1C AND FPG in 2-3 months**

HbA1C 5.7-6.5%
AND
FPG < 100 mg/dL

HbA1C > 6.5- <7%
OR
FPG 100-125 mg/dL

HbA1C: > 7%
OR
FPG: > 126 mg/dL

Manage in Primary Care

- Screen every 3 years if BMI is ≥ 85th to < 95th percentiles
- Screen annually if:
  - BMI ≥ 95th percentile or BMI ≥ 35
  - Signs of insulin resistance
  - Abnormal weight gain

Educate patient on symptoms of overt diabetes
Consider lifestyle intervention[5], including **referral to Dietitian or IDEAL Clinic**

Refer patient to Diabetes Clinic

- **HbA1C 6.5 - 7% is ok for routine referral, expedited appt not needed unless FPG >200**
- **Not recommended** to collect 2-hr OGTT prior to any specialist or specialty clinic referrals[6]
- Screen blood sugar immediately if presence of diabetes symptoms
- Consider lifestyle intervention[5] including **referral to Dietitian or IDEAL Clinic**

Refer patient to Diabetes Clinic for expedited appointment

- Consider lifestyle intervention[5] including **referral to Dietician or IDEAL Clinic**
- **If plasma glucose > 250 mg/dL or HbA1C >9% patient requires immediate intervention.**

Please collect a urinalysis for glucose and ketones and contact Diabetes team or refer to Emergency Department

<table>
<tr><th>#</th><th>Subject Superscript</th><th colspan="4">Description</th></tr>
<tr><td>1</td><td>Signs of insulin resistance</td><td colspan="4">• Hypertension
• Dyslipidemia (<HDL; elevated non-HDL; elevated TG/HDL ratio)
• Acanthosis Nigricans/Skin tags
• Polycystic Ovarian Syndrome</td></tr>
<tr><td>2</td><td></td><td colspan="4">Racial/ethnic groups ranked from most to least at-risk for prediabetes and diabetes due to genetic and environmental factors: • Native American (most at-risk) • African American • Hispanic • Asian American • Pacific Islander (least at-risk)</td></tr>
<tr><td rowspan="5">3</td><td rowspan="5">American Diabetes Association lab-based classifications for normal, prediabetes, and diabetes ranges</td><td></td><td>Normal</td><td>Prediabetes</td><td>Diabetes</td></tr>
<tr><td>HA1C</td><td>< 5.7%</td><td>≥ 5.7% and ≤ 6.4%</td><td>≥ 6.5%</td></tr>
<tr><td>FPG</td><td>< 100 mg/dL</td><td>≥ 100 to 125 mg/dL</td><td>≥ 126 mg/dL
AND diabetes symptoms</td></tr>
<tr><td>2-hr OGTT</td><td>< 140 mg/dL</td><td>≥ 140 to 199 mg/dL</td><td>≥ 200 mg/dL</td></tr>
<tr><td colspan="4">Children with FPG values between 86-99 md/dL have 2 times the risk for developing diabetes and 3.4 times the risk for developing prediabetes as an adult regardless of weight status.</td></tr>
<tr><td>4</td><td>HA1C as a primary screening tool</td><td colspan="4">• AVOID screening with HA1C in the following patients:
– HbSS, HbCC, and HbSC due to associated anemia, increased red blood cell turnover, and rigorous transfusion requirements that distort A1c reading
– Anemia due to risk of falsely high reading
– Iron deficiency due to risk of falsely high reading
– Heavy (menstrual) bleeding due to risk of a falsely low reading
– Kidney failure
– Liver failure
– Hemoglobinopathies (i.e. thalessemias)</td></tr>
<tr><td>5</td><td>Lifestyle interventions</td><td colspan="4">• Nutrition: Create tailored dietary prescription with monthly follow-up
• Weight management:
– Primary goal: weight maintenance
– Secondary goal: loss of 0.5-1 kg per month in growing patients OR 0.5-1 kg per week in post-pubertal adolescents to achieve 5% to 10% weight percentile drop OR < 85th percentile for BMI
• Exercise:
– Aerobic exercise 1-hr daily (walk, run, team sports, bike, hike, etc.)
– Strength exercise 3X per week
* Body weight exercises such as push-ups, planks, sit-ups, and squats are recommended for children and adolescents
* Resistance band, light free weight, and light weight machine exercises are recommended in adolescents with proper training
• Behavior: <2 hours of non-academic screen time is recommended</td></tr>
<tr><td>6</td><td>Utility of the 2-hr OGTT</td><td colspan="4">The 2-hr OGTT is not a preferred screening test due to limited feasibility, costliness and the burden it imposes on patients.</td></tr>
</table>

Citations:

- *Children's National Hospital Endocrinology Department*
- *Academy of Nutrition & Dietetics, Evidence Analysis Library of the Academy of Nutrition & Dietetics, 2015, https://www.andeal.org/topic.cfm?menu=5296&cat=5632*
- *American Diabetes Association, Diabetes Care, 2020, https://doi.org/10.2337/dc20-s013*
- *American Diabetes Association, Diabetes Care, 2020, https://doi.org/10.2337/dc20-s002*
- *American Diabetes Association, Diabetes Care, 2020, https://doi.org/10.2337/dc20-s015*
- *American Diabetes Association, Diabetes Care, 2020, https://doi.org/10.2337/dc20-s005*
- *American Diabetes Association, Diabetes Care, 2020, https://doi.org/10.2337/dc20-s006*

Algorithm for ALT Lab for Non-Alcoholic Fatty Liver Disease (NAFLD)

INCLUSION CRITERIA:

- All children that are overweight or have obesity with BMI above the 84th percentile
- **Only above the age of 10**[1]

Elevated ALT levels

ALT UPPER LIMIT NORMAL (ULN)

- Girls: 22 U/L
- Boys: 25 U/L

ELEVATED ALT[2]

- Girls: >22 to <80 U/L
- Boys: >25 to <80 U/L

and no signs of liver disease

ALT ≥80
(regardless of gender)

With signs and symptoms of liver disease[4]
OR
Suspected autoimmune disease[5]
REGARDLESS OF ALT LEVEL
refer directly to GI[6]

Repeat ALT in 3-6 months

- Monitor clinically
- Counsel for weight management and lifestyle modification[3]

If ALT is 10x the ULN, then call the GI/Liver nurse line for an emergent referral at 202-834-4282

If ALT trending down

- Boys: <51
- Girls: <43

on repeat liver chemistry, then continue standard of care unless signs or symptoms of liver disease

If ALT elevated for

- Boys: >52
- Girls: >44

on repeat liver chemistry, then consider further testing

If persistently elevated LFTs or ALT ≥80, then evaluate further for liver disease regardless of BMI or co-morbidities

- **See below for list of GI recommended laboratory testing**[6]
- **Can also refer to GI for testing based on family or PCP preference**[6]
- Continue counseling for weight management and lifestyle modification[3]
- Consider referral to **IDEAL clinic**

Routine outpatient ultrasound is NOT recommended due to low sensitivity and specificity unless palpable mass, palmar erythema, acute gallbladder pain, or telangiectasia.

Order of Risk of Liver Damage with NAFLD[7]

Normal Liver → **NAFLD** Non-Alcoholic fatty liver disease → **NASH** Non-Alcoholic Steatohepatitis → **Cirrhosis**

If normal on screening, ALT should be repeated in 2-3 years if risk factors are still present

#	Subject	Description
1	Inclusion criteria	Inclusion criteria for ALT includes all children who are overweight or have obesity with a BMI over 85th percentile, but **only in children ≥ 10 years of age**. Data for liver fat/damage is inconsistent for children <10 years of age. ***May consider screening in child 2-9yo with Severe Obesity(>99th% BMI)**
2	Elevated ALT levels less than 5x ULN	Elevated ALT levels less than 5x+ ULN do **NOT** necessarily correlate with level of histological fat in liver. For example, a patient with 5x ULN ALT may have normal liver histology, while a patient with 2x ULN ALT may have a significantly more fat in liver histology. The gold standard for assessing disease severity and amount of fat is liver biopsy. **Use clinical judgement in addition to ALT levels for assessment of NAFLD.**
3	Weight management counseling and lifestyle modification	Weight management and lifestyle counseling should include nutrition and physical activity recommendations. **Aerobic exercise** is preferred for decrease in ALT and fat in liver, but resistance training also proven to be beneficial. • At least 60 minutes or more of moderate-to-vigorous intensity physical activity daily, with at least 3 days a week including vigorous aerobic activity and resistance activity.
4	Signs of advanced liver disease	Red flag signs of advanced liver disease include: • Chronic fatigue • GI bleeding • Jaundice • Splenomegaly • Firm liver on physical exam • Low platelets • Low white blood cell count • Elevated direct bilirubin • Elevated international normalized ratio (INR) • Long history, >2 years, of elevated liver enzymes If signs and symptoms of advanced liver disease are present, then likely suggests elevated ALT is not only due to NAFLD and referral directly to GI is recommended.
5	Suspected autoimmune disease	Risk factors for autoimmune disease include hypothyroidism, diabetes, or family history of autoimmune disease, which can be causing elevations in ALT. It is recommended to refer patients to GI earlier than 1 year even for patients with mild ALT elevation for an autoimmune hepatitis screen. **This screening is not recommended in a primary care setting.**
6	Lab work for referral	Lab work for referral to GI, which PCP can start if comfortable: • **CBC** • **INR** • **CMP** **Hepatic function panel** to check for other hepatic markers - Bilirubin, Alkaline phosphatase, GGT, ALT/AST • **HbA1c** • **Infectious hepatitis screen (ABC)** - Screening for hepatitis B (sAg, sAb, cAb) - Screening for hepatitis C (total Ab) - If ordered at Children's National, use Hepatitis Diagnostic Panel + HepBsAb • **Alpha-1 antitrypsin deficiency screen** (alpha-1 antitrypsin phenotype) • **Wilson disease screen** (serum ceruloplasmin) • **Autoimmune hepatitis screen** (ANA, anti-smooth muscle Ab, liver-kidney microsomal Ab) • **Celiac disease screen** (tissue transglutaminase IgA, total IgA) • **Lysosomal acid lipase deficiency screen** (LALD enzyme level) If all labs negative in absence of signs/symptoms of liver disease acute referral not indicated; can continue lifestyle efforts to support dietary changes and weight loss, if persistent LFT elevation noted >1 year consider referral to GI for imaging
7	Liver damage risk with NAFLD	**NAFLD** (Non-alcoholic fatty liver disease) is a condition in which excess fat is stored in your liver without inflammation, and is common in patients with obesity, diabetes and high cholesterol. NAFLD puts a patient at higher risk for **NASH** (non-alcoholic steatohepatitis), a more serious condition in which there is excess fat in the liver with inflammation. NASH then puts the patient at risk for permanent liver damage, such as cirrhosis or liver cancer. • **NAFLD is reversible.** It is crucial to counsel patient on weight management and lifestyle modifications while patient does not have irreversible liver damage.

Sources:
Children's National Hospital Gastroenterology Department, Dr. Mohan and Dr. Vitola
National Institute of Diabetes and Digestive and Kidney Diseases, NIH, https://www.niddk.nih.gov/health-information/liver-disease/nafld-nash
NAFLD in children and adolescents, Mouzaki et al., UpToDate,
https://www.uptodate.com/contents/nonalcoholic-fatty-liver-disease-in-children-and-adolescents

Algorithm for Hidradenitis Suppurativa (HS)

HS has a high rate of co-morbidities that should be screened for at the time of diagnosis[1]

HPI/ROS findings – Ask screening question: *Have you had 2 or more outbreaks of boils in the last 6-12 months in the axillae, groin, inframammary folds or buttocks?*

Treatment goal: Reduce scarring and development of new lesions while preventing progression of disease to improve symptoms and quality of life

Physical exam findings present – Examine intertriginous areas including the axilla, groin, neck, breasts and buttocks

Likely diagnosis of HS

Lifestyle modifications[2]**:** All treatment modalities should also include include adjunct therapy for pain management, weight loss, appropriate skin care

- No sinus tracts or scarring
- Flares are intermittent and can go weeks to months without any active lesions

Mild

Treatment for flares:
- Topical clindamycin 2x/day[3] **AND**
- Benzoyl peroxide 10% wash[3] **AND**
- Oral doxycycline 100mg 2x/day x 2 weeks

Improvement

Flares are common and may occur at same or different site. Re-treat with previously effective therapy and continue to monitor for progression of disease

- Stop doxycycline
- Start zinc gluconate 50mg 2x/day x 12 weeks AND continue maintenance therapy of choice
- Monitor for disease progression

- Multiple flares of lesions per month, or always with at least one lesion active
- May have no scarring or have signs of spaced out scars or a single sinus tract/ tunnel

Moderate

Treatment:
- Topical clindamycin 2x/day[3] **AND**
- Benzoyl peroxide 10% wash[3] **AND**
- Oral doxycycline 100mg 2x/day x 2 weeks **AND**
- Maintenance therapy of choice

Consider dermatology referral

No improvement

ADD

- Oral doxycycine 100mg 2x/day x 12 weeks[4] **AND**
- Maintenance therapy
  - Metformin 500mg 2x/day for men and women **OR**
  - Spironolactone 50mg 2x.day for women **OR**
  - OCPs[5] for women
- If comorbid menstrual flares and/or irregularities present, screen for PCOS[6] and favor hormonal therapies for women
- Consider dermatology referral for all

Improvement

No improvement

ADD

- Refer to dermatology +/- HS multi-disciplinary clinic
- Consider change or addition of maintenance therapy
- Consider starting clindamycin 300mg 2x/day **AND** rifampin 300mg 2x/day, both x 12 weeks4

- Multiple flared lesions at any given time
- Interconnected sinus tracts and abscesses throughout affected area

Severe

Treatment:
- Topical clindamycin 2x/day[3] **AND**
- Benzoyl peroxide 10% wash[3] **AND**
- Oral doxycycline 100mg 2x/day x 2 weeks **AND**
- Maitenance therapy of choice

Refer directly to HS multi-disciplinary clinic

Additional treatment options for refractory or severe disease:
- Differing combination of topical/oral agents
- Biologic agents
- Laser therapy
- Surgical procedures

Routine incision and drainage **NOT** recommended for acute symptomatic lesions, unless obviously fluctuant with a definite large fluid collection[7]

#	Subject	Description
1	Associated co-morbidities	HS has a very high co-morbidity burden, with newer guidelines recommending that the following systems should be screened for at the time of diagnosis: • **Metabolic (obesity, dyslipidemia, hypertension, metabolic syndrome)** – Exam: BMI, blood pressure – Labs: fasting lipid panel, hemoglobin A1c, fasting blood glucose • **Endocrinologic (diabetes, PCOS, precocious puberty/premature adrenarche)** – History: menstrual irregularities – Exam: PCOS screening (signs of hyperandrogenism), signs of precocious puberty – Labs: PCOS screening labs if appropriate • **Psychiatric (depression, anxiety, substance use disorder)** – History: PHQ-2 and/or PHQ-9, GAD-7, AUDIT-C questionnaire/opioid risk tool • **Inflammatory conditions (inflammatory bowel disease, spondyloarthritis)** – History: arthritis and inflammatory bowel disease screening questions – Labs: IBD screening labs if appropriate • **Dermatologic (acne, pilonidal disease, dissecting cellulitis of scalp, pyoderma gangrenosum)** – Exam: Full skin exam Management and referrals to appropriate specialists if needed should be pursued if signs of these conditions are found.
2	Lifestyle modifications	Lifestyle modifications include weight management counseling with exercise and nutrition recommendations. **Weight loss** of 5-10% is the best supported modification. Other lifestyle modifications include counseling to: • Consider avoiding antiperspirant and using deodorant only, or switching to spray • Wash affected areas gently with fingers; do not scrub with washcloth or brush • Avoid overly tight clothing • Smoking/vaping cessation • NSAIDs or corticosteroids can be considered in short courses to reduce pain and inflammation • Avoid popping/draining new forming lesions[7]
3	Topical therapy	• **Topical clindamycin 1% solution** may help to reduce inflammatory lesions and pustules – Clean involved area with soap and water, dry, and apply the 1% clindamycin solution with fingertip 2x/day in skin areas subject to recurrent flares for **3 months** • **Benzoyl peroxide 10% antiseptic wash** must be used in conjunction with topical clindamycin to prevent Staph aureus resistance • Other antiseptic washes that can be alternated daily with benzoyl peroxide include: – Chlorhexidine gluconate 4% – Shampoo containing zinc pyrithione 1%
4	Long-term oral antibiotics	**Long-term oral antibiotics** have been shown to improve HS, although the mechanism is not definitively known. Patients who achieve satisfactory disease control may stop and then use zinc gluconate 50mg 2x/day for longer disease-free remission. a. **Oral doxycycline** 100mg 2x/day for **3-6 months (at least 3 months** prior to assessing response). **Strongly encourage patients to take this with a full meal to improve tolerability.** Not recommended for pediatric patients under the age of 9. Refer younger patients with HS to dermatology sooner for management. b. **Oral clindamycin** 300mg 2x/day plus rifampin 300mg 2x/day for **12 weeks** as second-line therapy if patients fail to respond to doxycycline.

#	Subject	Description
5	Antiandrogenic agents	Some female patients have noted menstrual variation in their HS, indicating a role of hormones in HS. **Antiandrogenic therapy** in women seem to have a stronger response compared to antibiotic use. **Antiandrogenic agents should NOT be given to pregnant women because of the risk for adverse effects on the fetus.** Always conduct a pregnancy test before considering use of antiandrogenic agents. • **Oral contraceptive pills (OCP)** improve clinical symptoms – **Ethinyl estradiol** 50 mcg (cycled days 5 to 25) and **cyproterone acetate** 50mg (cycle days 5 to 14) for **6 months** – **Ethinyl estradiol** 50mcg and norgestrel 500mcg (cycle days 5 to 25) daily for **6 months** Administration of combined OCPs containing ethinyl estradiol are key. Progesterone-only hormonal therapies can trigger or worsen HS, and it is recommended to switch to a different therapy if an HS patient is already on a progesterone-only agent. • **Spironolactone** for HS associated with improvement in pain, lesions, and disease severity, especially for patients with PCOS. – Start with 25mg/day and go up to 100mg/day for **at least 3 months**
6	Metformin	Insulin-resistance may contribute to HS, and **metformin** has shown benefit in HS along with modest weight loss for patients with obesity, particularly those with metabolic syndrome, PCOS or diabetes. 500mg initial dose 2x/day with food and titrate 500mg 1x/day x 1-2 weeks to minimize side effects, then increase to 500mg 2x/day **for at least 3 months**
7	Acute symptomatic lesions	• When patient has new forming lesion, counsel patient to intermittently apply **warm compress** over area for 10 minutes at a time throughout the day. This can improve symptoms of inflammation. • If **lesion starts to drain** on its own, keep wound clean and wash gently with antiseptic wash. Cover the skin with **petroleum jelly** to avoid dressing from sticking to the wound, and clean/change dressing daily until wound heals. – Adhesive tape should be avoided if possible, and instead an absorbent material should be held in place in a way that minimizes skin trauma, such as an elastic fishnet dressing. – If lesion continues to be painful and inflamed, instruct patient to call doctor to discuss additional methods for treating acute symptomatic lesions. • Additional interventions by dermatology: **intralesional corticosteroid injections** (triamcinolone 10mg/mL), **punch debridement** (partial unroofing) and **topical resorcinol** (topical 15% resorcinol).

Sources:
Children's National Hospital Dermatology Department
American Academy of Dermatology, North American clinical management guidelines for HS, https://doi.org/10.1016/j.jaad.2019.02.068
International Journal of Women's Dermatology, A concise clinician's guide to therapy for hidradenitis suppurativa, Nesbitt et al., doi: 10.1016/j.ijwd.2019.11.004
UpToDate, Hidradenitis Suppurativa: Management, Ingram, https://www.uptodate.com/contents/hidradenitis-suppurativa-management
Liy-Wong C, Kim M, Kirkorian AY, et al. Hidradenitis Suppurativa in the Pediatric Population: An International, Multicenter, Retrospective, Cross-sectional Study of 481 Pediatric Patients. JAMA Dermatol. Published online February 24, 2021. doi:10.1001/jamadermatol.2020.5435

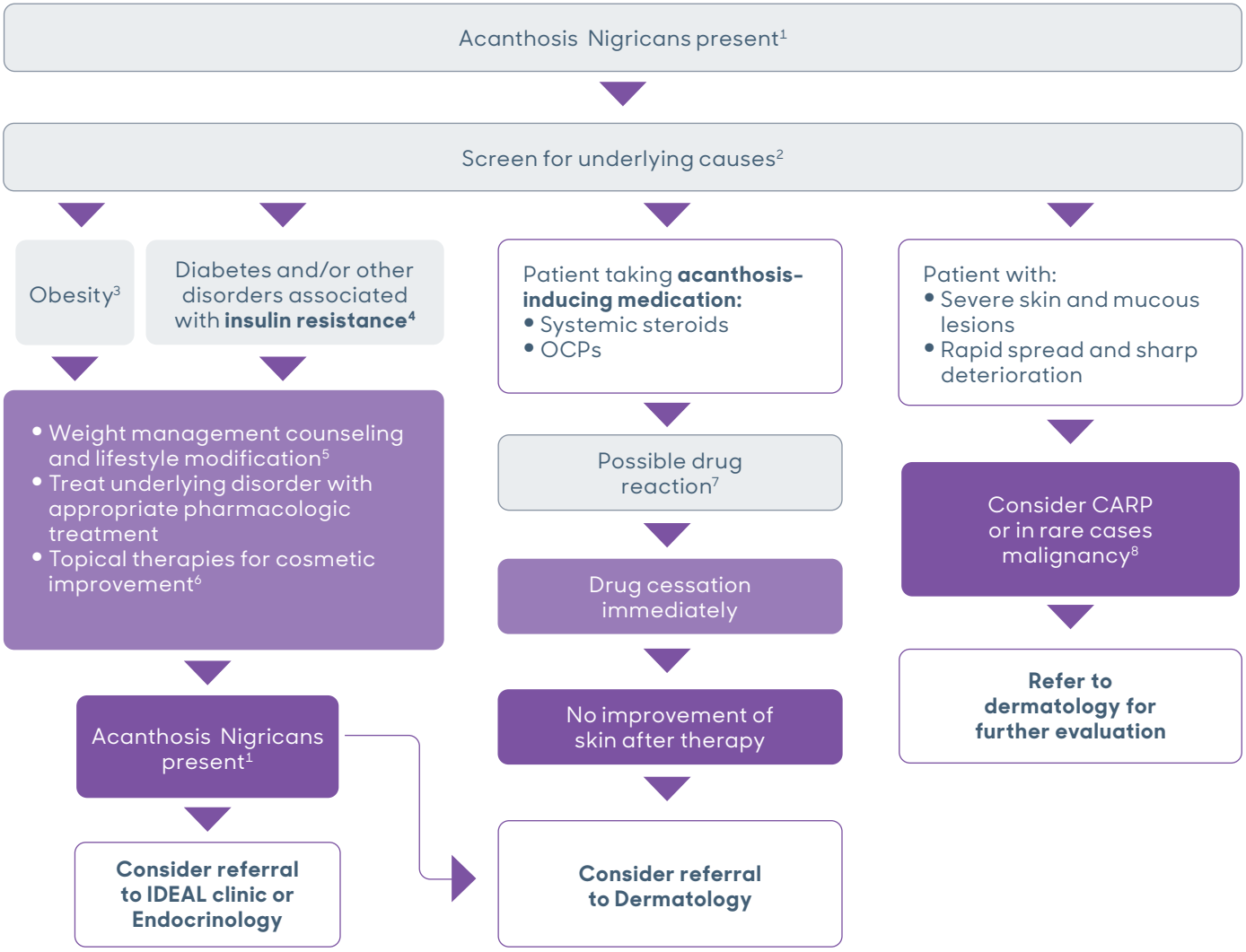
Algorithm for Acanthosis Nigricans

Examine areas including but not limited to[1]:

- **Full circumference of the neck**
- **Axillae**
- Anogenital region
- Inframammary
- Abdominal folds
- Antecubital
- Inguinal skin folds
- Hands (knuckles), elbows, knees or feet
- Dorsocervical fat pads

TREATMENT GOAL:

1. **Treat underlying medical condition** causing acanthosis nigricans
2. Address cosmetic concerns with topical therapies



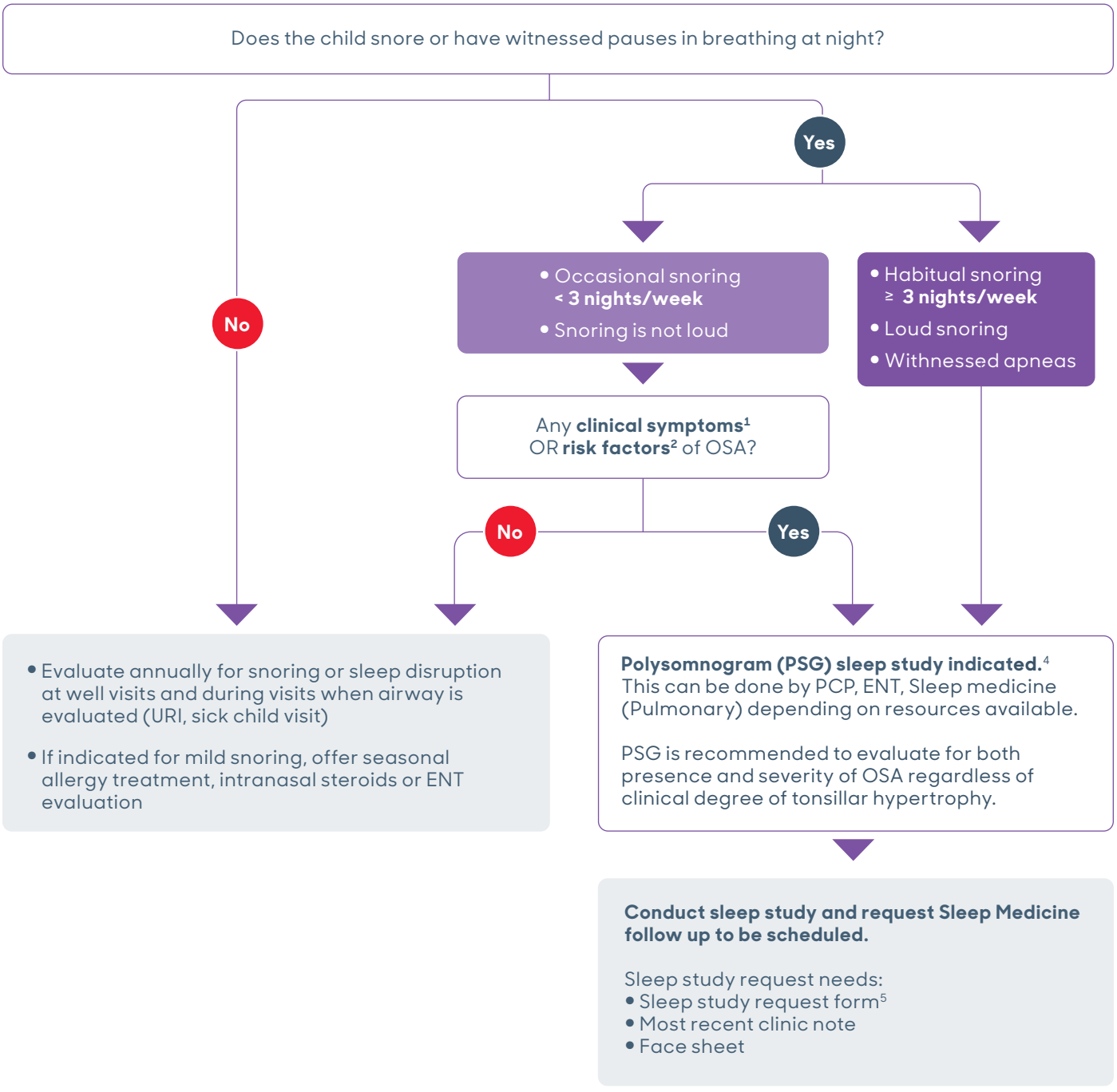
#	Subject	Description
1	Stages and location of acanthosis nigricans	Acanthosis nigricans typically presents with thickened, velvety hyperpigmented plaques on the skin. It is most commonly found on the **back/sides of the neck and axillae**, but also present in other **intertriginous areas**, including the **anogenital region, inframammary region, abdominal folds, antecubital region** and **inguinal skin folds**. Severe cases may demonstrate lesions on **areola, perineum, umbilicus, lips, buccal**, or other mucosa and other non-intertriginous areas. • Mild stages – affected skin appears "dirty" and a rough or dry texture with minimal elevation. As it advances, the skin may become thicker and **skin tags** may appear. • Typically appears in **symmetrical** distribution – unilateral cases may represent a variant of epidermal nevus. • **Acral form** – characterized by plaques on the knuckles of the hands, elbows, knees, or feet Be sure to conduct a thorough examination of the patient's skin, as the presence of acanthosis nigricans may suggest an underlying medical condition.
2	Screen for underlying causes	While acanthosis itself is not harmful, it is often caused by a harmful underlying disease or condition. These include **obesity, diabetes and other insulin resistance diseases, drug reactions, malignancy and genetic/familial traits.** While there is a high association with certain genetic disorders (ex. Down Syndrome) and acanthosis, it is still crucial to screen for any other underlying cause.
3	Obesity	Obesity is the most common medical disorder linked with acanthosis nigricans, and the prevalence of the skin condition increases with rising BMI when other factors are accounted for. Insulin resistance most likely plays a large factor in this, and weight management can lead to improvement of skin[5].
4	Insulin resistance diseases	**Type 2 diabetes mellitus** is strongly associated with acanthosis nigricans, most likely due to insulin resistance. Other insulin resistance and endocrine disorders that may be associated with acanthosis include **PCOS, hypertension, dyslipidemia, Cushing's syndrome** and other metabolic disorders. • Be sure to screen patient thoroughly if you suspect patient may have an endocrine or metabolic disorder in combination with acanthosis.
5	Weight management counseling and lifestyle modification	Weight loss is linked to improvements in skin in patients with obesity. Weight management counseling should include daily exercise and nutrition recommendations. • At least 60 minutes or more of moderate-to-vigorous intensity physical activity daily, with at least 3 days a week including vigorous aerobic activity and resistance activity. • Because acanthosis is strongly associated with insulin resistance and exercise has been shown to mitigate insulin resistance, **vigorous activity** may be very effective in improving acanthosis. • **Counsel patient that they should NOT scrub skin excessively.**
6	Topical therapies	Data on efficacy of topical therapies are limited but improvements have been reported. These include: • **Topical retinoids 0.1% gel** – retinoids have keratinolytic effects on the skin. Application to localized areas for up **to 2 weeks** shows improvement. Combination therapy with tretinoin 0.05% cream and/or 2x daily application of 12% ammonium lactate cream also shows improvement.
7	Drug reaction	Very rarely does medication cause acanthosis nigricans as a side effect and is most commonly found with medications that promote hyperinsulinemia. **See algorithm for acanthosis inducing medications.** Cessation of drug results in resolution of skin condition.
8	Severe or progressive hyperpig-mented skin thickening	Confluent and Reticulated Papillomatosis (CARP) is due to disordered hyperkeratinization, it is primarily a clinical diagnosis however in some cases biopsy is needed to rule out other causes. Dermatology evaluation is recommended. Very rarely does acanthosis nigricans present as a paraneoplastic disorder in children. Malignant acanthosis nigricans is characterized by the presence of hyperpigmented, hyperkeratosis, and cutaneous thickening of the skin or mucous membranes that have rapid spread. The majority of acanthosis nigricans-associated tumors are due to **gastric carcinomas**. This is generally only found in adults without obesity.

Sources:
Children's National Hospital Dermatology Department
Acanthosis nigricans, Sander et al., UpToDate, https://www.uptodate.com/contents/acanthosis-nigricans
An approach to acanthosis nigricans, Phiske, Indian Dermatology Online Journal, doi: 10.4103/2229-5178.137765
Malignant acanthosis nigricans: an early diagnostic clue for gastric adenocarcinoma, Yu et al., World J Surg Oncol, doi:10.1186/s12957-017-1274-5

Algorithm for Obstructive Sleep Apnea (OSA)

Epidemiology: Risk of OSA increases with obesity. 13-33% of all youth with obesity present with OSA. Screen all patients with obesity for OSA.

Treatment goal: Improve OSA so that patient has ability to sleep without any snoring or apneas at night.



<table>
<tr><th>#</th><th>Subject</th><th colspan="2">Description</th></tr>
<tr><td rowspan="4">1</td><td rowspan="4">Clinical symptoms</td><td colspan="2">It is crucial to take a focused sleep history when evaluating for OSA. These include both nighttime and daytime symptoms.
• Potential consequences of OSA in childhood: ADHD or disruptive behavior disorders, poor growth, hypertension, altered cardiac morphology, pulmonary hypertension</td></tr>
<tr><td>Nighttime symptoms:</td><td>Daytime symptoms:</td></tr>
<tr><td>• snoring
• labored breathing during sleep
• paradoxical abdominal movements
• apneas, pauses in breathing
• mouth breathing
• restless/agitated sleep
• sleeping with neck extended
• nighttime sweating
• nocturia
• sleep walking
• sleep terrors</td><td>• mouth breathing
• hyponasal speech
• poor behavioral functioning (inattentiveness, difficulty learning, irritability)
• hyperactivity (>sleepiness in young children)
• Sleepiness(> in adolescence)
• morning headache
• teeth grinding (bruxism)</td></tr>
<tr><td colspan="2">Bimodal Peak of OSA in younger kids is related to adenotonsillar hypertrophy and older kids/teens with obesity.</td></tr>
<tr><td>2</td><td>Risk factors</td><td colspan="2">Major risk factors for OSA include obesity, adenotonsillar hypertrophy and the male sex. Other risk factors include environmental smoke exposure, asthma, allergic rhiniti, or other conditions that reduce upper airway size or affect neural control of the upper airway (i.e. trisomy 21, craniofacial syndromes, neuromuscular disorders, mucopolysaccharidoses). If patient presents with snoring and has an associated risk factor, a sleep study is recommended.</td></tr>
<tr><td>3</td><td>Physical exam</td><td colspan="2">Physical exam for patient suspected of OSA should include:
• Examination of the oropharynx and mouth – evaluate for adenotonsillar hypertrophy, jaw structure (overbite), high-arched and narrow hard plate
• Plotting on growth chart – poor growth can indicate chronic severe OSA
• Cardiopulmonary exam – assess BP and cardiac auscultation to screen for pulmonary hypertension, a consequence of OSA in childhood
• Assess head and nose – turbinate hypertrophy; screen for craniofacial abnormalities that may suggest abnormal upper airway anatomy (mouth breathing, long facies, decreased nasal flow, hyponasal speech are all consistent with adenoidal hypertrophy, which can lead to OSA)</td></tr>
</table>

Sources:
Children's National Hospital Sleep Medicine Department
Link to AAO-HNS CPG Tonsillectomy in Children (could include as a reference if you like):https://journals.sagepub.com/doi/full/10.1177/0194599818801757American Academy of Sleep Medicine (AASM), International Classification of Sleep Disorders, Sateia, DOI: 10.1378/chest.14-0970
UpToDate, Evaluation of suspected obstructive sleep apnea in children, Paruthi, https://www.uptodate.com/contents/evaluation-of-suspected-obstructive-sleep-apnea-in-children

#	Subject	Description
4	Polysomnography (PSG)	**Overnight PSGs are used for definitive diagnosis of OSA.** They can identify obstructive events and quantify severity of OSA, including gas exchange abnormalities and sleep disruption (arousals associated with respiratory events). This can be done either by ENT, Sleep medicine specialist(Pulmonology) or PCP depending on resources available. Summary measures used for diagnosis of OSA include: • **Obstructive Apnea Hypopnea (OAH) Index** – average number of apneas plus hypopneas PER HOUR of sleep • **Oxygenation (SpO2)** – nadir SpO2 and percent of time SpO2 is < 90% out of total sleep time evaluates for hypoxemia associated with obstructions during sleep • **Hypoventilation** – end-tidal or transcutaneous CO2 > 50mmHg that persists for more than 25% of the total sleep time • Diagnosis and management should be recommended based on the results of the PSG.
5	Sleep study request form	Attached on the next page is a copy of the Children's National Medical Center Sleep Study Request Form for a PSG. • The request form has been pre-completed at the bottom to select elective PSG with referring physician and **PCP follow-up**, who are expected to relay results and create a treatment plan with the patient. This should be adequate for a primary care setting for diagnosis and management of OSA. If the ordering provider would like the Sleep Clinic to manage the patient after PSG is completed, then a separate appointment request has to be made to schedule a new patient visit within 1 month after PSG is completed. **NOTE:** Checking the box on the PSG order form for a Sleep Clinic follow-up **WILL NOT** automatically schedule the patient for a new patient visit in Sleep Clinic. In addition to filling the request form out, the most recent **clinic note** AND **face sheet** should be included.

Children's National Hospital | Pediatric Sleep Disorders Laboratory

SLEEP STUDY REQUEST FORM

Phone: (202) 476-2022 Fax: (202) 476-2981

Children's National

PATIENT INFORMATION *(may attach demographic sheet)*

Name: _____ DOB _____ Age ___Y___M Sex: ☐ M ☐ F

Insurance Carrier and ID # _____ **Must** send copy of Insurance card ☐ Done

Address _____

CONTACT INFORMATION Phone (Home) _____ Phone (Work) _____

Phone (Mobile) _____ Email: _____

Referring Physician _____ Specialty _____ Phone _____ Fax _____

Primary Care Physician _____ Phone _____ Fax _____

Ordering Physician Signature _____ Date _____

Reason for sleep study referral _____

NOTE: PLEASE ATTACH A COPY OF THE PATIENT'S MOST RECENT CLINICAL ENCOUNTER DOCUMENTING DETAILS OF THE SLEEP HISTORY, PHYSICAL EXAM AND REASON FOR REFERRAL

PRESENTING COMPLAINTS *(check all that apply)*

- ☐ Loud snoring
- ☐ Chocking/gasping arousals
- ☐ Observed apneas in sleep
- ☐ Restless sleep
- ☐ Nocturnal diaphoresis
- ☐ Enuresis
- ☐ Cyanosis/hypoxia
- ☐ ALTE
- ☐ Apnea of prematurity
- ☐ On O2
- ☐ On ventilator
- ☐ Tracheostomy
- ☐ On CPAP/BiPAP
- ☐ Daytime sleepiness
- ☐ Mood/behavior problems
- ☐ Attention problems/ADHD
- ☐ Academic concerns
- ☐ Bedtime resistance
- ☐ Difficulty falling asleep
- ☐ Night awakenings
- ☐ Insufficient sleep
- ☐ Inadequate sleep hygiene
- ☐ Restless legs symptoms
- ☐ Sleepwalking
- ☐ Sleep terrors
- ☐ Circadian rhythm disruption
- ☐ Nocturnal seizures
- ☐ Other

RISK FACTORS/MEDICAL CONDITIONS *(check all that apply)*

- ☐ Adenotonsillar hypertrophy
- ☐ S/P T&A Date _____
- ☐ Obesity BMI _____
- ☐ Allegies
- ☐ Asthma
- ☐ Family history OSA
- ☐ Gastroesophageal reflux
- ☐ Craniofacial anomalies
- ☐ Down syndrome
- ☐ Neuromuscular disease/CP
- ☐ Developmental delay/MR
- ☐ Sickle cell disease
- ☐ Cystic fibrosis
- ☐ Prematurity/BPD
- ☐ Tracheostomy
- ☐ Seizures (type) _____
- ☐ Other

Previous sleep studies? ☐ Yes ☐ CNH Lab? ☐ Other lab? *(if so, please attach previous sleep study results)*

POLYSOMNOGRAM REQUESTED: ☐ Elective ☐ Urgent ☐ Pre-op Surgery date _____

- ☐ **PSG** 95810 (95782 for < 6 yrs old)
- ☐ **PSG + CPAP/BiPAP titration (initial)** 95811 (95783 for < 6 yrs old)
- ☐ **PSG + MSLT** 95810 + 95805 (or 95782)
- ☐ **PSG + CPAP/BiPAP titration (repeat)** 95811 (or 95783) Current Settings _____
- ☐ **PSG + Seizure montage** 95810 or 95782
- ☐ **PSG + Other (Ventilator, 02, Tracheostomy)** 95810 or 95782 *(requires referral by a pediatric pulmonologist)*

FOLLOW UP *(please check one)* ☐ CNH Sleep Clinic _____ ☒ Referring physician ☒ PCP ☐ Other _____

SPECIAL INSTRUCTIONS _____

FOR SLEEP LABORATORY USE ONLY: ☐ Sleep Study Request reviewed and approved by Gustavo Nino, M.D., Medical Dorector
☐ Not approved ☐ Approval Pending

Comments: _____ Signature: _____ Date: _____

Radiology: Imaging Considerations for Children with Obesity

Background: Several important factors must be considered when ordering a diagnostic imaging exam for your patient with obesity. These pertain to not only the feasibility of the exam (will the patient fit in the MRI scanner?), but also image quality (will the clinical question be answered?) and radiation safety (is the CT dose increased in larger patients?). This guideline will address these concerns from both modality-based and condition-specific approaches with the intention of providing the appropriate imaging services for the patient with obesity and minimizing the number of cancelled or unsuccessful exams.

<table>
<tr><th>Imaging Concerns</th><th>General Considerations</th></tr>
<tr><td>Does the patient have limited mobility?</td><td>• Assess patient's ability to stand, lie flat, get on and off of the imaging table/gantry or roll comfortably
• Assist patients with limited mobility with positioning for the imaging exam
• Consider recruiting additional personnel or using patient lifting equipment to minimize risk of injury to both patient and imaging technologist
• Notify technologist ahead of time to procure necessary additional resources prior to patient arrival for efficiency</td></tr>
<tr><td>Can the patient perform a breath hold?</td><td>• Consider that CT and MRI of the chest, abdomen and pelvis, as well as certain US exams require breath holding
• Consider that limited breath holding capability may degrade image quality due to motion artifact</td></tr>
<tr><td>Table weight limits and gantry size
<table><tr><th>CNH Imaging Modality</th><th>Table Weight Limit (kg)</th></tr><tr><td>MRI</td><td>227</td></tr><tr><td>ED x-ray</td><td>225</td></tr><tr><td>Main campus radiology department x-ray</td><td>300</td></tr><tr><td>Main campus fluoroscopy</td><td>250</td></tr></table></td><td>• Consider table weight limits for X-ray, fluoroscopy, CT, MRI, nuclear medicine and DEXA to ensure patient safety and prevent equipment damage.
• Patient diameter may exceed size of CT scanner, MRI scanner, fluoroscopy table and DEXA machine.
• CT and MR imaging table will account for some of the diameter of the imaging gantry, reducing the space available for the patient.
• Ordering provider, scheduler or patient/family may call ahead of time to verify the patient does not exceed the table weight limit and diameter in order to avoid cancellation on the day of the exam.
• Table weight limits and gantry diameter vary across locations.
• Higher table weight limits, larger table sizes and increased gantry diameter may be available in the future as manufacturers consider the needs of patients with obesity.</td></tr>
</table>

Imaging Modality	Modality-Specific Considerations[1-5]	Modality-Specific Limitations
X-ray and fluoroscopy	• Absorbed radiation dose is increased in patients with obesity. • Increased body thickness degrades image quality due to increased scatter and noise. This is exacerbated with portable x-ray technique; therefore imaging in the radiology department is preferred when possible. • The imaging technologist or radiologist will adjust technique in order to balance image quality with radiation dose.	• Restricted patient positioning and limited mobility may lead to non-diagnostic image quality, necessitating repeat imaging. • Multiple images may be needed to cover the anatomy of interest (e.g. the abdomen) in large patients, further increasing radiation dose. • Patient size and weight may exceed table dimensions or weight limits. Ultimately CT may be required.
Ultrasound	• Image resolution decreases at greater depth from the skin surface and the sound beam is attenuated by subcutaneous and intraperitoneal fat, limiting visualization of solid organs in patients with obesity.	• Abdominal ultrasound may be the imaging modality most limited by large body habitus. • A non-diagnostic US due to obesity may cause delays in diagnosis of urgent conditions such as appendicitis, biliary disease or joint effusion. • Consider the use of CT/MRI in its place.
CT	• Image quality and radiation dose concerns are similar to those for x-ray. • The imaging technologist will adjust technique in order to balance image quality with radiation dose.	• Patient size and weight may exceed gantry dimensions or weight limits. • The imaging field of view is smaller than the gantry diameter; thus, even if the patient fits into the gantry, the peripheral soft tissues may be cropped from the image. • Photon starvation artifact may severely limit image interpretation.

Imaging Modality	Modality-Specific Considerations[1-5]	Modality-Specific Limitations
MRI	• Lengthy imaging time places the patient at risk for claustrophobia, anxiety and discomfort. • Additional sequences may be required to optimize image quality and resolve imaging artifacts related to size, further extending imaging time. • Open MRI can accommodate a larger patient diameter and weight; however the magnetic field strength and gradient strength are lower than traditional MRI scanners, compromising image quality.	• Concerns regarding gantry diameter and weight limits are similar to those for CT. • Additionally, skin burns may result from radiofrequency deposition if the patient's skin is in contact with the gantry. • Large patient size contributes to decreased signal-to-noise ratio, wrap-around artifact and increases in imaging time as well as magnetic field strength and radiofrequency (heat) deposition. • The use of larger surface coils in order to cover the desired anatomy may degrade image quality.
Nuclear medicine	• Larger patients receive a higher injected radiopharmaceutical dose as there is more tissue to traverse. • If the calculated weight-based dose exceeds national guidelines for dose limits, the radiologist must decide whether to increase the dose above these limits in order to produce a diagnostic quality image. • Alternatively, imaging time may be extended instead of increasing the dose, which may lead to longer sedation or patient discomfort and motion artifacts. • Nuclear medicine technologists are also exposed to these higher diagnostic doses. • Large patient size may require additional imaging views, prolonging imaging time.	• The gamma camera weight limit may be exceeded by patients with obesity. • Mobile gamma cameras may be available in some institutions, but are not currently available at CNH. • The same limitations of gantry diameter for CT scan apply for patients undergoing PET/CT or SPECT/CT, which may be utilized for lung perfusion imaging, MIBG and bone scans. • Image quality is degraded by decreased signal-to-noise ratio, increased scatter and poor target-to-background ratio. • Adipose tissue and skin folds may lead to attenuation artifacts, which are particularly relevant to myocardial perfusion SPECT. • SUV may be overestimated on PET scans of patients with obesity.
DEXA		• Table weight limits • Patient diameter
Interventional radiology	• Instruments of the appropriate length (needles, catheters), may not be readily available and may need to be ordered in advance. • Difficulty with airway management and IV access during sedation.	• Concerns regarding table weight limits, patient diameter and radiation dose are similar to those for fluoroscopy and CT. • US-guided procedures face the same limitations due to obesity as diagnostic imaging with US.

Disease	Diagnosis-Specific Considerations
Appendicitis[6-9]	*No consensus guidelines exist in the literature. Data on the effect of BMI percentile on the diagnostic performance of US are variable.* • US may not adequately penetrate the increased soft tissue in patients with obesity. • US may be associated with higher rates of non-diagnostic or inaccurate studies in patients with overweight/obesity, particularly those with low pre-test probability of appendicitis[6,9]. • The high positive predictive value of US for appendicitis in patients with obesity may be adequate to justify its use, particularly in patients with high pre-test probability of appendicitis[8]. • In select patients, consider early use of CT/MR in place of US in order to avoid delays in diagnosis. This must be weighed against the increased radiation dose in larger patients. • According to the American College of Radiology (ACR) Appropriateness Criteria, CT or MRI "may be appropriate" as the initial imaging study for a patient with intermediate or high clinical risk for appendicitis, and is "usually appropriate" for an equivocal or nondiagnostic US (2018).
Arthritis- infectious/ inflammatory or degenerative	• According to the ACR Appropriateness Criteria, x-ray and MRI are both considered usually appropriate and complementary in the workup of rheumatoid arthritis and seronegative spondyloarthropathy (adults; 2016).
Biliary disease	• Due to increased soft tissue the US beam may not adequately penetrate the liver to visualize the gallbladder and biliary tree. Imaging may be further limited by hepatic steatosis, which attenuates the ultrasound beam. • MRI/MRCP may be necessary for satisfactory visualization of the gallbladder and biliary tree and is preferred over CT when US is inadequate.
Blount's disease	• Knee radiographs are likely to be adequate for evaluation of knee pain and suspected Blount's disease in the patient with obesity.
Hepatic steatosis and fibrosis[10-14]	• Hepatic steatosis may limit the visualization of subtle liver masses or biliary ductal abnormalities. • US elastography for fibrosis can usually be performed successfully in patients with obesity, however MR elastography may be indicated if US is non-diagnostic. • An increased skin-to-liver capsule distance may decrease the reliability of US elastography, as indicated by an interquartile range/median of ≥30%. • Elastography values may be falsely elevated in the setting of cholestasis or acute parenchymal edema/inflammation. • There is conflicting evidence regarding whether hepatic steatosis affects US elastography values.

Disease	Diagnosis-Specific Considerations
Joint effusion/septic arthritis	• Due to the depth of the hip joint and overlying soft tissue, US may be of limited diagnostic value for visualization of hip joint effusions in patients with obesity. Diagnostic performance may be improved for knee and ankle joints as well as upper extremity due to their more superficial location. • Consider limited MRI for evaluation for hip joint effusion. Osseous changes would also be visualized with MRI. • According to the ACR Appropriateness Criteria, x-ray and MRI are "usually appropriate" in the workup of suspected septic arthritis.
Ovarian torsion	Transabdominal US may not be adequate for visualization of the ovaries. Consider transvaginal US in the appropriate patients. Alternatively, consider pelvic MRI without and with contrast, particularly in patients who are not sexually active or when US is inconclusive. According to the ACR Appropriate Criteria, CT "may be appropriate if US inconclusive or nondiagnostic and MRI is not available" for acute pelvic pain in the reproductive age group (negative β-hCG; 2015).
Polycystic ovarian syndrome[15-19]	• Transabdominal US may not be adequate for visualization of the ovaries. Consider transvaginal US in the appropriate patients. • Alternatively, consider pelvic MRI without contrast, particularly in patients who are not sexually active. • Ovarian volume and antral follicle count may be higher with MRI compared to US. • According to ACR Appropriateness Criteria non-contrast pelvic MRI "may be appropriate" for initial imaging in suspected PCOS (2019).
Post-operative leak study	• Post-bariatric surgery fluoroscopic evaluation for leak may be limited by patient size and image quality. For these patients, consider the use of serial abdominal radiographs or abdominal CT following oral contrast administration[4].
Precocious puberty	• Adnexal and adrenal tumors may not be effectively excluded by ultrasound in the setting of obesity. Consider MRI. • According to the ACR Appropriateness Criteria, US is "usually appropriate" and MRI "may be appropriate" for premenopausal women with clinically suspected adnexal mass without acute symptoms (2018).
Pseudotumor cerebri	• Increased size of the patient's shoulders may pose difficulty with positioning in the MRI scanner.
SCFE	• Panniculus and excess soft tissue over the hips may reduce the sensitivity of radiographs in detecting SCFE. • MRI is more sensitive than x-ray in detecting early slippage or "pre-slip." A rapid MRI protocol without contrast may be appropriate if radiographs are inconclusive or negative with continued clinical suspicion for SCFE[20].

RECOMMENDATIONS

- Consider including the diagnosis of "obesity" in the imaging requisition, as this will help the imaging team prepare for the exam. Specialized equipment or additional personnel may be necessary.
- Speak to a radiologist to develop a personalized diagnostic imaging plan. He/she may recommend an alternate imaging modality. The radiologist can also answer questions regarding the need for intravenous and/or oral contrast for CT and MRI.
- Advise the patient/family that additional radiologic studies may be needed to answer the clinical question. In emergent/urgent conditions, a more aggressive imaging strategy may be appropriate, such as forgoing US for CT/MRI in cases of suspected appendicitis.

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ALGORITHM 1: MANAGING OBESITY IN PATIENTS 2 TO 18 YEARS OLD

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ALGORITHM 2: DYSLIPIDEMIA IN THE PEDIATRIC POPULATION

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ALGORITHM 5: PREDIABETES AND T2DM IN CHILDREN AND ADOLESCENTS

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ALGORITHM 6: ALT LAB FOR NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD)

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ALGORITHM 7: HIDRADENITIS SUPPURATIVA (HS)

- Alikhan, A., Sayed, C., Alavi, A., Alhusayen, R., Brassard, A., Burkhart, C., Crowell, K., Eisen, D. B., Gottlieb, A. B., Hamzavi, I., Hazen, P. G., Jaleel, T., Kimball, A. B., Kirby, J., Lowes, M. A., Micheletti, R., Miller, A., Naik, H. B., Orgill, D., & Poulin, Y. (2019). North American clinical management guidelines for hidradenitis suppurativa: A publication from the United States and Canadian Hidradenitis Suppurativa Foundations. Journal of the American Academy of Dermatology, 81(1), 91–101. https://doi.org/10.1016/j.jaad.2019.02.068
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ALGORITHM 8: ACANTHOSIS NIGRICANS

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ALGORITHM 9: OBSTRUCTIVE SLEEP APNEA (OSA)

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Fast Referral Recommendation Guide

Subspecialty: IDEAL(Obesity) Clinic

Age Limits <19yo (young adults with special health care needs followed at Children's National also accepted

Referral Criteria	Special Instructions	Adult Referral Option
• Consider Referral after 2-3 months of PCP management monthly with no improvement in: – BMI >99th percentile OR – Lab abnormalities/comorbidities in patient with BMI >95th percentile. **Consider immediate referral for:** • Co-management for monogenetic obesity syndromes • Medical weight management as part of patient's treatment plan(i.e. SCFE or Blount's Dz, Intracranial HTN, Severe OSA) • Consultation for treatment of severe obesity with pharmacotherapy or bariatric surgery	**Fasting** Labs **(MANDATORY)** before referral: • Insulin • CMP • HA1C • TSH • 25 Hydroxy, Vitamin D • Lipid profile	**DC Medicaid Eligible ONLY & Non-Medicaid** GW Weight Loss Clinic 22nd & I Street NW 3rd Floor and 4th Floor Washington, DC 20037 (202) 741-2222 **Holy Cross Hospital** 1500 Forest Glen Road Silver Spring, MD 20910 301-754-7803 Nutrition counseling & Bariatric Surgery **Howard University Hospital & Washington Hospital Center** offer Bariatric Surgery ONLY Out of Network National Center for Weight & Wellness 1020 19th Street NW, Suite 450 Washington, DC 20036 202-223-3077 **Inova Fair Oaks Medical Campus** 3600 Joseph Siewick Drive Fairfax, VA 22033 703-348-4716

Dyslipidemia in lipid panel
- LDL-C ≥ 130 mg/dL
- TG ≥ 100 mg/dL in < 10 yo
- TG ≥ 130 mg/dL in ≥ 10 yo
- TC ≥ 200 mg/dL
- Non-HDL-C ≥ 145 mg/dL
- HDL-C < 40 mg/dL

Impaired FPG
> 100 mg/dL

Elevated ALT
Girls: ≥ 50 U/L
Boys: ≥ 70 U/L

HA1C
≥ 6%

Subspecialty: Nutrition Clinic		Age Limits <19yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
Consider families needing more guidance on nutrition. In addition to medical nutrition therapy for: • Weight management/ overweight • Underweight/poor growth • Prediabetes • Type II Diabetes Mellitus • High Cholesterol/Lipids • Renal **Telehealth appointments available*	**Main Hospital** 111 Michigan Ave., NW, First Floor, Washington, DC 20010 Diabetes Care Complex (DCC) Phone: 202-476-5631 **Shaw Metro** 641 S St. NW, Washington, DC 20001 Phone: 202-476-2123 **Prince George's County Outpatient** 2900 Campus Way North, Second Floor, Lanham, MD 20706 Phone: 301-276-9100 **Montgomery County** 9850 Key West Ave., Rockville, MD 20850 Phone: 301-765-5400 **Annapolis** 1730 West St., 1st Floor, Suite 100, Annapolis, MD 21401 Phone: 410-266-6582 **Howard County** 7625 Maple Lawn Blvd., Suite 230, Fulton, MD 20759 Phone: 301-847-2900	**GW Nutrition Clinic** (DC Medicaid ONLY & Non-Medicaid): 202-741-2222

Subspecialty: Adolescent Clinic		Age Limits <22yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
PCOS • Refer to Adolescent medicine for atypical presentation or if any support needed in diagnosis, treatment, and long-term management • Consider diagnosis of PCOS by 2 of 3 criteria below after exclusion of other etiologies: 1. Oligo and/or anovulation 2. Biochemical and/or clinical signs of hyperandrogenism: - Total testosterone >70 ng/dL, androstenedione >245 ng/dL, DHEA-S >248 ug/dL - clinical: acne, hirsutism, acanthosis nigricans 3. Polycystic ovaries ****Refer to PEDIATRIC GYNECOLOGY if Symptoms present in patients <12yo**	**Essential Screening Tests:** • Beta hCG • TSH • 17-Hydroxyprogesterone • Serum total AND free testosterone • FSH • LH • DHEAS **If the following abnormalities are found on screening refer patient to ENDOCRINOLOGY:** • Elevated FSH (see lab reference values) • Low LH (see lab reference values) • Prolactin > 25 • DHEAS > 600 ug/dL • Early morning 17-Hydroxyprogesterone > 170 ng/dL • Serum total testosterone > 150 ng/dL	**George Washington University** (DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Cardiology Clinic		**Age Limits** <19yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
Dyslipidemia LDL-C ≥ 130-159 mg/dL • 2 high level risk factors **OR** • 1 high level + 2 moderate level risk factors 2 or clinical CVD LDL-C ≥ 160 mg/dL Family history (+) **OR** 1 high level risk factor **OR** ≥ 2 moderate level risk factors **Blood Pressure** Only if Upper > 20 mmHg than lower on repeated BP Check **Refer to Lipidologist:** • TC> 200 mg/dl • TG> 250 mg/dl • TG/HDL >2.5 and non-HDL >145mg/dL	* Cardiology referral not necessary for hypertension if no differential in upper and lower extremities (please refer to nephrology) * Further testing for RVH may be completed by nephrology referral after nephrology visit	**George Washington University** (DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Dermatology Clinic		**Age Limits** <19yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
Poorly controlled Hidradenitis Supparativa		**George Washington University** (DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Ear Nose & Throat (ENT) Clinic		**Age Limits** <22yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
Habitual snoring ≥3 nights/week • Loud snoring • Witnessed apneas **Positive OSA on Sleep Study** **Physical Exam Findings or Red Flags:** • Tonsillar Hypertrophy • Turbinate Hypertrophy • Craniofacial abnormalities • Jaw structure (overbite), high-arched and narrow hard plate • Poor growth • Pulmonary hypertension	Sleep Study may be ordered by PCP, ENT, Sleep medicine (Pulmonary) depending on resources available. Sleep study requests **NEEDS:** • Sleep study request form • Most recent clinic note • Face sheet	**George Washington University** (DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Endocrinology Clinic		**Age Limits** <19yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
Prediabetes Clinic "Low Risk Prediabetes"(5.7-6%)Confirm prediabetes diagnosis with FPG or non-fasting plasma glucose "High Risk Prediabetes"(6.0-7%) Confirm "high risk" prediabetes or diabetes diagnosis with **FASTING Plasma Glucose**(100-125mg/dL) OR HA1C(6-7%) **T2DM Clinic** Confirm diabetes diagnosis with FPG(>125mg/dL) or HA1C(>7%)	- If plasma glucose > 250 mg/dL patient requires immediate intervention, refer to Diabetes program or Emergency Department * Not recommended to collect 2-hr OGTT prior to any specialist or specialty clinic referrals6 ***Provider may fax lab results to 202-476-4095 w/contact information for family. Family contacted directly for appt.**	**George Washington University** (DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Genetics Clinic		**Age Limits** any age
Referral Criteria	**Special Instructions**	**Adult Referral Option**
We suggest genetic testing in patients with extreme early onset obesity (before 5 years of age) and that have clinical features of genetic obesity syndromes (in particular extreme hyperphagia or neurodevelopmental delays) and/or a family history of severe obesity		**George Washington University** (DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: GI/Intestinal Rehabilitation Clinic		**Age Limits** <19yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
ALT >1-2x normal limits after 1 year repeat G: 25-50 U/L B: 35-70 U/L **ALT>80 after 3-6 month repeat or if above following levels consider additional screening** G: >44 U/L B: >52 U/L **Any signs of liver disease or abnormalities on infection/autoimmune screening labs - immediate referral**	*If labs improving each year to lower category, okay to repeat in 1 year and monitor *Routine outpatient ultrasound is NOT recommended due to low sensitivity and specificity. **- Lab work for referral (or PCP management):** • CBC • INR • CMP +GGT • HbA1c • Infectious hepatitis screen (ABC) • Alpha-1 antitrypsin deficiency screen • Wilson disease screen • Autoimmune hepatitis screen • Celiac disease screen • Lysosomal acid lipase deficiency screen	**George Washington University** (DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Nephrology Clinic		**Age Limits** <22yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
• Uncontrolled Elevated BP • Uncontrolled Stage I BP • Uncontrolled Stage II BP	**Necessary Labs:** • Urinalysis • BMP • Obesity Labs(Lipid Panel, ALT, Hemoglobin A1c) • Renal ultrasonography in those <6 years or those with abnormal urinalysis or renal function **Optional:** • Fasting serum glucose for those at high-risk for diabetes mellitus • TSH • Drug screen • Sleep study (if loud snoring, daytime sleepiness or reported history of apnea) • CBC, especially in those with growth delay or abnormal renal function	**George Washington University** (DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Orthopedics Clinic		**Age Limits** <19yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
• Slipped capital femoral epiphysis (SCFE) • Blount's disease		**George Washington University**(DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Pediatric Adolescent Gynecology Clinic (Washington Hospital Center)		**Age Limits** <22yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
PCOS Refer to pediatric gynecology if symptoms present in patients <12yo		**George Washington University**(DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Physical Medicine Rehabilitation (PMR)		**Age Limits** <19yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
Consider referral to Physical Medicine and Rehabilitation for evaluation of functional status, pain, mobility		**George Washington University** (DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Subspecialty: Radiology		**Age Limits** any age
Referral Criteria	**Special Instructions**	**Adult Referral Option**
• Speak to a radiologist to develop a personalized diagnostic imaging plan. They may recommend an alternate imaging modality. The radiologist can also answer questions regarding the need for intravenous and/or oral contrast for CT and MRI.	• Consider including the diagnosis of "obesity" in the imaging requisition, as this will help the imaging team prepare for the exam. A radiologist or technologist may contact you to discuss the imaging strategy and may suggest an alternate modality. • Questions regarding table weight limits and gantry size are best answered by the imaging technologist, who may be more familiar with the equipment specifications than the radiologist.	**Radiology Georgetown:** 202-444-3400 **George Washington University**(DC Medicaid ONLY & Non-Medicaid): 202-715-5203 **Howard University Hospital**: 202-865-3610 **Providence Hospital:** 202-269-7226 **Washington Hospital Center**: 202-877-2400

Subspecialty: Sleep Medicine		**Age Limits** <19yo
Referral Criteria	**Special Instructions**	**Adult Referral Option**
Conduct sleep study and request Sleep Medicine follow up to be scheduled.	Sleep Study may be ordered by PCP, ENT, sleep medicine (pulmonary) depending on resources available. Sleep study requests needs: • Sleep study request forms • Most recent clinic note • Face sheet	**George Washington University**(DC Medicaid ONLY & Non-Medicaid) Phone: 202-715-4000 **Howard University** Phone: 202-865-7677 **Washington Hospital Center** Phone: 202-877-3627

Children's National Subspecialist Contact List (Chronic Disease Prevention)

CHILDREN'S NATIONAL	TELEPHONE
Adolescent	202-476-5464
Cardiology(Preventive)	202-476-2020
Dermatology	202-476-7546
Endocrinology(PreDiabetes/Diabetes)	202-476-3440
Dietitian/Outpatient Nutrition	
Diabetes Care Complex (main hospital)	202-476-5631
CHC Shaw	202-476-2123 (Option 3)
PG County ROC	301-276-9100
Montgomery County ROC	301-765-5400
Annapolis ROC	410-266-6582
Howard County	ROC 301-847-2900
ENT	202-476-2159
Genetics	202-545-2500
GI (Hepatology)	202-476-3032
Gynecology (Pediatric/Adolescent) *Washington Hospital Center*	202-877-7000
IDEAL (Weight Management)	202-476-7200
IMPACT DC	202-476-3970
Nephrology	202-476-2090
Ophthalmology	202-476-3015
Orthopedics	202-476-2112
Physical Medicine/Rehabilitation (Occupational/Physical Therapy)	202-476-3094
Psychology	202-729-3300
Radiology	202-476-4700
Pulmonology	202-476-2128
Sleep Medicine/Sleep Study	202-476-2022

COMMUNITY PROVIDERS	TELEPHONE
Radiology	
Georgetown University Hospital	202-444-3400
GW University Hospital	202-715-5203
Howard University Hospital	202-865-3610
Providence Hospital	202-854-7560
Washington Hospital Center	202-877-9729
United Medical Center	202-574-6581
Adult Specialties	
GW University	202-715-4000
Howard University	202-865-7677
Washington Hospital Center	202-877-3627

Common Weight Associated Medications

	Significant Weight Gain	Small to Neutral Weight Gain	Weight Loss (neutral to mild)
ADHD		• Guanfacine(Intuniv)	• Atomexitine(Strattera) • Lisdexamfetamine(Vyvanse) • Amphetamine • Methylphenidate
Antidepressants	• Lithium • Amitriptyline(TCA) • Olanzapine(Zyprexa) • Duloxetine(Cymbalta) • Escitalopram(Lexapro) • Citalopram(Celexa) • Nortriptyline • Desipramine • Imipramine • Doxepin • Mirtazapine • Paroxetine	• Sertraline(Zoloft) • Fluoxetine(Prozac) • Trazodone • Venlafaxine • Fluvoxamine	• Bupropion (Wellbutrin)
Anti-epileptic	• Pregabalin(Lyrica) • Valproate • Vigabatrin • Gabapentin	• Lamotrigine (Lamictal) • Levetiracetam (Keppra) • Carbamezapine(Tegretol) • Oxocarbazepine (Trileptal) • Phenytoin	• Topiramate (Topamax) • Zonisamide • Felbamate
Antipsychotics	• Clozapine • Olanzapine (Zyprexa) • Chlorpromazine • Quietapine (Seroquel) • Risperidone (Risperidal)	• Aripiprazole (Abilify) • Holoperidol (Haldol) • Ziprasidone	
Anxiolytics		• Lorazepam (Ativan) • Diazepam (Diastat) • Oxazepam	
Migraine	• Divalproex (Depakote) • Amitriptyline(TCA) • Flunarizine • Gabapentin	• Levetiracetam (Keppra) • Timolol	• Topiramate (Topamax) • Zonisamide
Mood Stabilizers	• Valproate • Lithium • Gabapentin		• Topiramate (Topamax)
Diabetes Medications	• Insulin & Analogs • Pioglitazone • Glipizine • Glyburide		• GLP-1 Receptor Agonists (Semaglutide, Liraglutide, Exanatide, Dulaglutide) • Metformin
Cardiac and Miscellaneous Medications	• Beta Blockers (Propranolol, Metoprolol, Atenolol) • Glucocorticoids (i.e. Prednisone) • Gleevac • Depo Provera	• Oral Contraceptive Pills • Benzodiazepines • Statins • Antihistamines(Benadryl) • Carvedilol	• ACE Inhibitor (Lisinoppril, Enalapril) • ARB (Losartan)

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