ARNOLD PALMER HOSPITAL FOR CHILDREN
PEDIATRIC OBESITY TOOLKIT FOR PROVIDERS

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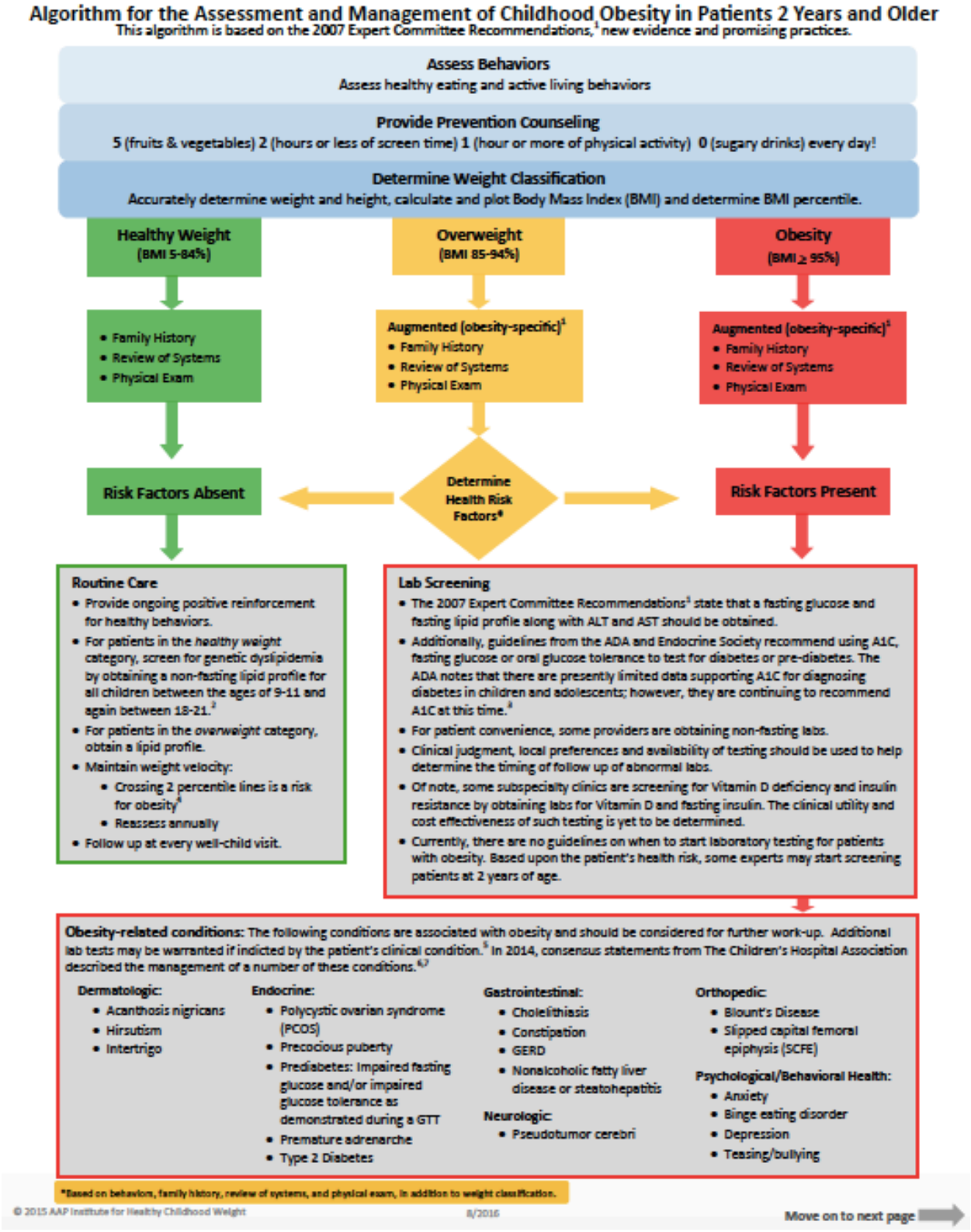
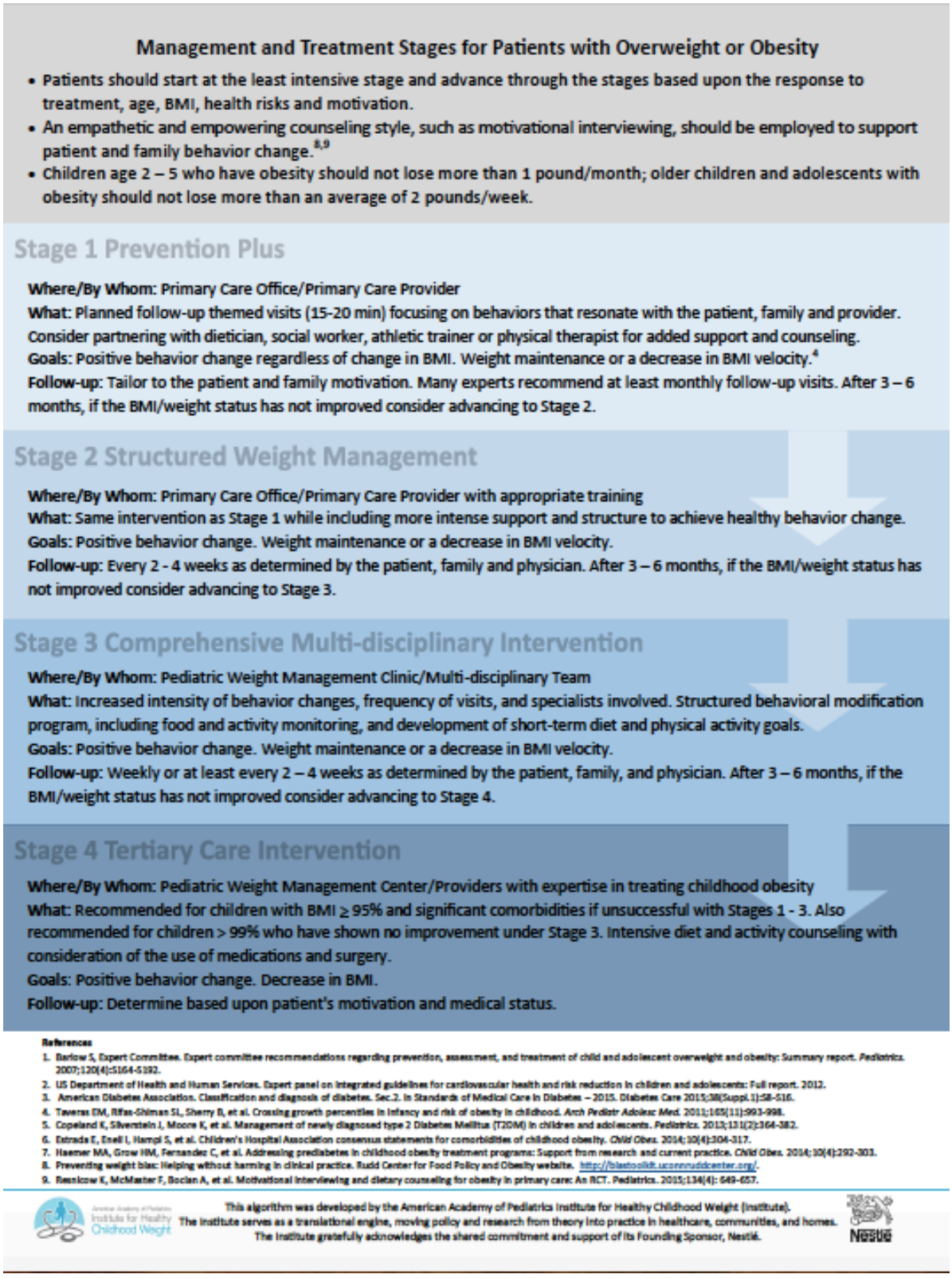
1. Algorithm for the Assessment and Management of Childhood Obesity in Patients 2 Years and Older



2. Management and Treatment Stages for Patients with Overweight and Obesity



Management and Treatment Stages for Patients with Overweight or Obesity

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

Stage 1 Prevention Plus

Where/By Whom: Primary Care Office/Primary Care Provider
What: Planned follow-up themed visits (15-20 min) focusing on behaviors that resonate with the patient, family and provider. Consider partnering with dietician, social worker, athletic trainer or physical therapist for added support and counseling.
Goals: Positive behavior change regardless of change in BMI. Weight maintenance or a decrease in BMI velocity.[4]
Follow-up: Tailor to the patient and family motivation. Many experts recommend at least monthly follow-up visits. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 2.

Stage 2 Structured Weight Management

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

Stage 3 Comprehensive Multi-disciplinary Intervention

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

Stage 4 Tertiary Care Intervention

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

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This algorithm was developed by the American Academy of Pediatrics Institute for Healthy Childhood Weight (Institute).
The Institute serves as a translational engine, moving policy and research from theory into practice in healthcare, communities, and homes.
The Institute gratefully acknowledges the shared commitment and support of its Founding Sponsor, Nestlé.

3. BMI Categories

BMI Percentile Range	Weight Category
< 5th Percentile	Underweight
5th Percentile to < 85th Percentile	Healthy Weight
85th to 95th Percentile	Overweight
95th to <99th Percentile	Obese
≥99th Percentile	Severe Obesity

4. Initial Evaluation and Workup for BMI >85th Percentile

- ROS including questions of hyperphagia (may indicate non-syndromic genetic origins for obesity)
- VITAL SIGNS: EVALUATE FOR HYPERTENSION
- PHYSICAL EXAM: ACANTHOSIS NIGRICANS, STRIAE, HIRSUTISM, ACNE, ECT.
- LABS: FASTING GLUCOSE, FASTING LIPID PANEL, AST AND ALT
    - Can consider A1C, CBC with iron studies and Vitamin D levels based on clinical judgement

5. Laboratory Results Guide for Overweight and Obese Pediatric Patients

Test	Results	Action Plan
Fasting Glucose	< 100	Recheck every 2 years
	100-125	Pre-diabetes provide counseling. Consider GGT. Recheck yearly, consider Endocrine referral
	≥ 126	Diabetes. Refer to Endocrine
Oral GGT (2-hour)	<140	Recheck every 2 years
	140-199	Pre-diabetes provide counseling. Recheck yearly, consider Endocrine referral
	≥200	Diabetes. Refer to Endocrine
Random Glucose	≥200	Diabetes. Refer to Endocrine
Fasting LDL	<110	Normal
	110-199	Borderline.
	≥130	High- Repeat in 2 weeks-3 months and begin 3-6 months of diet/lifestyle modifications Average of 2 results >160 with risk factors or >190 +/- risk factors consider statins with GI referral If average is >250 refer directly

		to gastroenterology
Fasting HDL	>45	Normal
	40-45	Borderline
	<40	Low
Fasting Triglyceride	See chart below	If high for age, begin 3-6 months of diet/lifestyle modifications and repeat levels in 2 weeks-3 months for average of 2 results If average >500 refer directly to Gastroenterology If >age based limit but <500, continue diet/lifestyle modifications
Liver Function Tests	ALT or AST ≥ 60 x 3 months or ≥ 80 at anytime	Refer to Gastroenterology

Age, yrs	**Normal Reference Value (mg/dL) for Triglycerides**	
	Male	**Female**
8-9	25-90	30-11
10-11	30-105	35-130
12-15	35-130	40-125
16-19	40-145	40-125

6. Metabolic Syndrome in Children

Risk Factor		**Diagnostic Values**
BMI		≥85th percentile
Blood Pressure		≥90th to <95th percentile
Dyslipidemia	HDL	≥40 to ≤45
	TG 0-9yo	≥75 to <100
	TG ≥10yo	≥90-<130
	Non-HDL	≥120 to <144
Glycemia	Fasting glucose	≥100 to <126
	Fasting insulin	≥20

7. Blood Pressure Thresholds

Updated Definitions of Pediatric BP Categories and Stages

	FOR CHILDREN AGED 1—<13 y	FOR CHILDREN AGED ≥13 y
Normal BP	<90th percentile	<120/<80 mm Hg
Elevated BP	≥90th percentile to <95th percentile or 120/80 mm Hg to <95th percentile (whichever is lower)	120/<80–129/<80 mm Hg
Stage 1 HTN	≥95th percentile to <95th percentile + 12 mm Hg or 130/80–139/89 mm Hg (whichever is lower)	130/80–139/89 mm Hg
Stage 2 HTN	≥95th percentile + 12 mm Hg or ≥140/90 mm Hg (whichever is lower)	≥140/90 mm Hg

BP=blood pressure, HTN=hypertension.

Reprinted with permission from Flynn JT, Kaelber DC, Baker-Smith CM, et al; Subcommittee on Screening and Management of High Blood Pressure in Children. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. Pediatrics. *2017;140(3):e20171904*

8. Quick Reference Blood Pressure by Age

Screening BP Values Requiring Further Evaluation

AGE, y	BLOOD PRESSURE, mm Hg			
	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
≥13	120	80	120	80

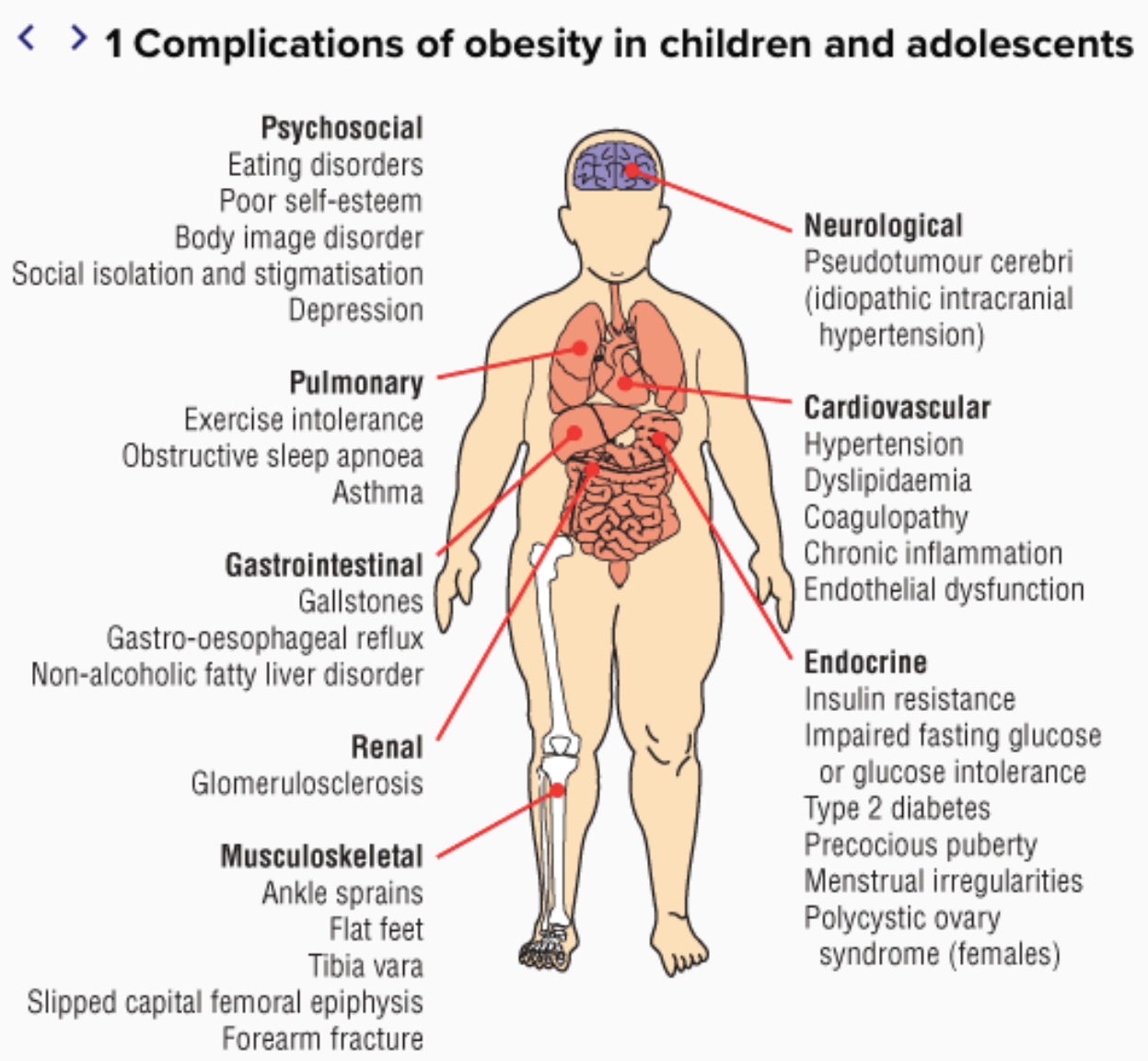
Reprinted with permission from Flynn JT, Kaelber DC, Baker-Smith CM, et al; Subcommittee on Screening and Management of High Blood Pressure in Children. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. Pediatrics. *2017;140(3):e20171904*

9. Patient Evaluation and Management by Blood Pressure Level

BP Category (see Table 3)	BP Screening Schedule	Lifestyle Counseling (Weight, Nutrition)	Check Upper and Lower Extremity BP	ABPM	Diagnostic Evaluation	Initiate Treatment	Consider Sub-specialty Referral
Normal	Annual	X					
Elevated BP	Initial measurement	X					
	Second measurement: Repeat in 6 months	X	X				
	Third measurement: Repeat in 6 months	X		X	X		X
Stage 1 HTN	Initial measurement	X					
	Second measurement: Repeat in 1-2 weeks	X	X				
	Third measurement: Repeat in 3 months	X		X	X	X	X
Stage 2 HTN	Initial measurement	X	X				
	Second measurement: Repeat/refer to specialty care within 1 week	X		X	X	X	X

Flynn JT, Kaelber DC, Baker-Smith CM, et al., and AAP Subcommittee on Screening and Management of High Blood Pressure in Children. Clinical practice guideline for screening and management of high blood pressure in children and adolescents. *Pediatrics.* 2017;140(3):e20171904

10. Obesity-Related Conditions



Adapted from Batch, MJA, 2005

11. Additional Obesity Related Conditions, Workup, Management

PCOS:

- Initial workup
  - Free and total testosterone levels. DHEA
  - Consider 17-hydroxyprogesterone to rule out late onset CAH
  - Consider FSH, LH to evaluate ovarian insufficiency
  - Pelvic ultrasound not indicated in adolescence

- Consider referral to adolescent gynecology or pediatric endocrinology
- Treatment
  - Lifestyle modifications are first line therapy
  - OCPs
    - First line pharmacologic therapy
      - May consider transdermal patch or vaginal ring as options
  - Antiandrogens (i.e., Spironolactone)
    - Consider for bothersome hirsutism
    - Best when used in combination with OCP
  - Metformin
    - Use for evidence of Insulin Resistance
  - Cosmetic hair removal (i.e., waxing, shaving, laser hair removal)

HYPOTHYROIDISM:

- Initial workup
  - TSH, fT4
- Refer to pediatric endocrinology if abnormal labs present

NONALCOHOLIC FATTY LIVER DISEASE

- Initial workup
  - AST, ALT, insulin level, lipid panel, Liver US
- Treatment:
  - Lifestyle modifications + weight loss
  - Consider pediatric gastroenterology referral

VITAMIN D DEFICIENCY:

- Initial workup
  - 25-OH Vitamin D level
  - Lab values (ng/mL)
    - Severe deficiency ≤ 5
    - Deficiency ≤ 15
    - Insufficiency 15-20
    - Sufficiency 50-250
- Treatment
  - Treat when child is deficient
    - 400-800 IU daily for Vitamin D level 20-30 ng/mL
    - 1000 IU daily for Vitamin D level <20 ng/mL
    - 2000 IU daily for prepubertal children with Vitamin D level <10 ng/mL
    - 4000 IU daily for adolescent children with Vitamin D level <10 ng/mL OR
    - Can consider 50,000 IU weekly for 2-3 months for adolescent children with Vitamin D level <10ng/mL* (Not a current AAP guideline but is used in practice by many for compliance)
  - If there is concern for Vitamin D deficiency secondary to malabsorption, consider increased dosing

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