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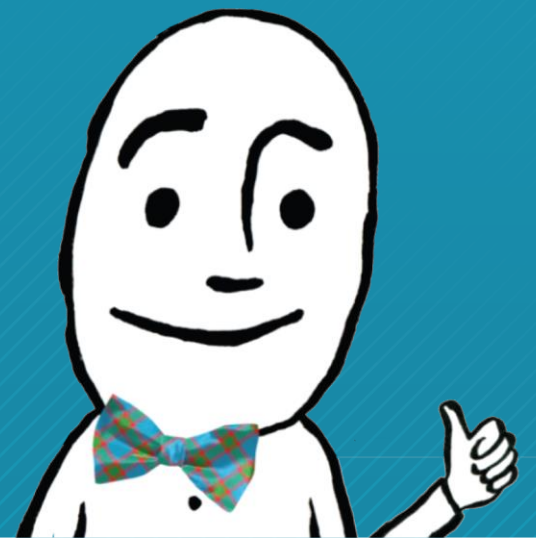
NATIONAL COLLABORATIVE ON CHILDHOOD OBESITY RESEARCH

TODAY'S PROGRAM

1. Welcome
2. Spotlight
   - Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents With Obesity
   - CDC Extended BMI-for-age Growth Charts
3. Q & A
4. NCCOR Announcements



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Today's Speakers

Karen Hilyard, PhD
Moderator

Sarah Hampl, MD, FAAP
University of Missouri-Kansas City School of Medicine

Sandra Hassink, MD, FAAP
American Academy of Pediatrics Institute for Healthy Childhood Weight

Cynthia Ogden, PhD
U.S. Centers for Disease Control and Prevention

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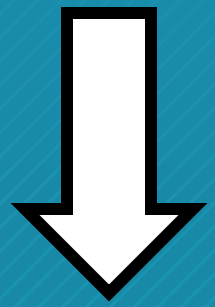
Have a question for our speakers?

Type your question(s) by clicking the Q&A icon located below and a representative will respond shortly.



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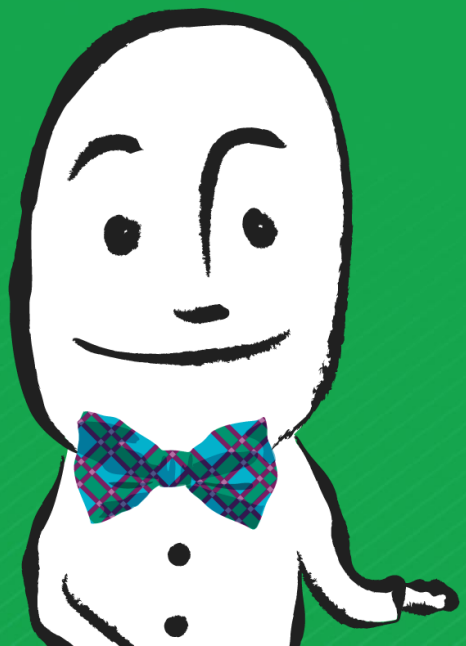
INTERACTIVE POLL



SPOTLIGHT

Evaluation and Treatment of Children and Adolescents with Obesity

An AAP Clinical Practice Guideline

Sandra G. Hassink, MD, FAAP, Medical Director, AAP Institute for Healthy Childhood Weight

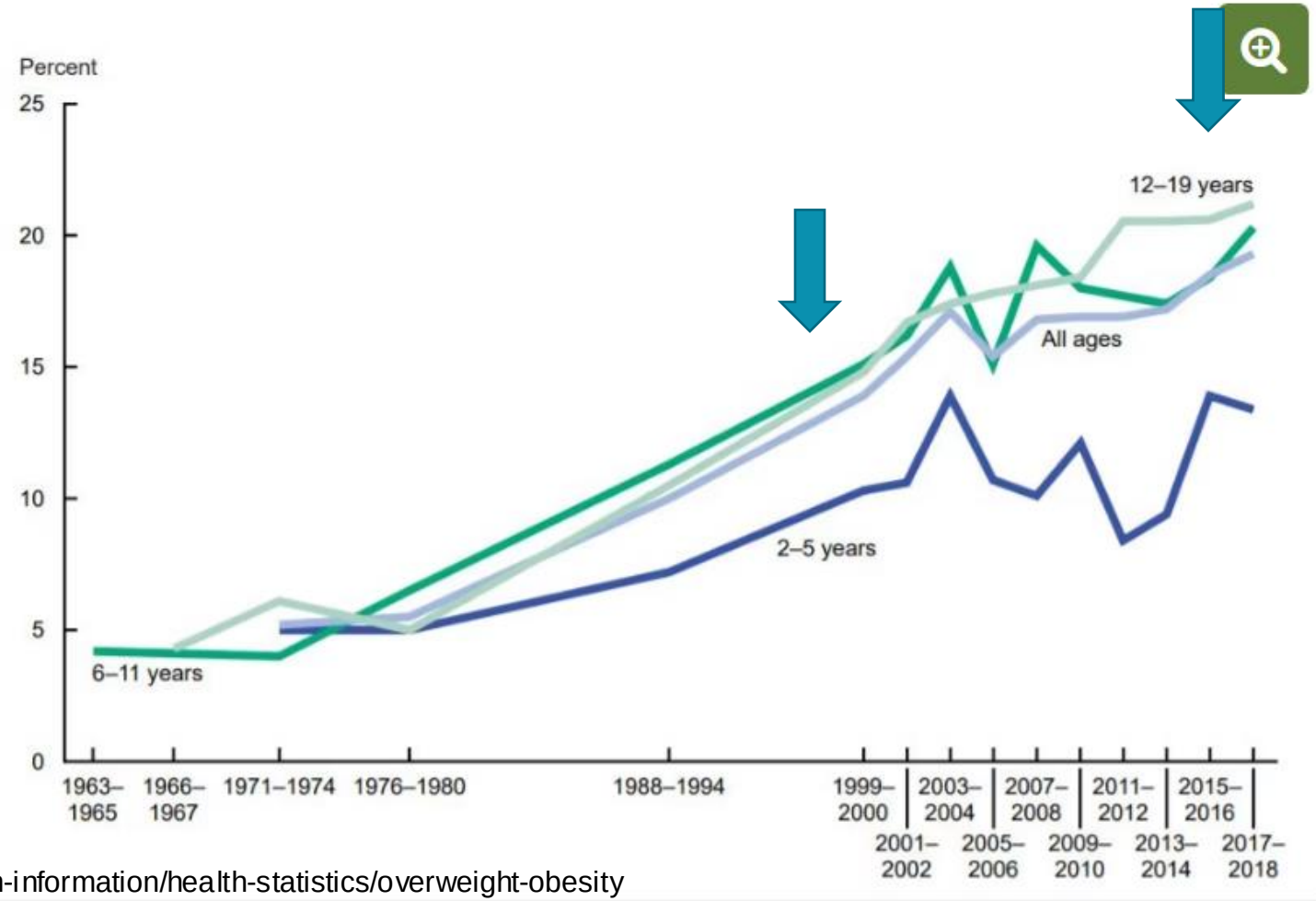
Sarah E. Hampl, MD, FAAP, DABOM, Children's Mercy Kansas City Center for Children's Healthy Lifestyles & Nutrition; University of MO-Kansas City School of Medicine

Disclosures

- We served as the vice-chair and chair of the “Evaluation and Treatment of Children and Adolescents with Obesity” CPG writing committee.
- Sandra is the Medical Director of the AAP Institute for Healthy Childhood Weight.

Youth

Trends in obesity among children and adolescents ages 2–19 years, by age: United States, 1963–1965 through 2017–2018[3]



https://www.niddk.nih.gov/health-information/health-statistics/overweight-obesity

14.1

Million children and adolescents in the United States are affected by obesity

Looking Back – 1997

Expert Committee:
William H. Dietz, MD, PhD
Leonard H. Epstein, PhD
Samuel S. Gidding, MD
John H. Himes, PhD, MPH
Linda Jonides, RN, CPNP
William J. Klish, MD
Thomas N. Robinson MD, MPH
Mary Story, PhD, RD

Sarah Barlow attended and wrote manuscript with references

16 multidisciplinary specialists (physicians, dietitians, nurses, psychologists) reviewed the draft

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS
Pediatrics 2007;120;Supplement 163-288

Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report
Sarah E. Barlow and and the Expert Committee

Assessment of Child and Adolescent Overweight and Obesity
Nancy F. Krebs, John H. Himes, Dawn Jacobson, Theresa A. Nicklas, Patricia Guilday and Dennis Styne

Recommendations for Prevention of Childhood Obesity
Matthew M. Davis, Bonnie Gance-Cleveland, Sandra Hassink, Rachel Johnson, Gilles Paradis and Kenneth Resnicow

Recommendations for Treatment of Child and Adolescent Overweight and Obesity
Bonnie A. Spear, Sarah E. Barlow, Chris Ervin, David S. Ludwig, Brian E. Saelens, Karen E. Schetzina and Elsie M. Taveras

CPG Development

Comprehensive Process

CPG By the Numbers

Methodology – Scope of the Review

Key Question 1

What are clinic-based, effective treatments for obesity?

Key Question 2

What is the risk of comorbidities among children with obesity?

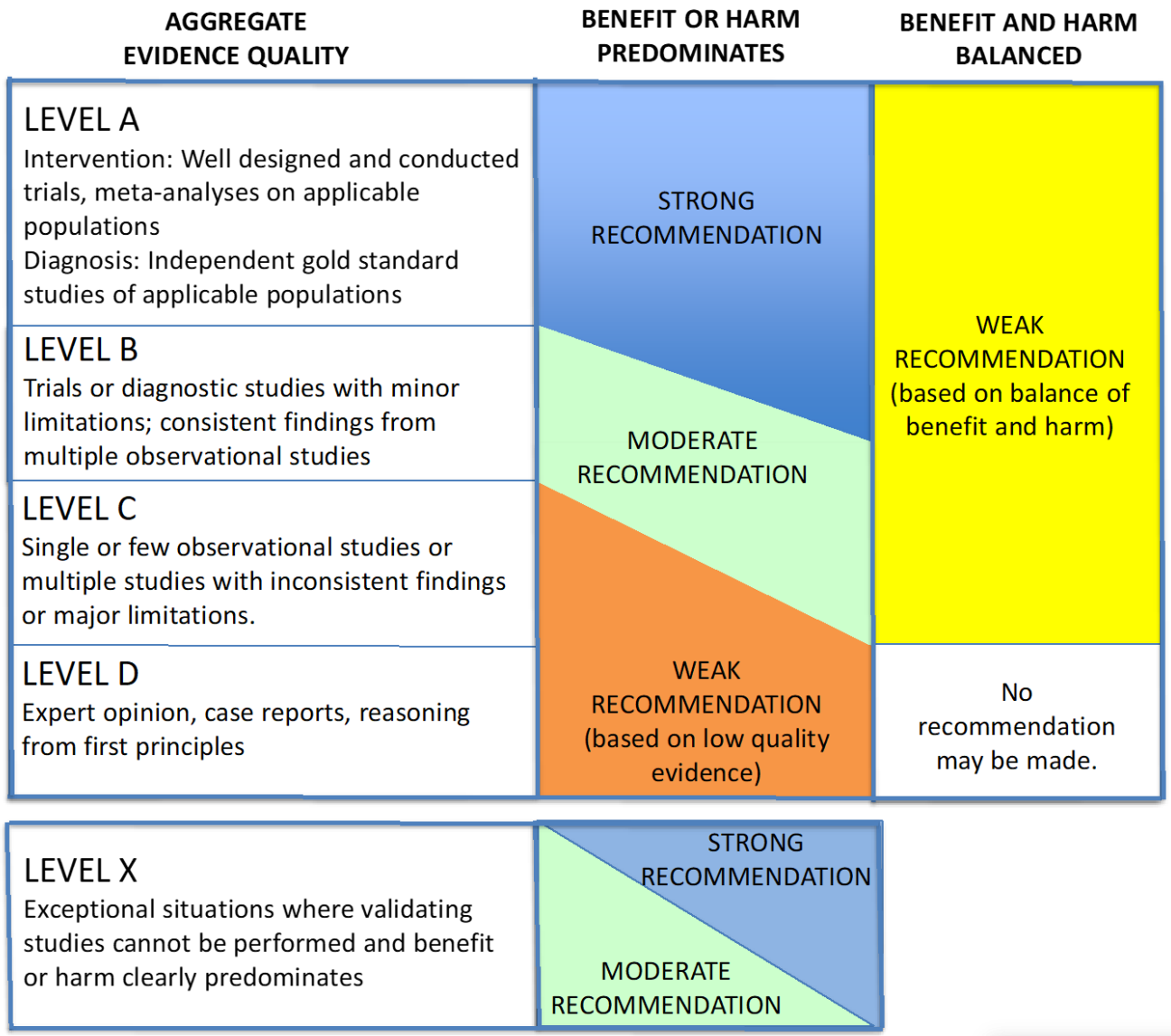
Original search period ended April 6, 2018. An additional search was conducted covering the time period April 7, 2018 - February 15, 2020.

- 15 988 Articles screened
- 1642 Full text articles reviewed
- 382 Studies included

Inclusion Criteria for Both Key Questions

- Required to include children ages 2-18 years.
- Children could have other conditions (e.g., asthma) as long as they were not known to cause obesity, such as Prader-Willi syndrome, obesogenic medication (e.g., antipsychotics), or known genetic mutations associated with obesity (e.g., MC4R).
- All studies had to originate from Organization for Economic Cooperation and Development (OECD) member countries and had to be available in English.

Evidence Grading for Key Action Statement (KAS) Development



The CPG summarizes what we know about child obesity treatment and comorbidity management and provides practical, effective recommendations in the context of whole-child care, non-stigmatizing communication, and addresses key social drivers of health.

- Sarah Armstrong, MD, FAAP

New From Previous Recommendations

- We understand more fully the implications of obesity as a **chronic disease**.
- We understand the physiological impacts of **social determinants of health** on obesity more completely.
- We know more fully that **weight bias and stigma** is pervasive and harmful, and it can be a barrier to treatment.

New From Previous Recommendations

- Offer treatment early and immediately – **there is no benefit to watchful waiting**.
- Treat obesity and comorbid conditions **concurrently**.
- There are **multiple evidence-based strategies** that can be used collectively to deliver intensive & tailored obesity treatment.
- **Structured, supervised weight management** interventions **decrease current & future eating disorder symptoms**.

New From Previous Recommendations

- Obesity is often an **indicator of structural inequities** like unjust food systems, health inequities and environmental & community factors
- Genetics, obesity-promoting environments, life experiences combined with inequities and structural barriers to healthy living **all contribute to overweight and obesity**.

Social and Environmental Context Comorbidity Risk

- We now recognize that race is not a biological construct.
- So, the association between
  - ethnicity,
  - race,
  - obesity, and
  - comorbidities

  most likely reflects the impact of epigenetic, social, and environmental factors, such as SDOH (e.g., limited food access, low SES, exposure to structural racism, neighborhood deprivation, etc.).

Key Takeaways

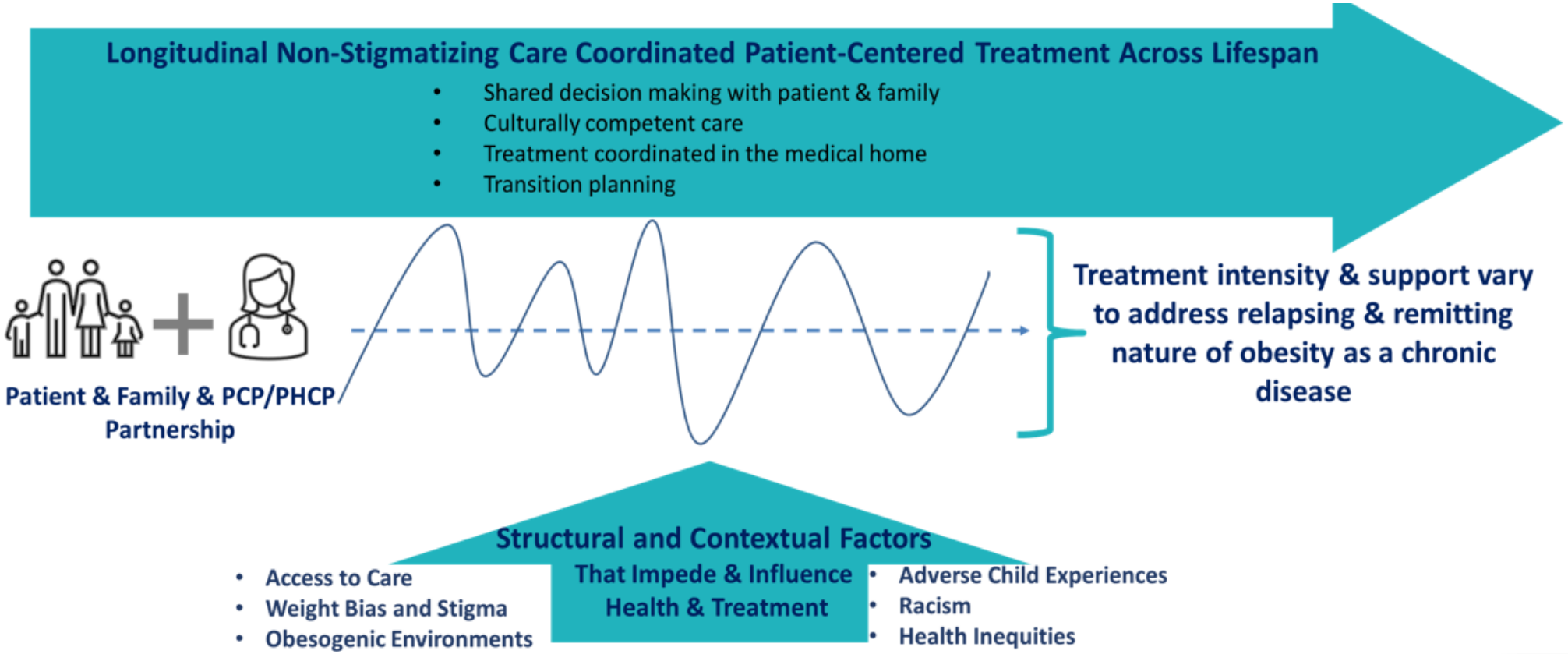
- Obesity is a complex chronic disease
- There are effective evidence-based strategies for treatment
- Comprehensive whole child evaluations are important
- Treating obesity also means treating comorbidities
- Obesity treatment is safe and effective
- Children with overweight or obesity should be offered treatment upon diagnosis

Whole Child Approach

Underlying **genetic**, **biological**, **environmental**, and **social determinants** that are risks for obesity is the foundation of evaluation and treatment.

- AAP Clinical Practice Guideline

Treatment Experience of Obesity as a Chronic Disease



> "The primary care clinician is well-positioned to evaluate for weight-related comorbidities, appropriately initiate treatment, coordinate care with subspecialists, and provide concurrent obesity and comorbidity treatment."
>
> - CPG

Evaluation Recommendations

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Assessment & Evaluation KAS Topics

BMI Measurement

Comprehensive Evaluation
(PE, ROS, Hx, etc)

Risk Assessment
(Whole child)

Comorbidity Evaluation
(labs, tests)

BMI Measurement

KAS 1. Pediatricians and other PHCPs **should measure height and wt, calculate BMI, and assess BMI percentile using age- and sex-specific CDC growth charts** or growth charts for children with severe obesity at least annually **for all children 2 to 18 y of age** to screen for overweight (BMI ≥85th percentile to <95th percentile), obesity (BMI ≥95th percentile), and severe obesity (BMI ≥120% of the 95th percentile for age and sex).

Assess Risk

- Consensus Recommendation: Perform initial and longitudinal assessment of individual, structural, and contextual risk factors to provide individualized and tailored treatment of the child/adolescent with overweight/obesity.

Comorbidities

- There is compelling evidence that obesity increases the risk for comorbidities, and that weight loss interventions can improve comorbidities. - CPG

Evaluate for Comorbid Conditions

KAS 2. Pediatricians and other PHCPs should evaluate children 2 to 18 y of age with overweight (BMI ≥85th percentile to <95th percentile) and obesity (BMI ≥95th percentile) for obesity-related comorbidities by using a comprehensive patient history, mental and behavioral health screening, SDoH evaluation, physical examination, and diagnostic studies.

Lab Evaluation

KAS 3.1. In children 10 y and older with overweight (BMI ≥85th percentile to <95th percentile), pediatricians and other PHCPs may evaluate for **abnormal glucose metabolism and liver function** in the presence of risk factors for T2DM or NAFLD. In children 2 to 9 y of age with obesity (BMI ≥95th percentile), pediatricians and other PHCPs may evaluate for lipid abnormalities.

KAS 5. Pediatricians and other PHCPs should evaluate for **dyslipidemia** by obtaining a fasting lipid panel in children 10 y and older with overweight (BMI ≥85th percentile to <95th percentile) and obesity (BMI ≥95th percentile) and may evaluate for dyslipidemia in children 2 through 9 y of age with obesity.

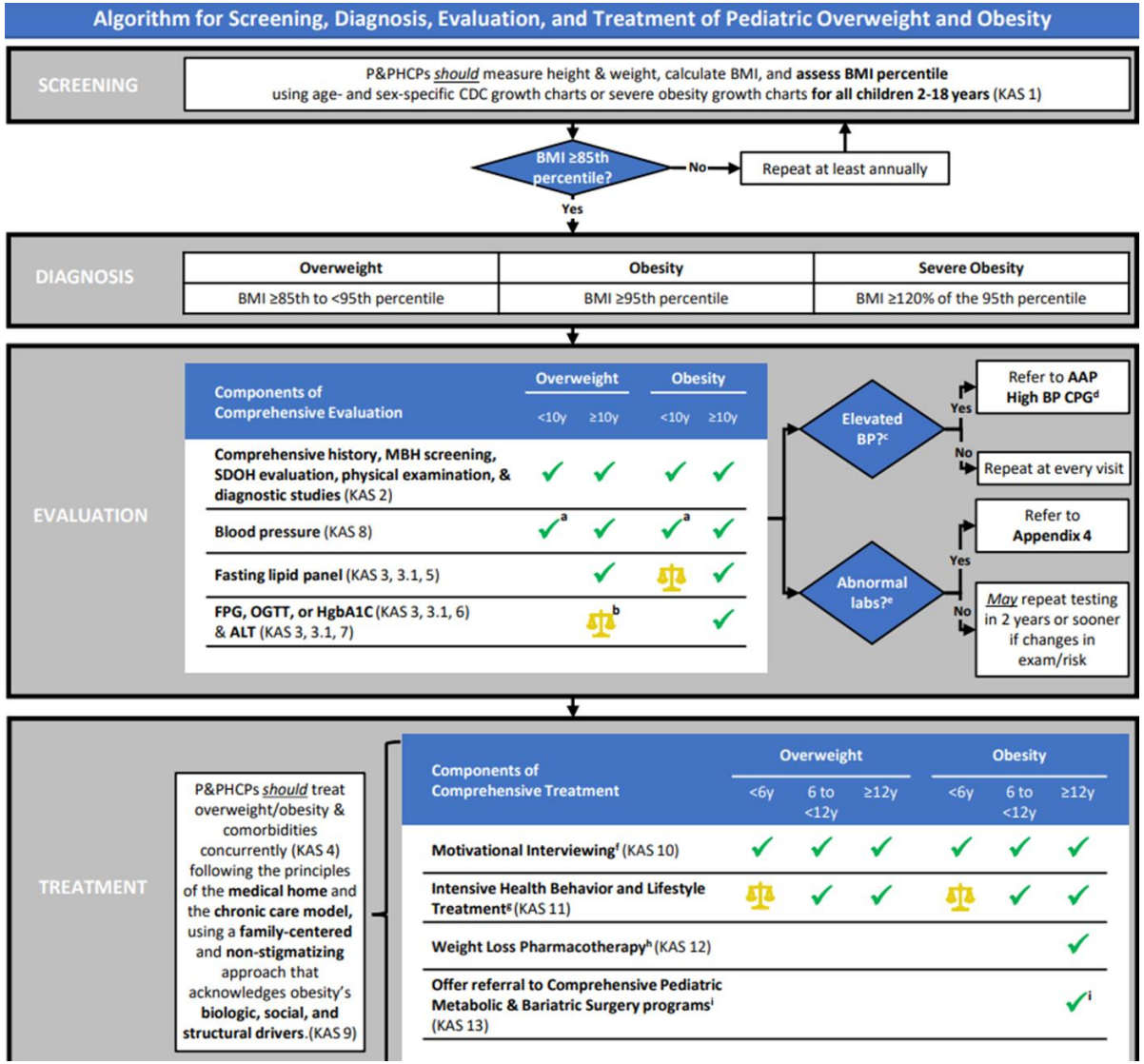
KAS 6. Pediatricians and other PHCPs should evaluate for **prediabetes and/or diabetes mellitus** with fasting plasma glucose, 2-h plasma glucose after 75-g oral glucose tolerance test (OGTT), or glycosylated hemoglobin (HbA1c)

KAS 7. Pediatricians and other PHCPs should evaluate for **NAFLD** by obtaining an alanine transaminase (ALT) test.

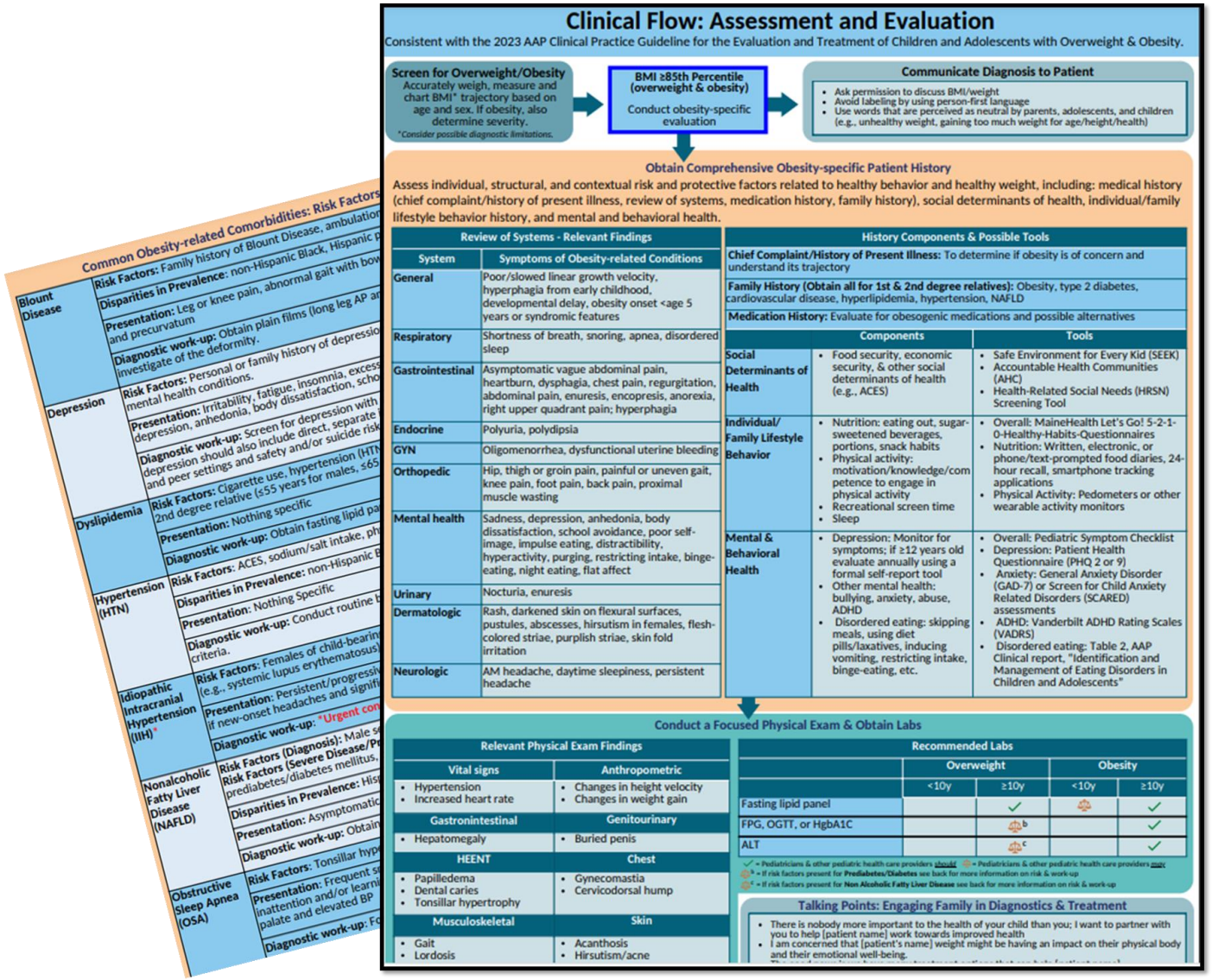
KAS 8. Pediatricians and other PHCPs should evaluate for **hypertension** by measuring blood pressure at every visit starting at 3 y of age in children and adolescents with overweight (BMI ≥85 to <95th percentile) and obesity (BMI ≥95th percentile).

Consensus Recommendations for Other Comorbid Conditions

Comorbid Condition	Consensus Recommendation
OSA	• Obtain a sleep history, including symptoms of snoring, daytime somnolence, nocturnal enuresis, morning headaches, and inattention, among children and adolescents with obesity to evaluate for OSA. • Obtain a polysomnogram for children and adolescents with obesity and at least one symptom of disordered breathing.
PCOS	• Evaluate for menstrual irregularities and signs of hyperandrogenism (ie, hirsutism, acne) among female adolescents with obesity to assess risk for PCOS.
Depression	• Monitor for symptoms of depression in children and adolescents with obesity and conduct annual evaluation for depression for adolescents 12 years and older with a formal self-report tool.
Blount	• Perform a musculoskeletal review of systems and physical examination (eg, internal hip rotation in growing child, gait) as part of their evaluation for obesity.
SCFE	• Recommend immediate and complete activity restriction, non–weight-bearing with use of crutches, and refer to an orthopaedic surgeon for emergent evaluation, if SCFE is suspected. PHCPs may consider sending the child to an emergency department if an orthopaedic surgeon is not available.
IIH	• Maintain a high index of suspicion for IIH with new-onset or progressive headaches in the context of significant weight



Algorithm: Supports clinical decisions for screening, diagnosing, evaluating and treating pediatric obesity at the point of care.



Clinical Flow: Assessment and Evaluation

Consistent with the 2023 AAP Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents with Overweight & Obesity.

Screen for Overweight/Obesity
Accurately weigh, measure and chart BMI* trajectory based on age and sex. If obesity, also determine severity.
*Consider possible diagnostic limitations.

BMI ≥85th Percentile (overweight & obesity)
Conduct obesity-specific evaluation

Communicate Diagnosis to Patient
- Ask permission to discuss BMI/weight
- Avoid labeling by using person-first language
- Use words that are perceived as neutral by parents, adolescents, and children (e.g., unhealthy weight, gaining too much weight for age/height/health)

Obtain Comprehensive Obesity-specific Patient History

Assess individual, structural, and contextual risk and protective factors related to healthy behavior and healthy weight, including: medical history (chief complaint/history of present illness, review of systems, medication history, family history), social determinants of health, individual/family lifestyle behavior history, and mental and behavioral health.

Review of Systems - Relevant Findings

System	Symptoms of Obesity-related Conditions
General	Poor/slowed linear growth velocity, hyperphagia from early childhood, developmental delay, obesity onset <age 5 years or syndromic features
Respiratory	Shortness of breath, snoring, apnea, disordered sleep
Gastrointestinal	Asymptomatic vague abdominal pain, heartburn, dysphagia, chest pain, regurgitation, abdominal pain, enuresis, encopresis, anorexia, right upper quadrant pain; hyperphagia
Endocrine	Polyuria, polydipsia
GYN	Oligomenorrhea, dysfunctional uterine bleeding
Orthopedic	Hip, thigh or groin pain, painful or uneven gait, knee pain, foot pain, back pain, proximal muscle wasting
Mental health	Sadness, depression, anhedonia, body dissatisfaction, school avoidance, poor self-image, impulse eating, distractibility, hyperactivity, purging, restricting intake, binge-eating, night eating, flat affect
Urinary	Nocturia, enuresis
Dermatologic	Rash, darkened skin on flexural surfaces, pustules, abscesses, hirsutism in females, flesh-colored striae, purplish striae, skin fold irritation
Neurologic	AM headache, daytime sleepiness, persistent headache

History Components & Possible Tools

Chief Complaint/History of Present Illness: To determine if obesity is of concern and understand its trajectory

Family History (Obtain all for 1st & 2nd degree relatives): Obesity, type 2 diabetes, cardiovascular disease, hyperlipidemia, hypertension, NAFLD

Medication History: Evaluate for obesogenic medications and possible alternatives

	Components	Tools
Social Determinants of Health	• Food security, economic security, & other social determinants of health (e.g., ACES)	• Safe Environment for Every Kid (SEEK) • Accountable Health Communities (AHC) • Health-Related Social Needs (HRSN) Screening Tool
Individual/ Family Lifestyle Behavior	• Nutrition: eating out, sugar-sweetened beverages, portions, snack habits • Physical activity: motivation/knowledge/competence to engage in physical activity • Recreational screen time • Sleep	• Overall: MaineHealth Let's Go! 5-2-1-0-Healthy-Habits-Questionnaires • Nutrition: Written, electronic, or phone/text-prompted food diaries, 24-hour recall, smartphone tracking applications • Physical Activity: Pedometers or other wearable activity monitors
Mental & Behavioral Health	• Depression: Monitor for symptoms; if ≥12 years old evaluate annually using a formal self-report tool • Other mental health: bullying, anxiety, abuse, ADHD • Disordered eating: skipping meals, using diet pills/laxatives, inducing vomiting, restricting intake, binge-eating, etc.	• Overall: Pediatric Symptom Checklist • Depression: Patient Health Questionnaire (PHQ 2 or 9) • Anxiety: General Anxiety Disorder (GAD-7) or Screen for Child Anxiety Related Disorders (SCARED) assessments • ADHD: Vanderbilt ADHD Rating Scales (VADRS) • Disordered eating: Table 2, AAP Clinical report, "Identification and Management of Eating Disorders in Children and Adolescents"

Conduct a Focused Physical Exam & Obtain Labs

Relevant Physical Exam Findings

Vital signs	Anthropometric
• Hypertension • Increased heart rate	• Changes in height velocity • Changes in weight gain
Gastrointestinal	**Genitourinary**
• Hepatomegaly	• Buried penis
HEENT	**Chest**
• Papilledema • Dental caries • Tonsillar hypertrophy	• Gynecomastia • Cervicodorsal hump
Musculoskeletal	**Skin**
• Gait • Lordosis	• Acanthosis • Hirsutism/acne

Recommended Labs

	Overweight		Obesity	
	<10y	≥10y	<10y	≥10y
Fasting lipid panel		✓	⚖	✓
FPG, OGTT, or HgbA1C		⚖[b]		✓
ALT		⚖[c]		✓

✓ = Pediatricians & other pediatric health care providers should ⚖ = Pediatricians & other pediatric health care providers may
[b] = If risk factors present for Prediabetes/Diabetes see back for more information on risk & work-up
[c] = If risk factors present for Non Alcoholic Fatty Liver Disease see back for more information on risk & work-up

Talking Points: Engaging Family in Diagnostics & Treatment

- There is nobody more important to the health of your child than you; I want to partner with you to help [patient name] work towards improved health
- I am concerned that [patient's name] weight might be having an impact on their physical body and their emotional well-being.

Clinical Flow: Assessment and Evaluation

- Screening
- Diagnosis
- Evaluation

Treatment Recommendations

Comprehensive Obesity Treatment

KAS 9. Pediatricians and other PHCPs **should treat overweight** (BMI ≥85th percentile to <95th percentile) and **obesity** (BMI ≥95th percentile) in children and adolescents, following the principles of the **medical home** and the **chronic care model**, using a **family-centered** and **nonstigmatizing** approach that acknowledges **obesity's biologic, social, and structural drivers.**

Provide the most intensive longitudinal treatment in the medical home

Provide or ensure ongoing medical evaluation & monitoring.
What is happening with this patient and family physically, emotionally, and socially?

Develop & implement an individualized comprehensive treatment plan, using evidence-based strategies.
What can help the patients & family develop & reach treatment goals and treat comorbidities?

Tailor treatment as needed.
What else is needed to support the patient & family's immediate needs & longitudinal treatment progress?

Serve as medical home.
What care coordination and/or advocacy does this patient/family need?

PCP & PHCP Evidence-Based Toolbox

- **Motivational Interviewing**
- **Intensive Health Behavior & Lifestyle Treatment**
- **Pharmacotherapy**
- **Surgery**

Motivational Interviewing

KAS 10. Pediatricians and other PHCPs **should use motivational interviewing** (MI) to engage patients and families in treating overweight (BMI ≥85th percentile to <95th percentile) and obesity (BMI ≥95th percentile).

Intensive Health Behavior and Lifestyle Treatment

KAS 11. Pediatricians and other PHCPs **should provide or refer** children **6 y and older** (Grade B) and **may provide or refer children 2 through 5 y of age** (Grade C) **with overweight** (BMI ≥85th percentile to <95th percentile) and **obesity** (BMI ≥95th percentile) **to intensive health behavior and lifestyle treatment**. Health behavior and lifestyle treatment is more effective with greater contact hours; the most effective treatment includes 26 or more hours of face-to-face, family-based, multicomponent treatment over a 3- to 12-mo period.

More about IHBLT

WHO
- Patient & family
- Multidisciplinary treatment team

WHEN
- Upon diagnosis

WHERE
- Healthcare setting
- Community–based setting with linkage to medical home

WHAT
- Health education
- Skill building
- Behavior modification & counseling

DOSAGE
- Longitudinal (3-12 months long)
- At least 26 contact hours

FORMAT
- Group
- Individual, or
- Both

CHANNEL
- Face-to-face or
- Virtual

When IHBLT is not available, PCPs should…

Deliver the best available intensive treatment to all children with overweight and obesity.

Build collaborations with other specialists and programs in their communities.

Pharmacotherapy

KAS 12. Pediatricians and other PHCPs **should offer adolescents 12 y and older with obesity** (BMI ≥95th percentile) wt loss **pharmacotherapy,** according to medication indications, risks, and benefits, as an **adjunct to health behavior and lifestyle treatment**.

Consensus Recommendation: Pediatricians and other PHCPs may offer children ages 8 through 11 y of age with obesity weight loss pharmacotherapy, according to medication indications, risks, and benefits, as an adjunct to health behavior and lifestyle treatment.

Metabolic and Bariatric Surgery

KAS 13: Pediatricians and other PHCPs should offer referral for adolescents 13 y and older with severe obesity (BMI ≥120% of the 95th percentile for age and sex) for evaluation for metabolic and bariatric surgery to local or regional comprehensive multidisciplinary pediatric metabolic and bariatric surgery centers.

Criteria for Metabolic and Bariatric Surgery

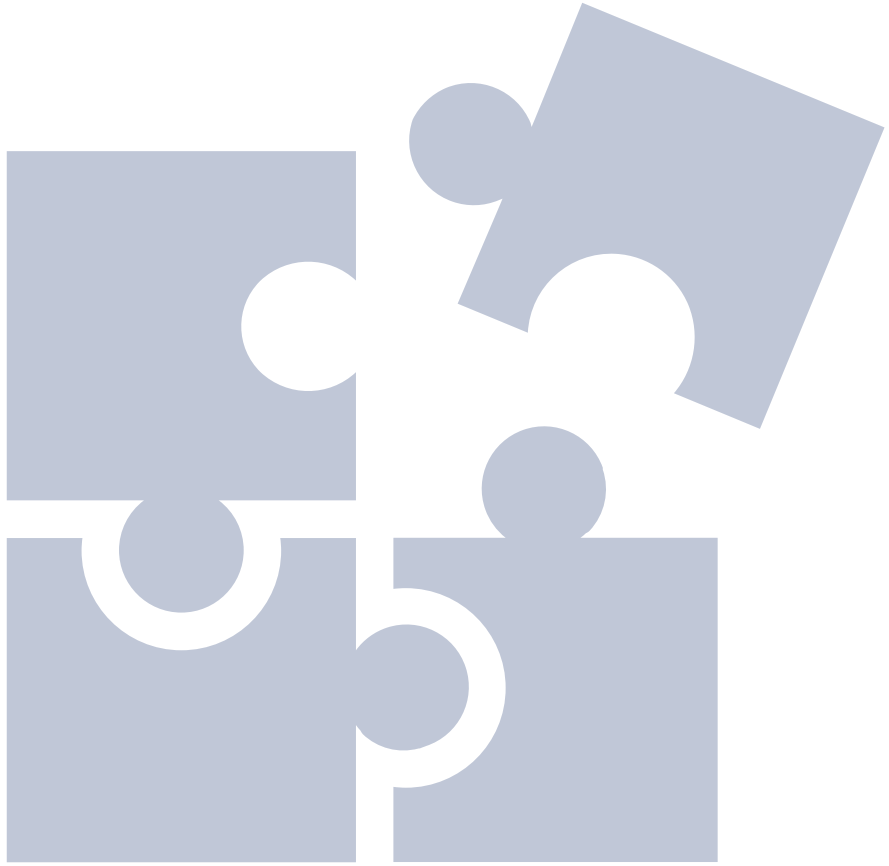
TABLE 20

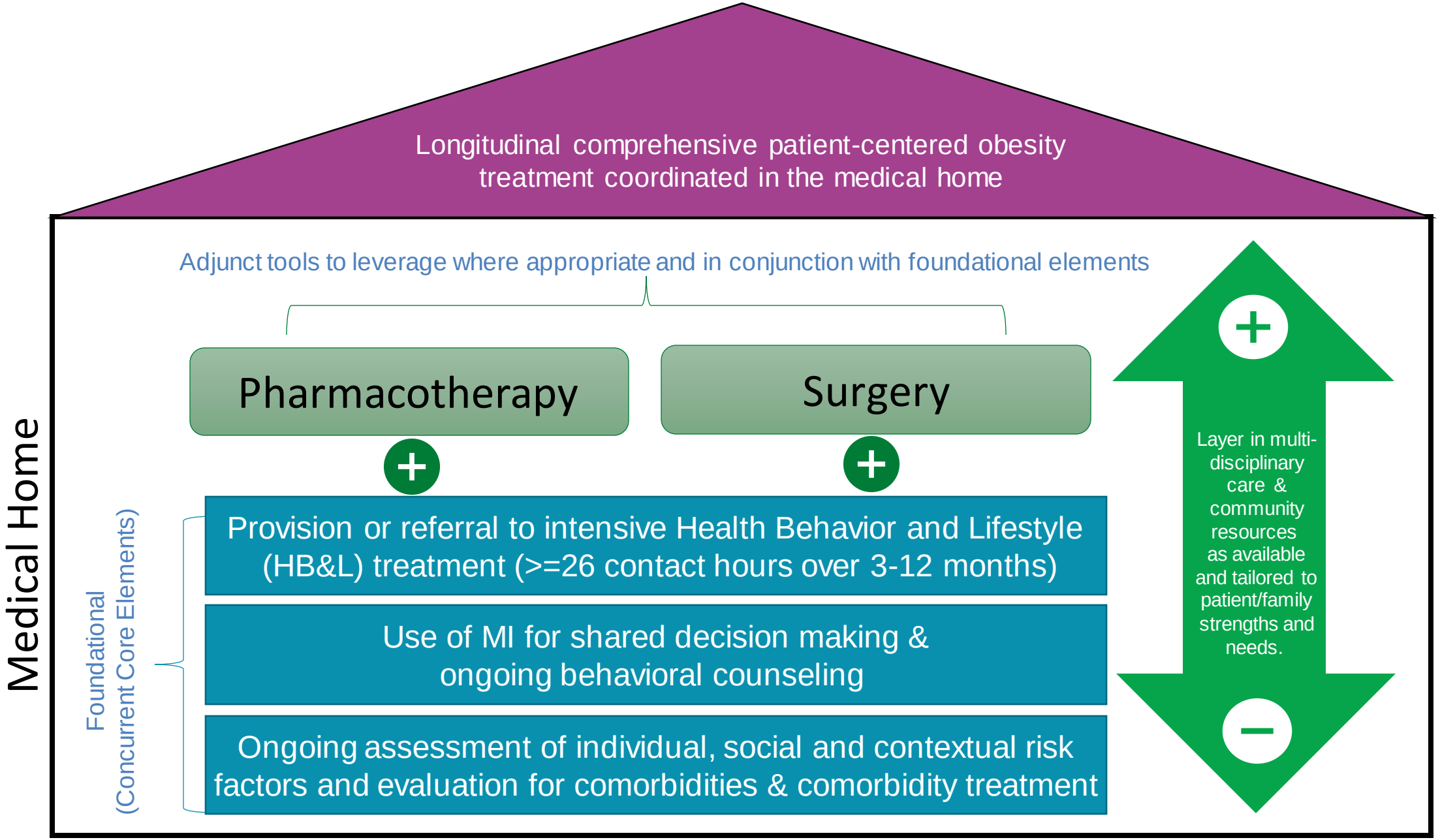
Criteria for Pediatric Metabolic and Bariatric Surgery[733]

Weight Criteria	Criteria for Comorbid Conditions
Class 2 obesity, BMI ≥ 35 kg/m^2 or 120% of the 95th percentile for age and sex, whichever is lower	Clinically significant disease; examples include but are not limited to T2DM, IIH, NASH, Blount disease, SCFE, GERD, obstructive sleep apnea (AHI >5), cardiovascular disease risks (HTN, hyperlipidemia, insulin resistance), depressed health-related quality of life.
Class 3 obesity, BMI ≥ 40 kg/m^2 or 140% of the 95th percentile for age and sex, whichever is lower	Not required but commonly present.

AHI, apnea-hypopnea index.

Putting it all Together





Limitations and Challenges

Evidence Gaps and Future Research Needs

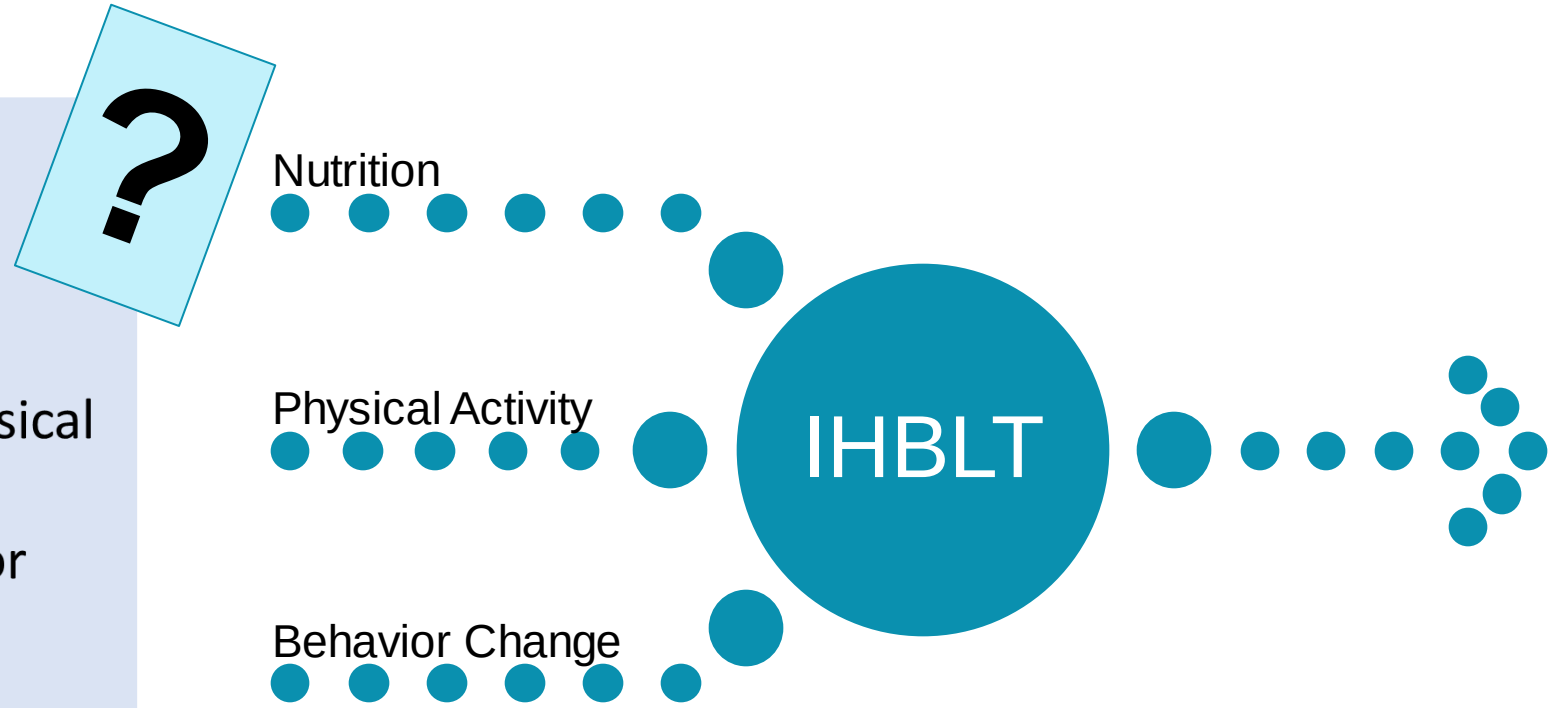
Important areas of uncertainty for pediatricians

- Duration of treatment effects on weight & comorbidities
- Heterogeneity of treatment effects
- SDS, SDOH, special populations, obesity severity
- Impact of specific components in multicomponent programs

Contributions of Specific Strategies are Unknown

Specific strategies

- Reduce sugar-sweetened beverage
- Use Choose My Plate
- Moderate to vigorous physical activity
- Reduce sedentary behavior
- Eat breakfast
- 5 2 1 0
- Ensure appropriate sleep



More Research Gaps

- **Epidemiology**: predictors of severe obesity; costs
- **Measurement**: alternatives to BMI in primary care; relation of BMI change with comorbid conditions
- **Risk factors**: biologic, such as maternal obesity; environmental, such as food insecurity
- **Comorbidities**: when and how often to evaluate; role of SDOH on comorbidity development, especially among minority populations

Implementation Barriers

- Healthcare infrastructure and capacity limitations, especially facing primary care pediatricians
- Coverage
- Burden on family to participate in IHBLT
- Skill set of providers who use medications

Advocacy Recommendations

Implementation and Advocacy Recommendations for Healthcare

- Coverage of **comprehensive** obesity prevention, evaluation, and treatment
- Multisector partnership to **expand access** to evidence-based pediatric obesity treatment programs
- CDS systems to aid in managing children and adolescents with obesity
- Improved education and training opportunities for practicing providers and in preprofessional schools and residency/fellowship programs

Implementation and Advocacy Recommendations

- Accelerate progress in prevention and treatment of obesity through **policy change within and beyond the health care sector** to **improve the health and well-being of children**
- Targeted policies are needed to purposefully address the **structural racism** in our society that drives the alarming and persistent disparities in childhood obesity and obesity-related comorbidities

AAP Clinical Implementation Resources

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AAP Clinical Implementation Resources

Self-Paced CME Modules

Quality Improvement Opportunities

Clinical Decision Support Tools

Coding Reference Card

FHIR Resource

Multimedia Assets

Family Resources

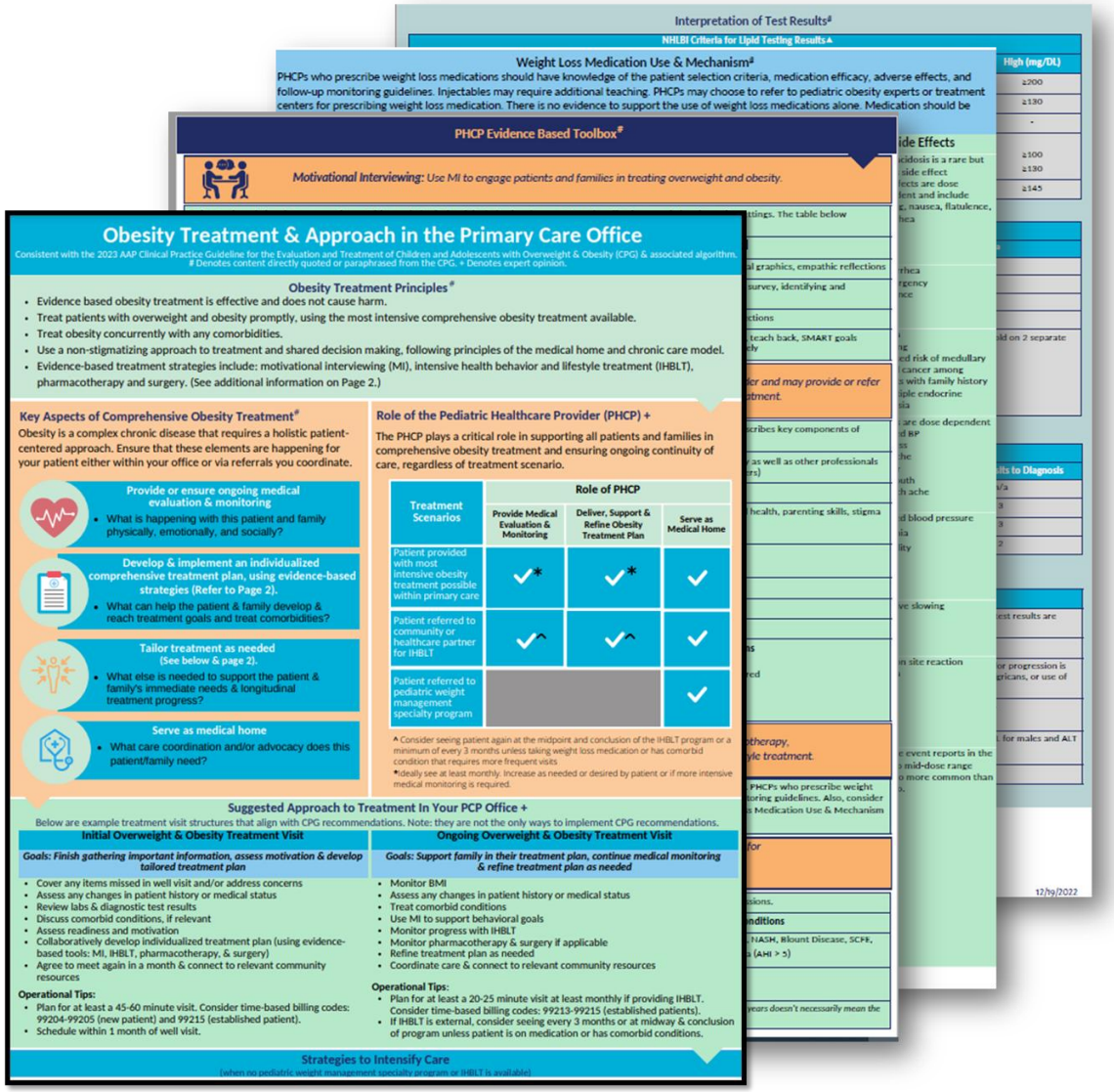
Clinician Resources

Clinical Flow: Treatment and Approach in Primary Care Office

Treatment

(How – Part 2)

- Suggested treatment approaches
- Strategies to intensify treatment
- Pediatric'an's' toolbox of treatment options
- Medication considerations
- Support on interpreting lab results



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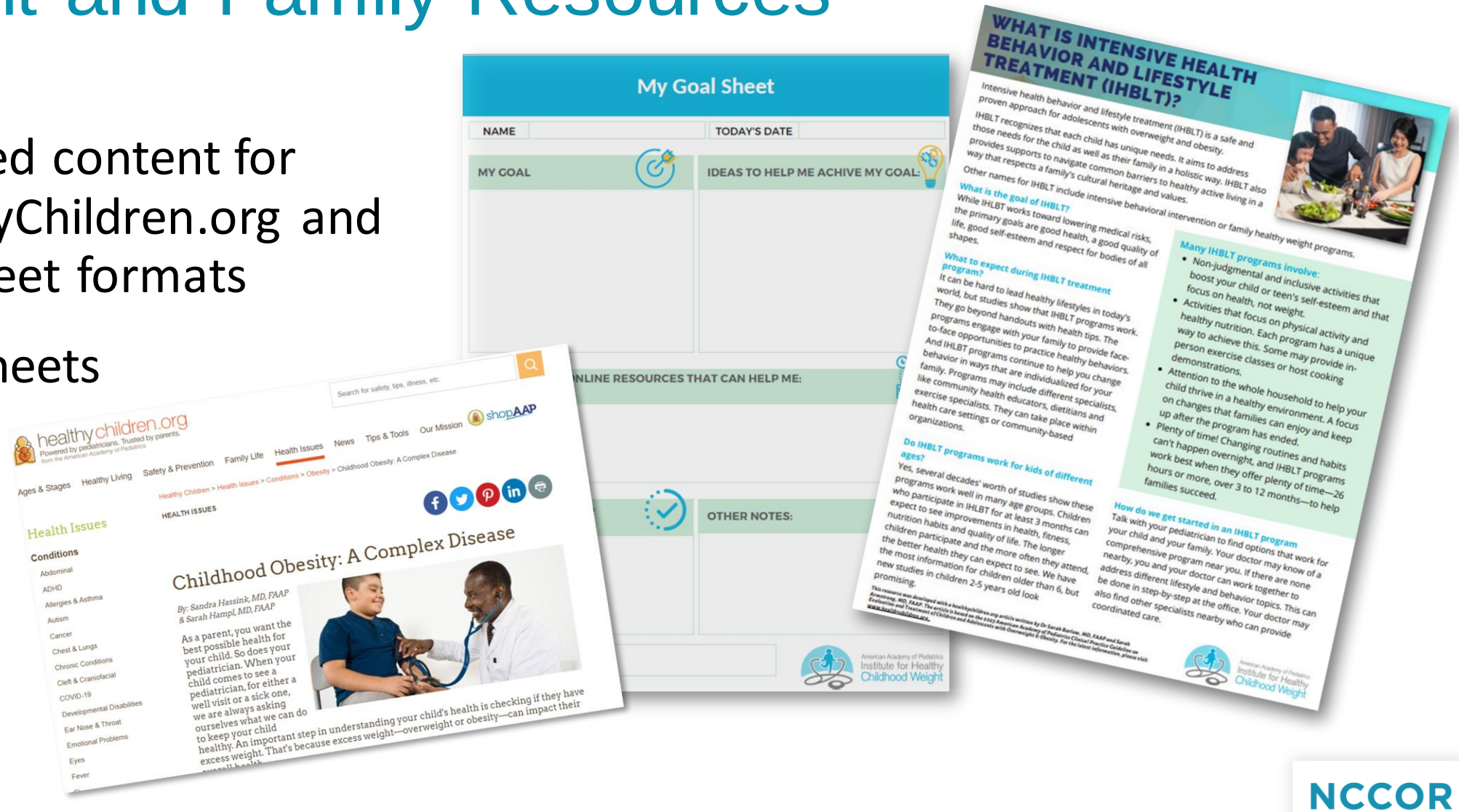
Patient and Family Resources

- Updated content for HealthyChildren.org and fact sheet formats
- Goal sheets



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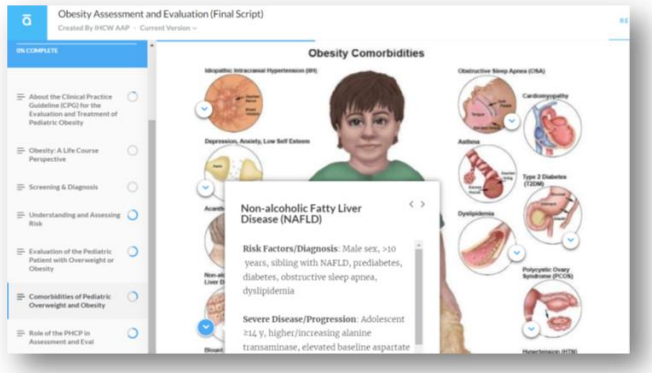
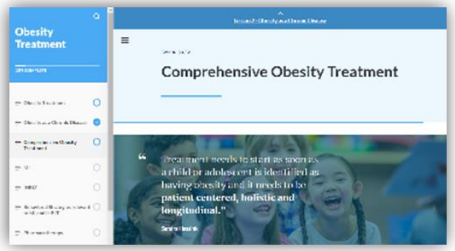
www.aap.org/obesitycpg





THANK YOU!

Email
obesity@aap.org

Institute for Healthy Childhood Weight Website
https://ihcw.aap.org

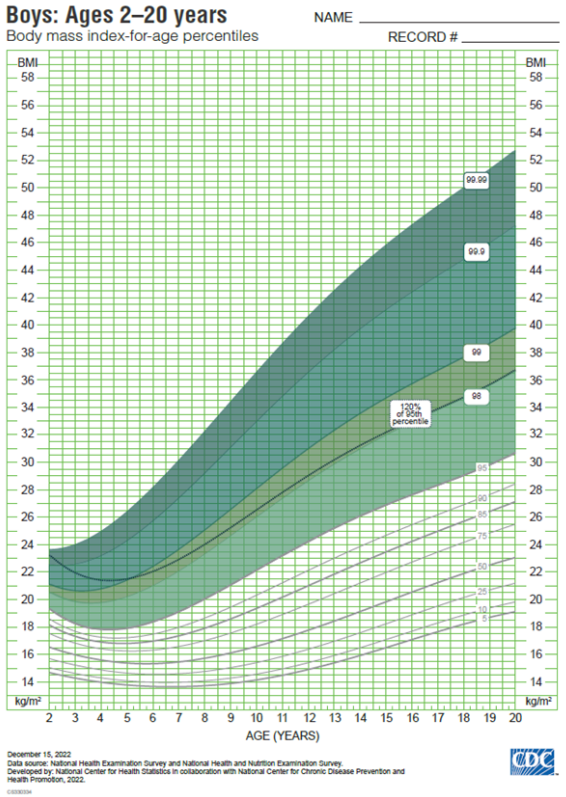
Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents with Obesity Website
https://www.aap.org/obesitycpg

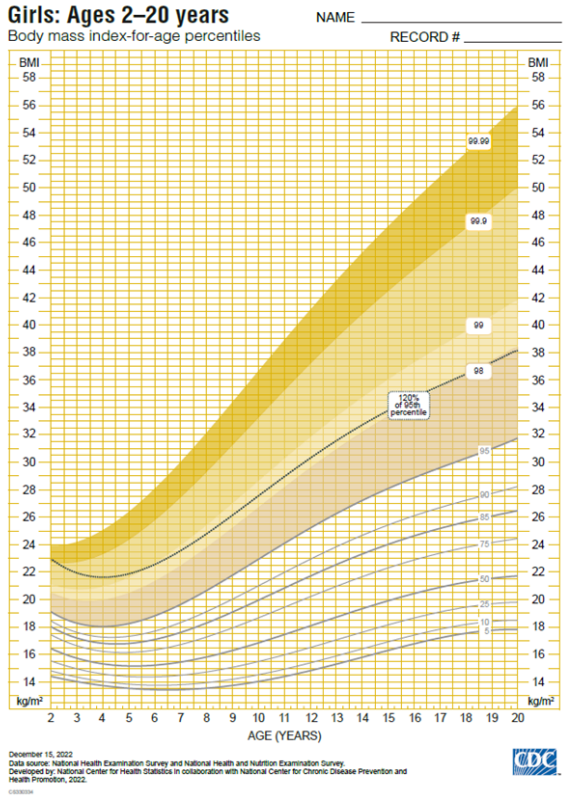
Twitter
@AAPHealthyWT

CDC Extended BMI-for-age growth charts

Cynthia Ogden, PhD, MRP
NHANES Analysis Branch Chief

March 28, 2023

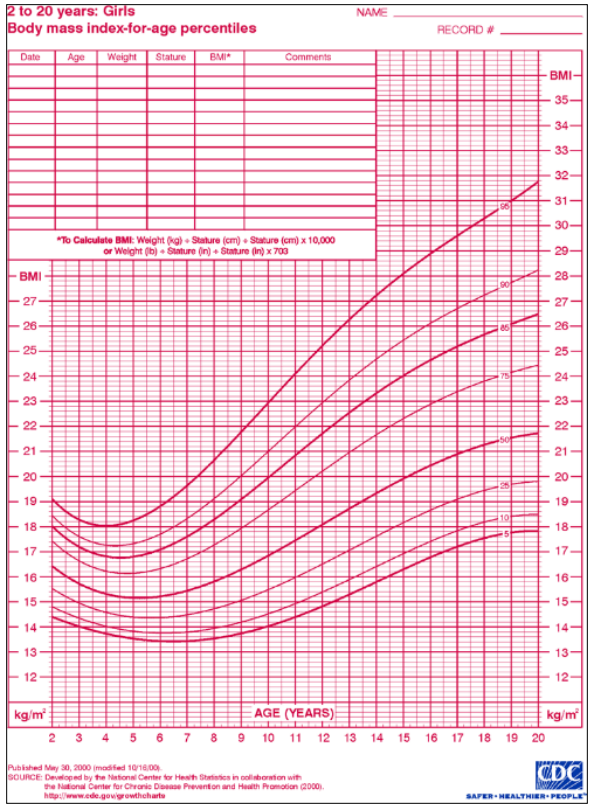


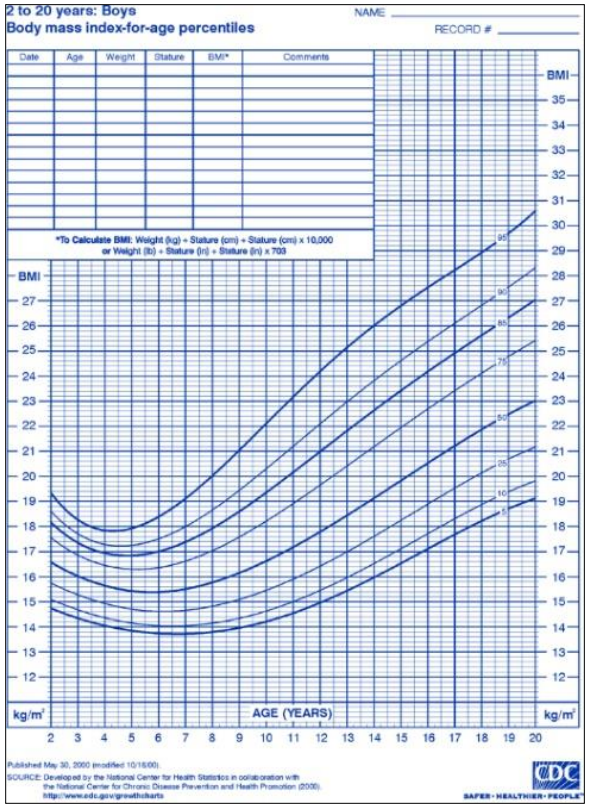


Key Points

- Prevalence of childhood obesity has increased over the past 40 years
- 2000 CDC body mass index (BMI)-for-Age Growth Charts do not extend to BMIs high enough for children and adolescents with extreme BMIs
- New tool available: CDC Extended BMI-for-Age Growth Charts to track growth for children & adolescents with severe obesity

Reminder: Definitions





BMI Category	BMI Range
Overweight	85th to <95th percentile
Obesity	≥95th percentile
Severe Obesity	≥120% of the 95th percentile or ≥35 kg/m^2

Extended BMI-for-Age Growth Charts
Why?

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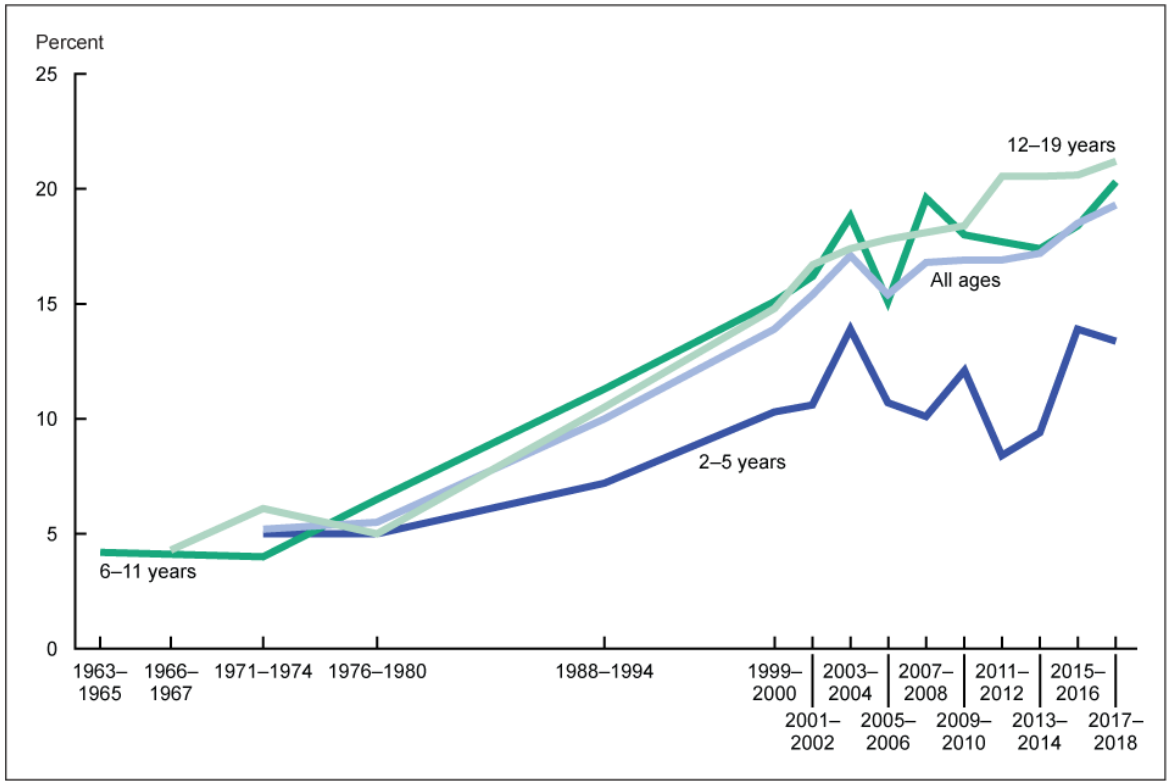
Why Were New BMI Growth Charts Created?

Obesity prevalence among US children and adolescents



NOTE: Obesity is body mass index (BMI) at or above the 95th percentile from the sex-specific BMI-for-age 2000 CDC Growth Charts.
SOURCES: National Center for Health Statistics, National Health Examination Surveys II (ages 6–11), III (ages 12–17); and National Health and Nutrition Examination Surveys (NHANES) I–III, and NHANES 1999–2000, 2001–2002, 2003–2004, 2005–2006, 2007–2008, 2009–2010, 2011–2012, 2013–2014, 2015–2016, and 2017–2018.

https://www.cdc.gov/nchs/data/hestat/obesity-child-17-18/obesity-child.htm

Severe obesity prevalence:

1971-74: 1.0%

to

2017-18: 6.1%

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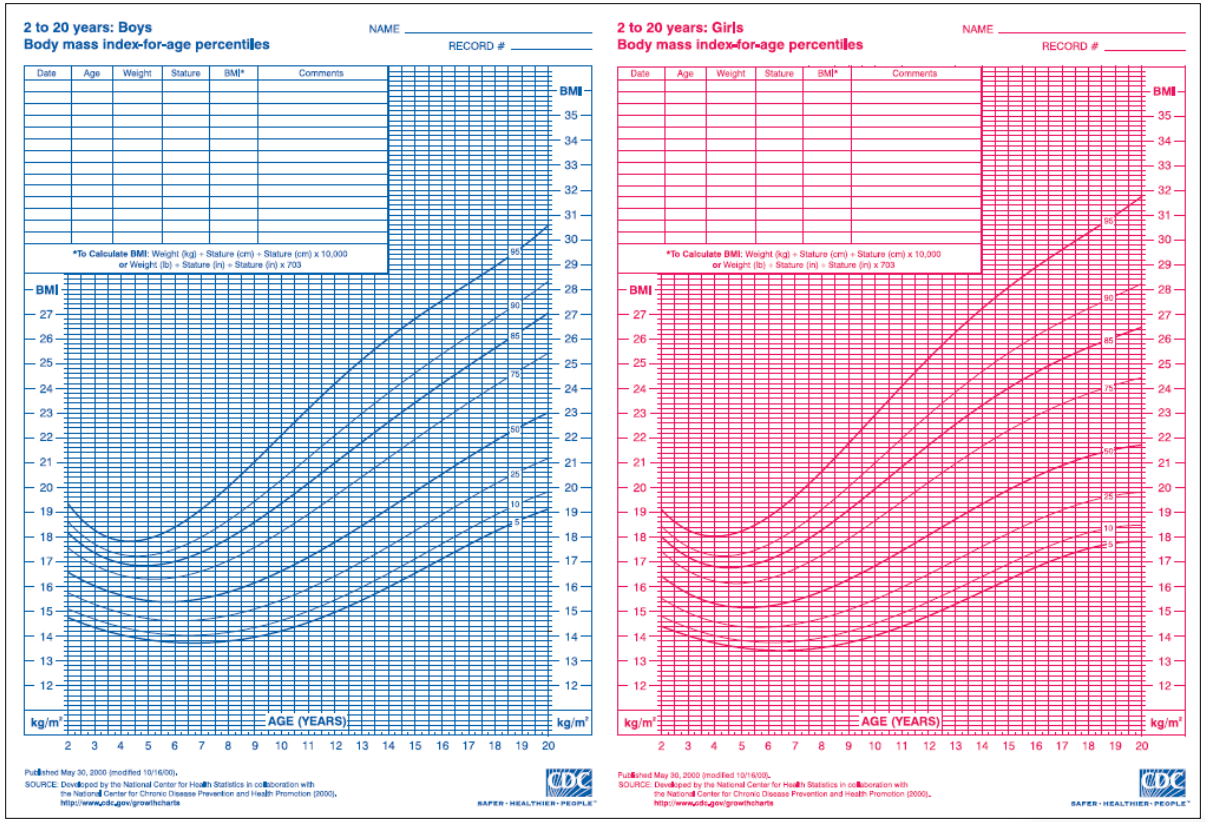
CDC 2000 Growth Charts: No Valid Percentiles/Z-scores Above 97th Percentile

- **Problem?** BMI growth charts don't extend high enough for use with very high BMIs
  - Maximum BMI 37
- **Why?** Based on reference data from 1963-80 for most children and adolescents
  - Obesity lower than today, data sparse



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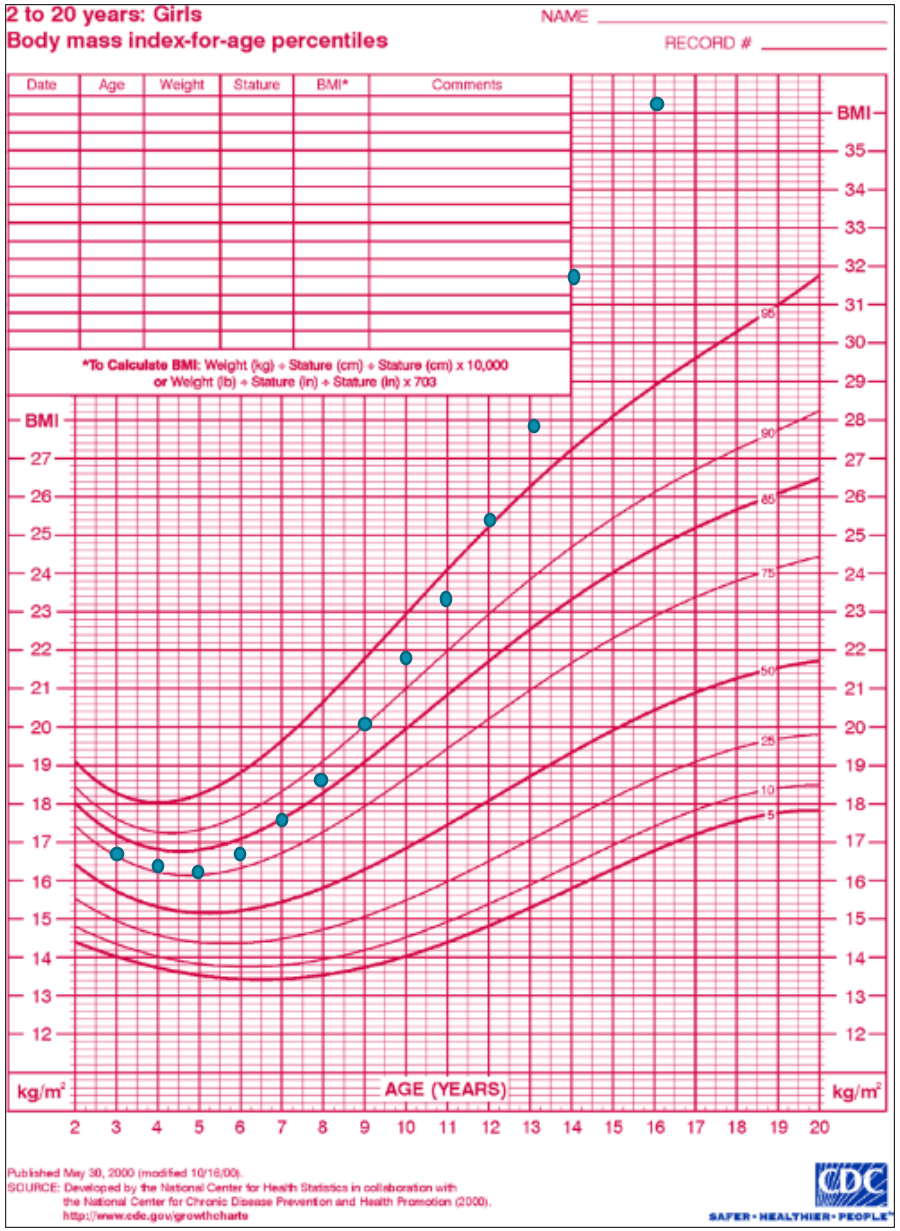
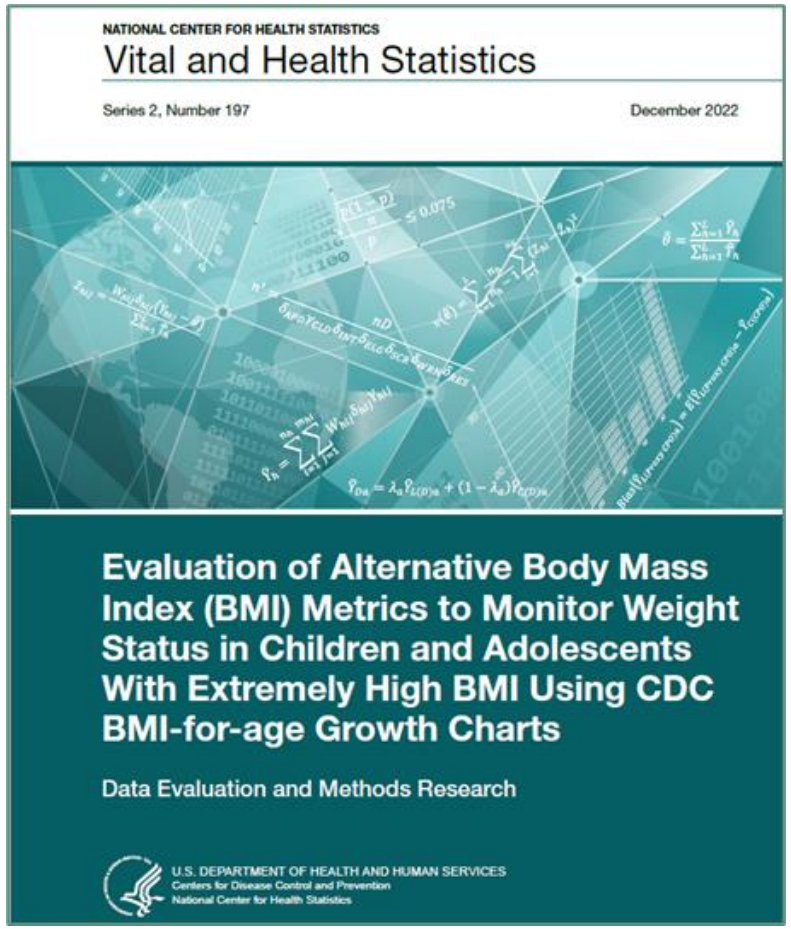
Example

- 16-year-old girl, with history of excess weight since early childhood, now with BMI>40
- BMI values too high for chart
- No percentile value
- Difficult to monitor changes in growing children because no reference population of actual children and adolescents



CDC Effort To Evaluate Alternative BMI Metrics

- Wanted a single, continuous metric
- Workshop with CDC/NIH/academia in 2018
- Reviewed several alternatives:
  - BMI (untransformed)
  - % of 95th percentile
  - BMI units from the median (adjusted and unadjusted)
  - Percent from the median (adjusted and unadjusted)
  - Modified BMI z-scores/percentiles
    - used for identifying implausible values
  - Extended BMI z-scores/percentiles
    - NEW! Created by NCHS



Hales *et al*. Vital Health Stat 2022

Extended BMI-for-Age Growth Charts What?

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What is New?

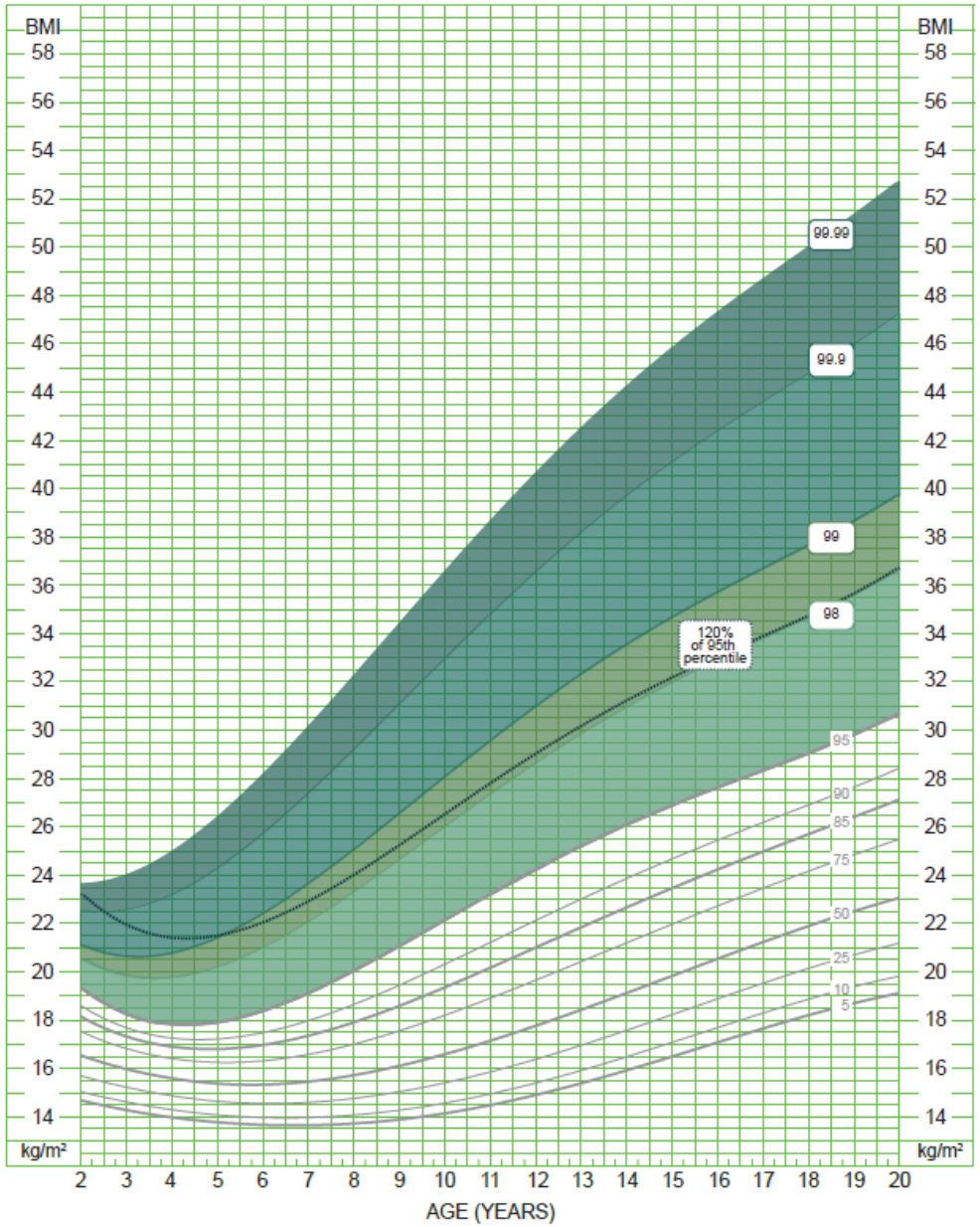
- Includes 4 additional percentile curves above the 95th percentile
  - 98th, 99th, 99.9th, and 99.99th percentiles
- Can plot BMI up to 60 kg/m^2
- Includes line with 120% of the 95th percentile (severe obesity threshold)
- Shading provides a visual aid for discussing very high BMI with children and families

Boys: Ages 2–20 years

Body mass index-for-age percentiles

NAME _____

RECORD # _____



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.

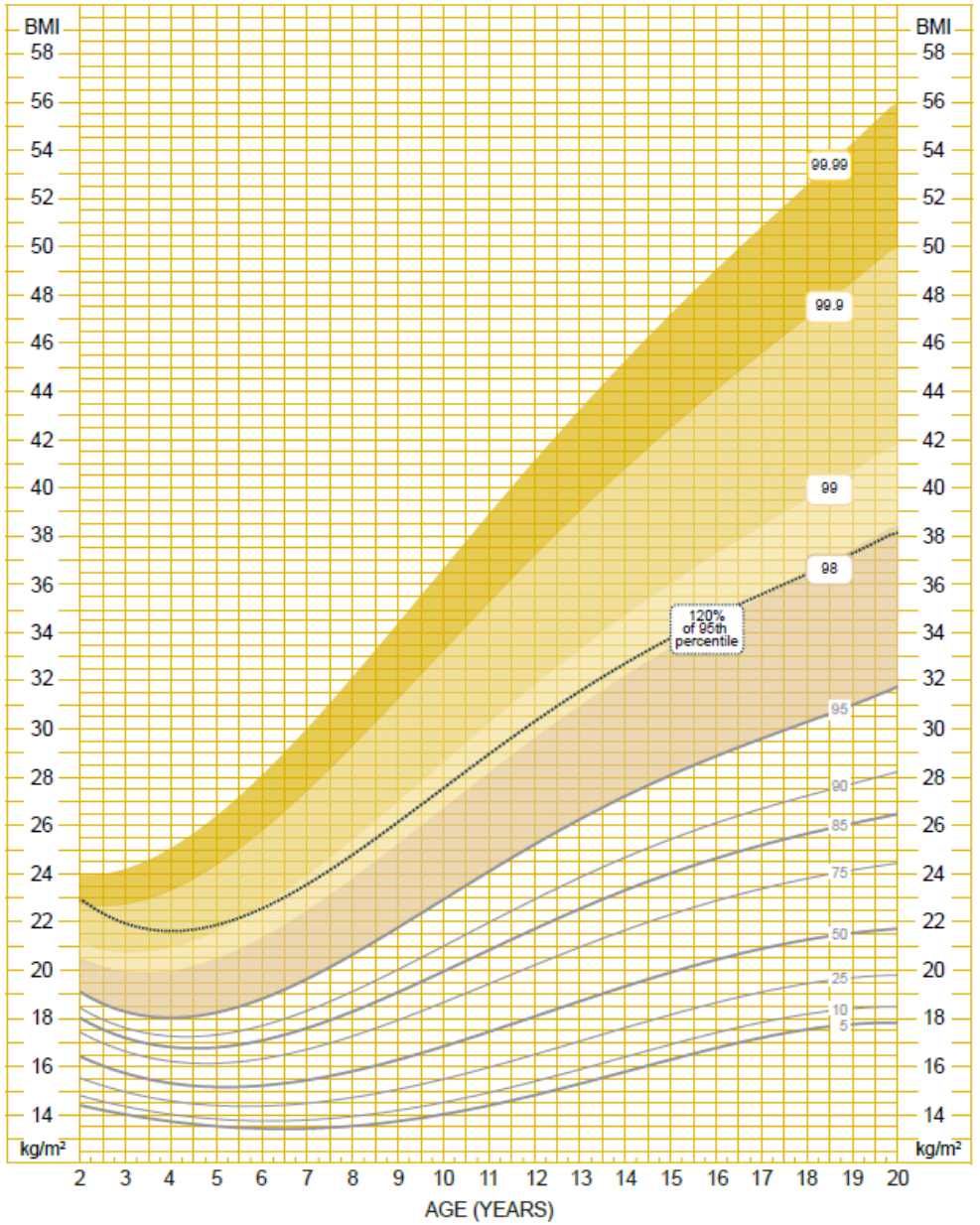
CS330334

Girls: Ages 2–20 years

Body mass index-for-age percentiles

NAME _____

RECORD # _____



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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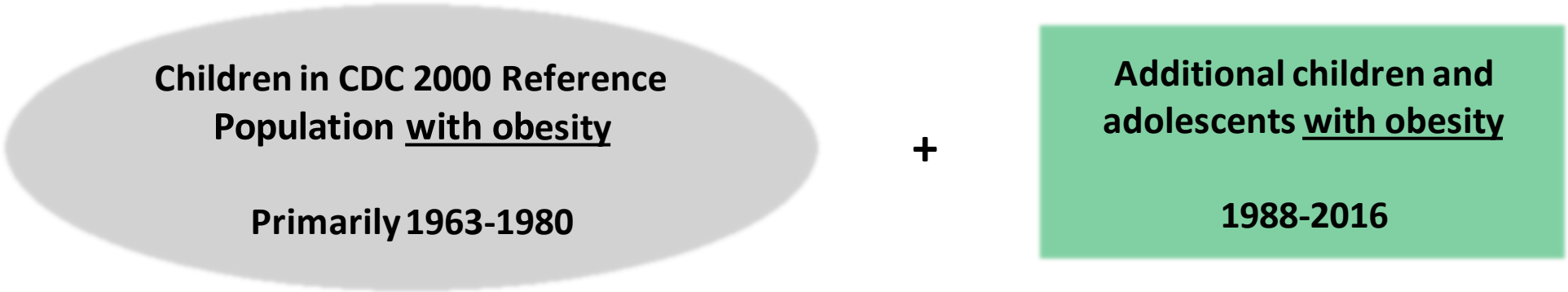
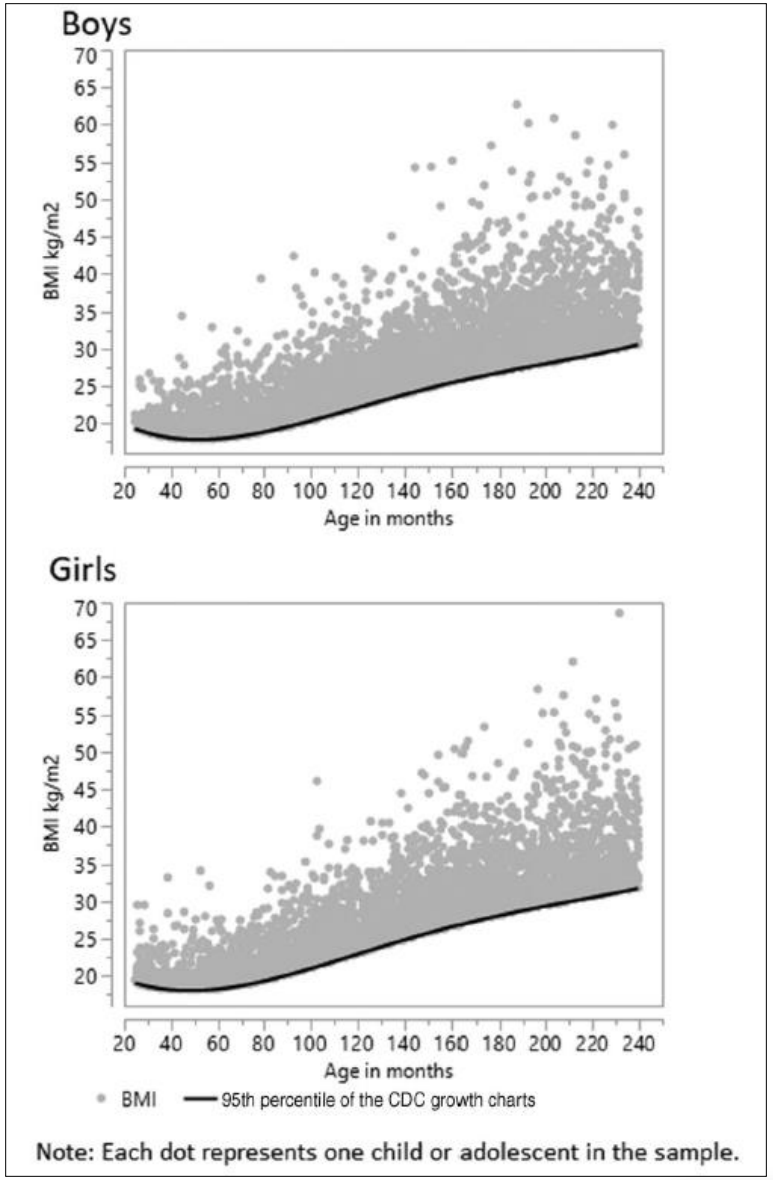
Extended BMI Z-scores and Percentiles: Data Source

Combines all children and adolescents with obesity 1963-2016



Extended BMI Z-scores and Percentiles: Method

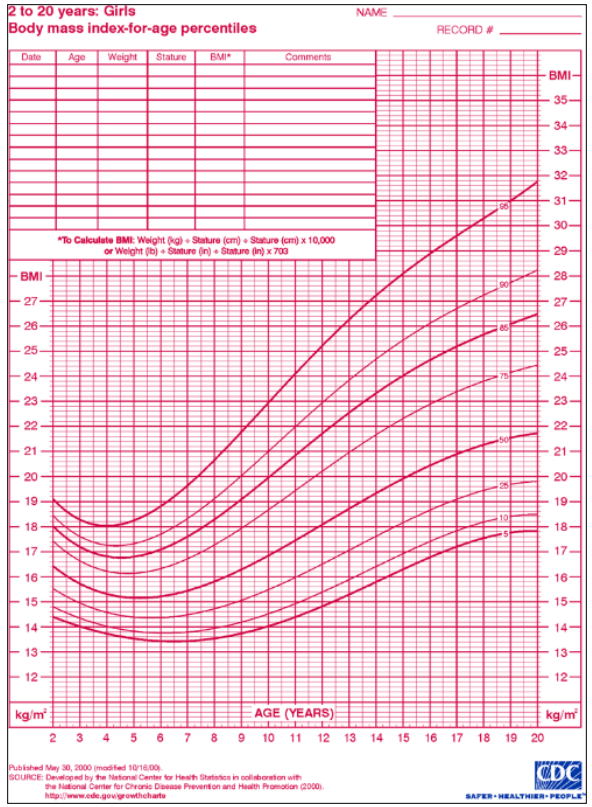
- BMI distribution above the 95th percentile modelled
- Did not shift whole distribution
- Preserved BMI z-scores and percentiles up to the 95th percentile

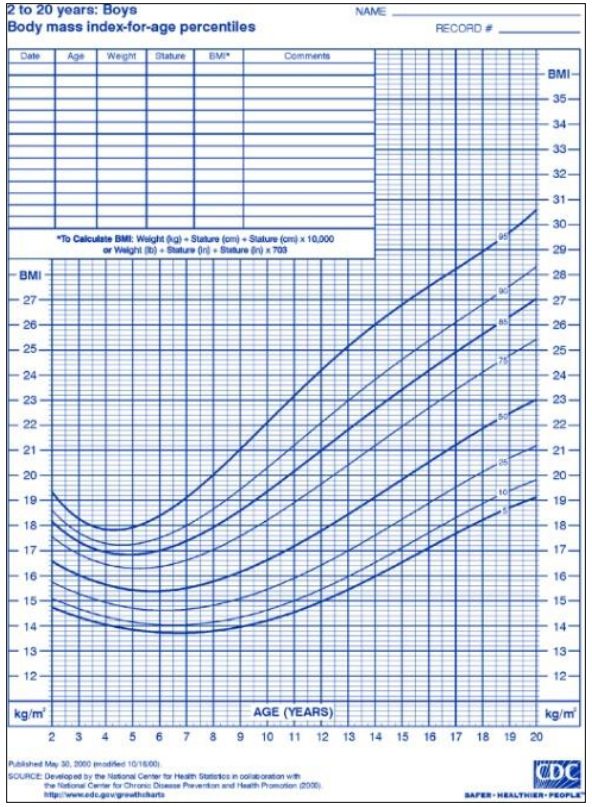


Wei *et al*. A method for calculating BMI z-scores and percentiles above the 95th percentile of the CDC growth charts. Ann Hum Biol. 2020.

What Does Not Change?

2000 CDC growth charts and BMI Categories





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Advantages of Extended BMI Z-scores and Percentiles

- Single metric for seamless use across all BMIs and weight categories
  - Familiar
- Reference curves/percentiles based on nationally representative data
  - Unlike other metrics

Website with Additional Resources

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

National Center for Health Statistics

CDC > National Center for Health Statistics > Growth Charts > CDC Growth Charts

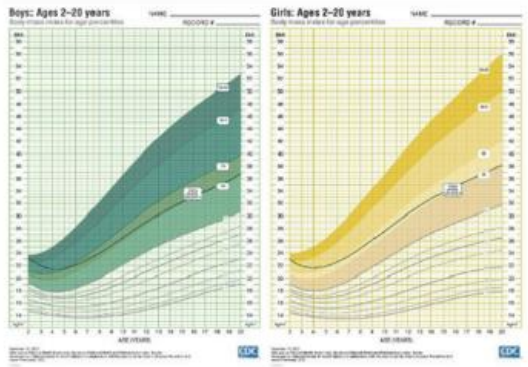
CDC Extended BMI-for-Age Growth Charts

Print

In the US, the prevalence of obesity and severe obesity has increased since 1980, and in 2017-2018 more than 4.5 million children and adolescents had severe obesity. The 2000 CDC BMI-for-age growth charts, based on data from 1963-1980 for most children, do not extend beyond the 97th percentile. So, CDC developed new percentiles to monitor very high BMI values. These extended percentiles are based on data for children and adolescents with obesity – including from 1988-2016 – thus increasing the data available in the reference population. See the report on alternative BMI metrics for more information.

https://www.cdc.gov/growthcharts/extended-bmi.htm

CDC Extended BMI-for-Age Growth Charts



For Healthcare professionals

Data File with LMS and Sigma Parameters

Computer Program

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Cynthia L Ogden, PhD
cogden@cdc.gov

Thank you to Drs. Aly Goodman and Craig Hales for some slides.

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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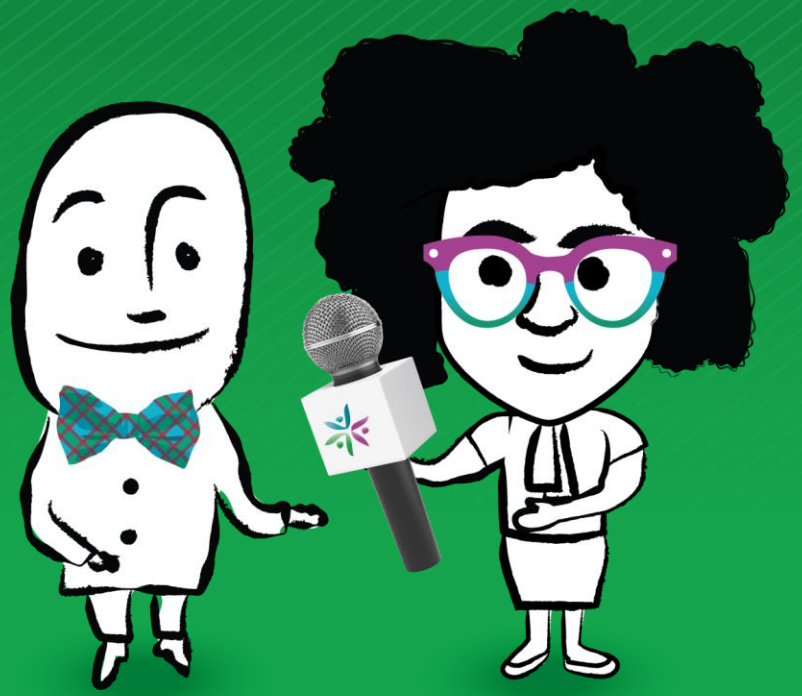

Q&A

ANNOUNCEMENTS

Upcoming Connect & Explore Webinar

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New Publication

- NCCOR Annual Report 2022: Connecting Research to Communities
  - Highlights NCCOR accomplishments last year
  - Read at www.nccor.org

New Publication

- National Collaborative on Childhood Obesity Research Efforts to Advance Childhood Obesity Research: Progress and Next Steps
  - Amanda S. Sharfman, David Berrigan, Deborah A. Galuska, Laura Kettel Khan, Ellen W. Stowe, Jill Reedy
  - American Journal of Preventive Medicine
  - March 2023

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Sign up for NCCOR Student Hub!

→ nccor.org/e-newsletter

Check out the student hub webpage!

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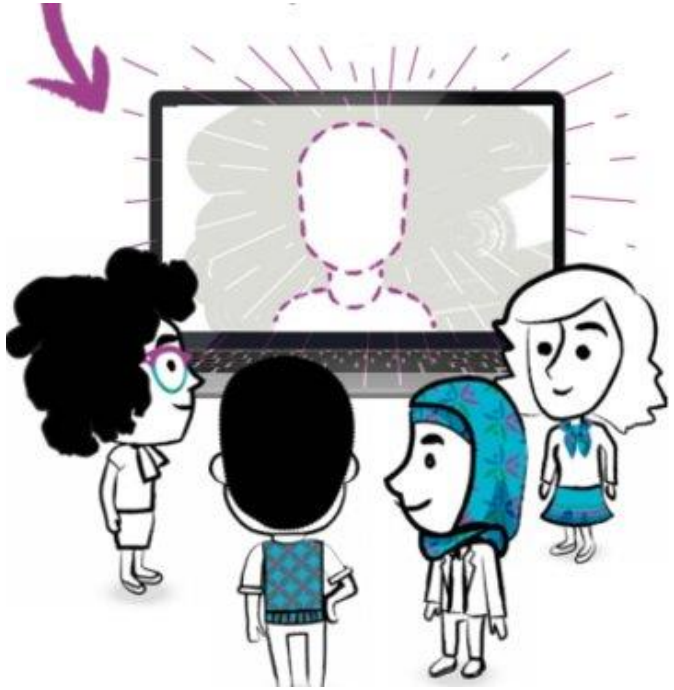
Have you used any of NCCOR's tools?

Let us know at nccor@fhi360.org
and we may feature you in our next webinar!



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FURTHER QUESTIONS?

Email the NCCOR Coordinating Center
nccor@fhi360.org