

# Pediatric Overweight and Obesity Module Script

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## Pediatric Overweight & Obesity

Welcome to the module Pediatric Overweight and Obesity. In this module we will be talking about assessment, prevention, and treatment of pediatric overweight for children under the age of 5.

## Assessment of Child Overweight and Obesity

We will begin by discussing how to assess child overweight and obesity.

## Assessment of Weight Status

Assessment of weight status in children depends on the age. Until age 2, weight status is assessed using the weight for length measurements on the WHO growth charts. After age 2 the assessment should be done using BMI. To calculate BMI weight is divided by height, so it is a “weight-for-height” measurement.

There are age and gender-specific cut-points for BMI; this is very important because under the age of 18, children are growing at such a rapid weight that there cannot be a consistent cut point like there is for adults. For adults, a BMI of 25 or under is normal weight, but for children it varies tremendously by age and by gender. You can plot children (2 and older) on the CDC growth charts, which are done by the national center for health statistics. These are the most consistent charts that can be used and should be used in all settings whether public health or clinical.

## Definition of Weight Status

These terms apply to children 2 years and older. Overweight is defined as greater than the 85th percentile but less than the 95th percentile of BMI. This category used to be called “at-risk-for overweight”; but is now called “overweight”.

Obesity is defined as children above the 95th percentile of BMI. This was previously known as overweight but is now obese. So, when you look at literature in children’s obesity, it is very important that you look at the date and look at the context in which it was written, because what is called overweight in early literature is actually obese.

It is a better practice to look at what percentile they used for classifying children as opposed to the actual label that it was given. FYI, for WIC purposes, Infants and children less than 24 months > 97.7 percentile weight-for-length are considered high weight for length.

## Trends in Overweight Children

NHANES data from the last 2 to 3 decades shows that there has been an increase in overweight or obesity in children across time. We see this in the 2- to 5-year-old children, as well as in older children. Right now, we've seen at least a doubling of overweight in the preschool and early-childhood age children.

## Persistent of Childhood Overweight

There's a lot of debate about the persistence of child obesity. If a child has a high weight when they are an infant, does that mean they are going to stay overweight?

If you look at the longitudinal data from a variety of populations, in general about 15% of overweight infants will remain overweight. 25% of overweight preschool children will remain overweight. Somewhere around 5-6 years of age, you hit the 50/50 point, where half of the children grow into their weight and normalize, and half of the children remain overweight. Then when you look at older children, 80% of older children 10-14, with at least one obese parent will remain overweight.

Children usually hit puberty around 10-14 years of age, and they have their growth spurt. At that point they lose the ability to grow into their weight, so the persistence of overweight is much higher after puberty than it is before puberty.

## Recognition of Obesity as a Problem

Recognizing overweight and obesity in children can be a problem for parents. Obese mothers are less likely to recognize that their child is overweight compared to mothers who are at an ideal body weight. Mothers are less likely to recognize a male child as overweight compared to a female child.

## Complications

Next, we will discuss complications associated with childhood overweight and obesity.

## Respiratory Disorders

There are some medical complications that are a large concern. With overweight, we are less concerned about the physical appearance of the child, and more concerned about what the excess weight means in terms of health risks.

Respiratory disorders are one of the issues we need to think about in children. When you look at obese children, about 1/3 to 1/2 of these children have some level of sleep apnea or hypoventilation, 5% of them have very severe sleep apnea.

Asthma is another issue that has been linked with obesity. We see that children above the 85th percentile are at higher risk than those below. However, you should keep in mind that some of the same risk factors for asthma, such as low income or living in an urban area, are also risk factors for obesity. So, it does not mean that obesity causes asthma or vice versa, but that there are some common risk factors for both.

## Orthopedic Issues

Orthopedic issues are seen in many overweight children. The earlier a child becomes overweight, the more likely they are to have an orthopedic issue, and the more pronounced that issue will be.

Slipped capital femoral epiphyses is common orthopedic issue in overweight children. It occurs when the ball at the upper end of the femur (thigh bone) slips off in a backward direction.

Blount's disease, another common issue, occurs when the inner part of the shin bone, just below the knee, fails to develop normally; it can cause severe bowing of one or both legs.

## Liver Disease

Liver disease is another complication that is more commonly seen in obese children. In this population, the disease is largely characterized by a fatty infiltration of the liver, and sometimes it proceeds to the point where it has inflammation and children can actually get diagnosed with fibrosis or cirrhosis. Fatty infiltration of the liver with inflammation affects about 3% of children worldwide.

Although the data are not really great on the prevalence in terms of overweight/obese children in Western Nations, it has been estimated to be 23 to 53%. It is probably closer to a quarter of the children than a half.

## Endocrinologic Complications

Endocrinologic factors will be more pronounced in adolescents, but it is important to discuss them in this module on children 5 and under, because we know it is the perfect time to intervene.

We are starting to see more precocious puberty and accelerated linear growth in bone age, the age of the adiposity rebound, where body fat stops reducing, and starts increasing is getting younger in some children, so it is important to realize that these endocrine changes can start relatively young and can carry through into childhood and adolescence.

## Endocrinologic Complications

Hyperinsulinemia or insulin resistance was not something seen in youth 30 or 40 years ago but is now seen fairly frequently. There has been a dramatic increase of hyperinsulinemia in the most overweight children, those at the 97th percentile and above.

Type 2 or Non-Insulin Dependent Diabetes now makes up about 45% of the pediatric diabetes cases. When you look at studies, the prevalence rates vary by race and ethnicity, family history, and other factors. It is estimated that 4% of teenagers have undiagnosed diabetes.

## Acanthosis Nigricans

These are pictures of Acanthosis Nigricans. It is a darkening of the skin and a change in the texture of the skin that occurs in insulin resistance. For children from high-risk groups (American Indian, Hispanic/Latino, and Black children), Acanthosis Nigricans can be one of the earlier signs of insulin resistance. It typically appears around the neck, under the arm folds and sometimes around the abdomen. Children with acanthosis nigricans should be screened for insulin resistance.

## 5- to 10-Year-Old Children with Hyperinsulinemia

If a child continues to be overweight or obese after age 5, the risk of hyperinsulinemia increases. The risk of hyperinsulinemia is highest for children at the 97th percentile and above.

Starting around the 85th percentile and again at the 95th percentile, we do see increases in rates of insulin resistance.

## 5- to 10-Year-Old Children with Elevated Blood Pressure

We see similar data when it comes to blood pressure. Looking at increases in blood pressure for children, at around the 85th percentile we start to see some increases, but the most dramatic increases are actually above the 97th percentile.

## Clustering of CVD Risk Factors

What is very concerning is that there is a clustering of risk factors. Of children that are overweight, many do not have just one risk factor but have multiple risk factors, including hyperinsulinemia, high blood pressure, and high cholesterol.

In the general population, about 60% have one risk factor for cardiovascular disease, and more than quarter have two or more risk factors for heart disease.

## Relation of Overweight to Adverse CVD Risk Factors in Children Ages 5 to 17

These are odds ratios of developing different kinds of comorbid conditions with child obesity. Keep in mind that an odds ratio of 1 means you are at average risk. The odds ratio is the prevalence for overweight children versus prevalence for children who are not overweight.

Children above the 95th percentile are 2 1/2 times more likely to have high cholesterol, about 7 times more likely to have high triglycerides. When it comes to insulin resistance, they are about 13 times more likely to be insulin resistant compared to children that are below the 85th percentile.

## Metabolic Syndrome

Metabolic syndrome is a clustering of risk factors looking at hypertension, abdominal obesity, insulin resistance, and often high cholesterol or high triglyceride levels. Being overweight or

obese as a child seems to carry a lifelong risk with it. Adults who were not obese as children or as adults, have about a 1% prevalence of metabolic syndrome.

When you look at individuals that are obese in adulthood but not in childhood, about 10% of them will develop metabolic syndrome. For those who are obese as children and remain obese as adults, it is 28%, which is about 56 times the risk of someone who was not obese as a child or adult, and about 3 times the risk of someone who is obese as an adult but was not as a child.

So, we do know that childhood obesity carries its own risk above and beyond adult obesity.

## Psychosocial Consequences

There are also psychosocial risk factors of child obesity, particularly for females. Most of the data points to very few psychosocial risk factors for males, particularly adult males, but for women they are more likely to be discriminated against, to have lower income, they are less likely to get married, they have fewer friends and are more likely to have disordered eating if they are overweight compared to not overweight.

## Prevention of Overweight and Obesity

Next, we will discuss prevention of overweight and obesity in children.

## Routine Screening for all Children

In 2007, an Expert Committee of the American Academy of Pediatrics recommended routine screening for risk factors for children of all ages, as part of their well-child visits or other visits. This should include at least once a year a qualitative assessment of their diet, their level of physical activity, their sedentary behaviors, and the ability of the family to make lifestyle changes to improve whatever is determined to be an issue.

## Nutrition Issues

The 2007 AAP guidelines discuss issues specific to nutrition and include:

- Reducing the frequency of eating outside the home
- Reducing excessive consumption of sweetened beverages and juice
- Reducing the consumption of large portion sizes, portion sizes should be based on age for young children
- Looking at the frequency and quality of breakfast consumption
- Looking at whether or not the foods consumed are energy dense (which means that they are highly processed and have a lot of fats and sugars)
- Looking at how much fruit and vegetable intake children have a daily basis
- And then also looking at the overall frequency of meals and snacks that they have per day.

## Physical Activity Issues

With regard to physical activity, it is recommended that at least once a year, you look at the environmental and social support that children have for being physical activity. You look at barriers to physical activity, whether or not they are receiving their 60 minutes of moderate physical activity per day.

Sedentary should be examined separately: how many hours of screen time are occurring? Watching television or DVD, playing video games, and using the computer qualify as screen time. It is recommended that non-school related screen time is limited.

## Nutrition Recommendations

The following are nutrition messages that should be given to all parents, particularly parents of young children, during their well-child visits and other anticipatory guidance opportunities:

- Limit sweetened beverages to a few per week
- Eat 5 or more fruits and veggies per day
- Get 60 min of physical activity each day
- Less than 2 hours of screen time
- Remove all TVs, DVD players and other screen related activities from bedrooms
- Eat breakfast every day
- Limit meals away from home, especially fast food
- Limit portion sizes to those that are appropriate
- Eat meals as family

The final nutrition message is to breastfeed at least 6 months. This did not come out in the report, but it is important to recognize so it is included here.

## Nutrition Education Messages for Families

Nutrition messages, particularly for families with young children, should be simple, concrete, and consistent. Simple typically means one concept per statement. Giving too much information causes people to tune out, and they will not understand or hear what you are telling them.

Concrete means it has to be identifiable and measurable. So, instead of saying “eat less fat”, say “eat foods with less than 5 grams of fat per serving”.

Consistency is part of what National Initiative for Children’s Healthcare Quality is trying to do. The NICHQ will be discussed further in the following slide. This group works for consistent messages across all the disciplines, health care providers and programs. When people hear one message from the physician, another from a nurse and then another from their WIC nutritionist

or dietitian, they tend to think that nobody knows what they are talking about, and they won't make any changes. It is important to be consistent with all messages.

## NICHQ

The National Institute of Children's Healthcare Quality (NICHQ) has developed an online outline on how to approach counseling and other types of training and assessment for pediatric obesity.

One of the issues in the past is that each clinic or group does their own thing, and parents and children often hear different pieces of advice from different groups. The idea behind this is that everyone can adopt a more consistent approach to this area.

Link: [https://www.nichq.org/sites/default/files/resource-file/Healthy\\_Care\\_for\\_Healthy\\_Kids\\_Obesity\\_Toolkit.pdf](https://www.nichq.org/sites/default/files/resource-file/Healthy_Care_for_Healthy_Kids_Obesity_Toolkit.pdf)

## Information and Referrals for Families

Parents need to understand appropriate medical care. As mentioned earlier, they need to know how they should approach the issue of medical care. You need to encourage parents to be proactive about assessing their child's risks, such as requesting cholesterol screenings and being sure the appropriate child blood pressure cuffs are used in medical settings that are not specific to pediatrics. Parents need to be empowered to ask for these medical tests, because often times health care professionals may not remember to do a full screening in their 10-minute visit with a client.

## Medical History and Examination

A medical history and examination for all children above 85th percentile should include a family history of obesity, Type 2 diabetes, cardiovascular disease (particularly hypertension), and questions about early cardiovascular deaths. The child should also be evaluated for associated co-morbid conditions.

## Treatment for Overweight and Obesity in Youth

Now we will talk a bit about treatment.

The main thing to point out here is that most of the treatments are for children older than 5. Because this module focuses on children 5 and under, we will briefly discuss all the treatment options but focus more on the options appropriate for the age group.

## New Guidelines for Child Obesity

In December 2007, a new list of expert committee recommendations on assessment, prevention and treatment of child obesity were released in the journal *Pediatrics*. There are 3

independent documents, one for each of those topics, and there is one overview document on how the three areas fit together.

The next section will describe the stages of child obesity treatment from this document. Click the link to view the entire document.

Link: <https://www.andeal.org/vault/2440/web/files/PWM/PWM2007/Ped2007DecV120.pdf>

## Staged Approach to Treatment

The 2007 guidelines for childhood obesity look at a staged approach to treatment. The stages are based on a child's age, BMI, co-morbid conditions, the weight status of parents and how they proceed through treatment (meaning how successful they are through the different stages).

### Stage 1: “Prevention Plus” Protocol

Stage 1 is “Prevention Plus”. It is very similar to some of the other prevention messages we discussed earlier. Stage 1 looks at dietary habits and physical activity, particularly focusing, for nutrition purposes, on fruits and vegetables and the absence of sugar-sweetened beverages.

For activity, it focuses on less than 2 hours of screen time per day, keeping televisions out of the bedroom, and getting 60 minutes or more of physical activity per day.

### Stages 1: “Prevention Plus” Protocol

Families in stage 1 should be counseled about eating a daily breakfast, limiting meals from outside of the home, having family meals as often as possible, and particularly important, allowing the child to self-regulate his or her own intake at meals and not being overly restrictive.

Children up to age 3 or 4, can regulate their own intake pretty well, so it important that the parents not override that by either limiting their children's calorie intake too restrictively or drawing too much attention to the issue. At this age, we want them to focus on knowing their body, and knowing when they are full or hungry.

### Stage 1: “Prevention Plus” Protocol

The goal for stage 1 is weight maintenance and allowing the children to grow into weight. Typically, a monthly follow-up is the best way to go, since stage 1 is a fairly non-intensive treatment stage.

After 3-6 months, if there is no improvement, older children would advance to stage 2. Young children can also advance to stage 2, but that is the furthest stage they would go to.

### Stage 2: “Structured Weight Management”

Stage 2 “Structured Weight Management” is similar to stage 1. In addition to focusing on fruits and vegetable, physical activity, and no sugar-sweetened beverages, stage 2 also addresses the following:

- Reducing highly processed foods
- Having structured meals and snack times so there is no grazing
- Maintaining only 3 meals and 2 to 3 snacks per day
- Having supervised play to make sure that the children are being active
- Limiting screen time to less than 1 hour per day
- And having day care providers and other family members play a role in monitoring what the children are doing.

## Stage 2: “Structured Weight Management”

The goal for stage 2 is weight maintenance with growth. Unless the child is excessively obese, weight loss is not recommended. There are conditions in which weight loss may be required for young children, but this should be done with close supervision by a medical provider.

Weight loss should not exceed 1 pound per month in young children. If it does exceed more than that, it is probably a result of too little energy intake or another issue that needs to be discussed with the health care provider.

## Stage 3: “Comprehensive Multi-Disciplinary Approach”

Stage 3 is a Multi-disciplinary Approach. The first 2 stages can be done, for the most part, by a single provider.

Stage 3 is more of a group treatment approach. It requires family participation, supervision, structured behavior modification, monitoring physical activity and nutrition intake, booklets, and journals to complete, frequent contact between providers and families, and talking with families about goal setting.

Very few children under 5 are going to proceed to this stage. Again, if they are severely obese, this may be appropriate, but for the most part it is for older children.

## Stage 3: “Comprehensive Multi-Disciplinary Approach”

The goal of stage 3 is weight maintenance or gradual weight loss. The weight loss goals are similar to what they were in the previous stage.

## Weight Targets for 2-5 Year Olds

In general, at the end of treatment, the weight targets for 2- to 5-year-olds would be to have them maintain their weight and then try to grow into their weight so that they slowly fall further down on the BMI curve. If they are above the 95th percentile, weight maintenance is

still the preferred measure, however if they have a lot of co-morbid conditions, weight loss may be required. If they have a BMI over 21 or 22, these are the children that would be appropriate for the stage 3 of the program, and we are going to look at gradual weight loss for these children.

## Stage 4: “Tertiary Care”

Stage 4 is meant for children who are pubescent or beyond puberty. Stage 4 is occasionally for a young child who is above the 99th percentile. These tertiary care centers are more commonly found in large medical centers or university medical centers.

## Test Your Knowledge

Now it is time to test your knowledge!

### True/False

Question 1: BMI percentiles are used to assess overweight and obesity for children 2 years and older.

- A. True
- B. False

Answer: A. True

### Multiple Choice

Question 2: In the past 2 to 3 decades, how has the prevalence of childhood overweight and obesity changed?

- A. No change
- B. Doubled
- C. Tripled
- D. Decreased by half

Answer: B. The prevalence of childhood overweight and obesity has doubled in the past 2 to 3 decades

### Multiple Choice

Question 3: Which of the following is a complication of childhood overweight and obesity?

- A. Asthma
- B. Blount’s disease
- C. Liver disease

D. Hyperinsulinemia

E. All of the above

Answer: E. All of the above

## Multiple Choice

Question 4: Which of the following is not a nutrition recommendation for prevention of childhood overweight and obesity?

A. Eat breakfast daily

B. Eat family meals

C. Limit meals away from home

D. 20 minutes of physical activity daily

E. None of the above

Answer: D. The recommendation is 60 minutes of physical activity daily.

## Multiple Choice

Question 5: The staged approach to childhood overweight and obesity treatment is based on which of the following?

A. Child's age

B. BMI

C. Comorbid conditions

D. Weight status of parents

E. All of the above.

Answer: E. The staged approach in the 2007 guidelines is based on all of these.

## Quiz Results

Quiz Result

## Resources

### Resources:

American Academy of Orthopaedic Surgeons. "Slipped Capital Femoral Epiphysis." AAOS. Aug 2007. <http://orthoinfo.aaos.org/topic.cfm?topic=a00052>

Neil K. Kaneshiro. "Blount's Disease" Medline Plus. Dec 2008. [www.nlm.nih.gov/medlineplus/ency/article/001584.htm](http://www.nlm.nih.gov/medlineplus/ency/article/001584.htm)

## End Slide

This completes the module Pediatric Overweight and Obesity, presented by the Minnesota Department of Health WIC Program.

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