Sleep, Diet, and Exercise: Practicing Evidence-Based Preventive Pediatric Occupation Therapy

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The Ohio State University, Columbus, OH
Speaker

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Systematic Job Matching

The Ohio State University
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Acknowledgements

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• Brent Braveman, PhD, OTR/L, FAOTA
• Amy Lamb, OTD, OTR/L, FAOTA
• Mary Fristad, PhD, ABBP

Previous Related Work
Objectives

1. Describe the healthy habits construct.
2. Explain the utility of using existing evidence to improve health in children.
3. Classify interventions as sleep, diet, or exercise-related.
## Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>0-15</td>
<td>Introduction and Overview</td>
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<td>15-30</td>
<td>Sleep Hygiene</td>
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<td>30-45</td>
<td>Physical Activity</td>
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<td>45-60</td>
<td>Healthy Nutrition</td>
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<td>Questions</td>
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The IHI Triple Aim

Population Health

Experience of Care

Per Capita Cost

Benefits for Women
- Providing insurance options, covering preventive services, and lowering costs.

Young Adult Coverage
- Coverage available to children up to age 26.

Strengthening Medicare
- Yearly wellness visit and many free preventive services for some seniors with Medicare.

Holding Insurance Companies Accountable
- Insurers must justify any premium increase of 10% or more before the rate takes effect.
The Center for Integrative Health and Wellness heals the whole person.

We offer the best of both conventional and complementary medicine to promote optimal health, prevent and treat disease and meet each patient’s unique physical, emotional and spiritual health goals.

A key feature is our Integrative Medicine Clinic, which provides a rich scope of services and educational opportunities rarely found in traditional medical centers. Our nationally recognized practitioners include nurses, physicians, massage therapists and chiropractors with expertise in pediatrics, nutrition therapy, Chinese medicine and many other fields. With public interest in complementary health care continuing to grow, we offer acupuncture, mind-body medicine, music therapy and many other nontraditional therapies.

We also provide convenient access to the world-renowned scientists and clinicians at The Ohio State University Wexner Medical Center.
How can Pediatric OTs practice preventive medicine?

In ways that...

• align with the Affordable Care Act (2010)
• bring educational & medical systems together
• demonstrate our unique value
• maximize existing evidence-based practices
• don’t require us to reinvent the wheel
Preventive Pediatric Occupational Therapy
Healthy Habits for Children:

1. Sleep Hygiene
2. Physical Activity
3. Healthy Nutrition
**HEALTH POLICY PERSPECTIVES**

**P4 Medicine and Pediatric Occupational Therapy**

Andrew C. Persch, Brett H. Braverman, Christine A. Mitzler

**MULTI-TERM**
- individualized medicine
- occupational therapy
- patient participation
- pediatrics
- preventive medicine

Pediatric occupational therapy practitioners face a complex and ever-changing healthcare environment, creating many challenges and opportunities. Persch et al. discuss a systems approach to healthcare that emphasizes proactive and robust care arrangements. They present a model to optimize the skills of occupational therapy practitioners to demonstrate the value of occupational therapy services.


**HEALTH POLICY PERSPECTIVES**

**Healthy Habits for Children: Leveraging Existing Evidence to Demonstrate Value**

Andrew C. Persch, Amy J. Lamb, Christine A. Mitzler, Mary A. Fridrik

**MULTI-TERM**
- eating habits
- habits
- health promotion
- motor activity
- school health services
- sleep

Healthy habits are a crucial component to promoting health and well-being across the lifespan. Persch et al. review evidence that supports leveraging existing interventions to demonstrate value in promoting healthy habits among children. They highlight the importance of early intervention and the need for a comprehensive approach to address multiple aspects of healthy habit development.


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Format of Presentation

- Habit in Typical Populations
- Habit in At-Risk Populations
- Benefits of Habit
- Clinical Implications
- Applications
For children, sleep hygiene is defined as “modifiable parent and child practices that promote good sleep quality, allow sufficient sleep duration, and prevent daytime sleepiness.”
Sleep is a Basic Need

• Sleep is a basic physiological need for all children.¹,²
• Sleep provides energy and motivation to participate in life.²
• Sleep patterns and routines are important to physical and mental health.³

¹ Mindell, Meltzer, Carkadon, & Chervin, 2009
² Maslow, 1943
³ Danner, 2000; Wolfson & Carskdon, 1998
Your Child’s Sleep

The AASM recommends that your child get the following amounts of sleep at each stage of growth.

14-15 hours
12-14 hours
11-13 hours
10-11 hours
9-10 hours

Infants | Toddlers | Preschoolers | School-age children | Teenagers
Sleep Habits and Routines in Typical Populations

• The time at which children wake-up is generally more consistent than their bedtime.¹
• Young children often depend on their caregivers to establish both a morning and bedtime routine.
• Independent sleep habits begin to form during adolescence.²
• Children with inconsistent sleep habits are at risk for decreased school performance, physical, and mental health.³,⁴
• Sleep deprivation impairs overall performance.⁴

¹ Petta, Carskadon, & Dement, 1984
² Hauri, Percy, Olmstead, & Sateia, 1980
³ Danner, 2000; Wolfson & Carskadon, 1998
⁴ Pilcher & Huffcutt, 1996
Sleep Habits and Routines in At-Risk Populations

- Difficulty with sleep hygiene is commonly observed in children with mental health disorders, such as Depression, Bipolar Spectrum Disorder (BSD), Attention Deficit Hyperactivity Disorder (ADHD).

- Sleep debt and overall impaired sleep can exacerbate behavioral, anxiety, and mood disorders.

- Diminished sleep quantity and quality is commonly observed in children with developmental disabilities, such as Autism, Down Syndrome, Prader-Willi Syndrome, Intellectual Disability, Cerebral Palsy.

1 Emslie, Rush, Weinberg, Rintelmann, & Roffwarg, 1990
2 Lofthouse et al., 2008
3 Corkum, Tannock, & Moldofsky, 1998
4 Wiggs & Stores, 2004
5 Cotton & Richdale, 2010
6 Newman, O’Regan, & Hensey, 2006
Sleep is Healthy for Children

- Children respond to modest restriction and extension of sleep habits and routines.¹
- Modest extensions of sleep quantity may improve daily function.¹
- A healthy range for children and adolescents is between 7 and 9 hours of sleep per night.²
- In children with BSD, evidence supports better sleep leads to better mood.³

¹ Sadeh, Gruber, & Raviv 2003
² Harris, King, & Gordon-Larsen, 2005
³ Barbini, Bertelli, Colombo, & Smeraldi, 1996
Clinical Implications of Sleep in Practice

- Occupational therapy practitioners should be aware of the signs and symptoms indicative of insufficient sleep and sleep deprivation.¹

- Signs and symptoms include: fatigue, irritability, decreased stress tolerance, difficulty concentrating, remembering, and/or learning, sickness, blurred vision, changes in appetite.

¹ Sadeh, Gruber, & Raviv 2003
Promoting Good Sleep Hygiene for Children

1. Educate children and families about sleep.¹
2. Build awareness of sleep patterns, using formal sleep screening instruments or informal tools.¹
3. Identify opportunities to improve sleep hygiene and recommend feasible behavioral modifications, such as taking a break from technology use before bed and establishing a consistent bedtime routine.

¹ Fristad, Goldberg Arnold, & Leffler, 2011
Pediatric Case Study

• Riley is a student on your OT caseload. She is a 7th grader at Riverside Middle School who has been diagnosed with Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD). Riley has difficulty following directions and staying on task in the classroom. Riley’s teachers report she often comes to school in the morning tired, fatigued, and drowsy. Riley is a picky eater. She snacks on high carb food throughout the day. Riley struggles to participate in afternoon classroom activities and often requests to take a nap.

• Riley’s mother picks her up after school and they drive directly to her older brother’s nightly baseball practices. Riley snacks on chips in the car and plays apps on her IPad during the practice. They swing by fast food multiple times a week for dinner. Riley goes to bed anytime between 10:00pm and 12:00am. She works on her homework in bed and falls asleep with the lights on. Riley wakes-up at 6:30am every morning but usually hits snooze. She runs late, skips breakfast, and rushes off to the school bus.

• Riley’s parents and primary care physician have expressed concern about her weight and her sedentary lifestyle.

• You are working with Riley to help her with sleep hygiene, physical activity, and healthy nutrition.
Pediatric Case Study: Sleep Hygiene

- What happens when I don’t get enough sleep?
  - Comes to school in the morning tired, fatigued, and drowsy
  - Difficulty following directions and staying on task
- What happens when I get too much sleep?
- How much sleep do I get?
  - Bedtime = 11:30pm
  - Fall-asleep time = 12:30am
  - Wake-up time = 6:30am
  - Total sleep time = 6 Hours
- Am I getting enough sleep? Yes/No
- If no, use this chart to track your sleep.
<table>
<thead>
<tr>
<th>Time</th>
<th>Bedtime</th>
<th>Fall-Asleep Time</th>
<th>Wake-Up Time</th>
<th>Total Sleep Time</th>
<th>Total Nap Time</th>
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</thead>
<tbody>
<tr>
<td>Monday-Tuesday</td>
<td>11:30pm</td>
<td>12:30pm</td>
<td>6:30am</td>
<td>6 Hours</td>
<td>0 Minutes</td>
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<tr>
<td>Tuesday-Wednesday</td>
<td>12:30pm</td>
<td>12:45pm</td>
<td>7:00am</td>
<td>6 Hours 15 Minutes</td>
<td>30 Minutes</td>
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</table>
Pediatric Case Study: Sleep Hygiene Intervention Targets

- Create a sleep occupational profile based on informal interview with the child and their family, assessment scores, and data collection from the sleep tracking chart.

<table>
<thead>
<tr>
<th>Environmental Modifications</th>
<th>Establish a Sleep Routine</th>
<th>Behavioral Modifications</th>
<th>Plan Ahead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish a quiet place for rest</td>
<td>Set target bedtimes and wake-up times</td>
<td>Limit technology use before bed</td>
<td>Work on homework earlier in the day</td>
</tr>
<tr>
<td>Establish a quiet place for sleep</td>
<td>Create a bedtime routine checklist</td>
<td>Refrain from high sugar foods before bed</td>
<td>Incorporate time for bedtime and morning routines</td>
</tr>
<tr>
<td>Turn down the lights before bed</td>
<td>Create a morning routine checklist</td>
<td>Introduce calming routines before bed</td>
<td>Increase physical activity in the day to ensure fatigue at night</td>
</tr>
<tr>
<td>Use a nightlight</td>
<td>Behavioral contract</td>
<td>Set a second alarm in the morning</td>
<td>Set alarm early enough for morning routine and breakfast</td>
</tr>
</tbody>
</table>

Physical Activity in Typical Populations

- Inactivity, especially TV, strongly associated with obesity\(^1\)
- Activity/inactivity habits of childhood/adolescence predict adult patterns & habits\(^2\)
- Minorities & females experience greater inactivity\(^3\)

\(^1\) Gortmaker, Sobal, Peterson, Colditz, & Dietz, 1996
\(^2\) Raitakari, Porkka, Taimela, Telama, Rasanen, & Viikari, 1994
\(^3\) Andersen, Crespo, Bartlett, Cheskin, & Pratt, 1998
Physical Activity in At-Risk Populations

• More physical activity results in fewer depressive symptoms
• Exercise helps to alleviate dysphoria
• Youth with mood disorders may gain weight secondary to changes in mood & medication side effects

1 Fristad, Goldberg Arnold, & Leffler, 2011
Physical Activity in At-Risk Populations

• Weight-bearing increased bone-density in children with CP
• Physical training delays deterioration in children with DMD
• School-based yoga increases resiliency & self-esteem

1 Chad, Bailey, McKay, Zello, & Snyder, 1999
3 Case-Smith, Sines, Klatt, 2010
Physical Activity is Healthy for Children

• Increased bone & CV health, decreased cancers\(^1\)
• Promotes positive physical & mental health outcomes\(^2\) that may persist into adulthood\(^3\)
• Promotes decreased fat levels and proper functioning of physiological systems\(^4\)
• Reduces stress & anxiety\(^5\)

\(^1\) NIH, 1987
\(^2\) Ross & Hayes, 1988
\(^3\) USDHHS, 1996
\(^4\) Baranowski, Mendlein, Resnicow, Frank, Cullen, & Baranowski, 2000
\(^5\) Fristad, Goldberg Arnold, & Leffler, 2011
Yoga With Children
A dynamic activity with physical, psychosocial, and behavioral benefits
What is Yoga?

• Key elements: physical postures, controlled breathing, deep relaxation and meditation.

• These structured activities “require individuals to exercise volitional control over their physical and mental activity” (Davidson, 2012)
Why do we care about yoga?

• In 2007 ~ 1.5 million children were participating in yoga programs across the United States (Barnes, Bloom, & Nahin, 2009)

• This number continues to increase as these programs are implemented in a growing number of studios, clinical settings, and schools.

• Yoga is being used extensively by OTs and PTs to address a variety of physical, developmental, and psychosocial issues.
Welcome to Every Kid's Yoga
An integration of Yoga, Creative Arts, and Play
Founded upon the relationship between movement, learning, and child-development
Committed to increasing health, creativity, and awareness in children and others.

Yoga for the Special Child
A Therapeutic Approach for Infants and Children with Sensory Integration Disorders
Nancy Williams
Illustrated by Leslie Wolfe

Yoga Therapy for Every Special Child
Meeting Needs in a Natural Setting
Nancy Williams

Yoga Therapy for Children with Autism and Special Needs
Louise Goldberg

Yoga with a Sensory Integrative Approach
Integrated Nicole Cuomo
Other Yoga Programs

• Yoga-Ed
  http://yogaed.com/

• Zensational Kids
  http://www.zensationalalkids.com/

• Get Ready to Learn
  http://home.getreadytolearn.net/

• Wholekids Pediatrics
  http://www.wholekidspediatrics.com/pediatrics/
Move Into Learning
Objective: Anxiety disorders are the most prevalent psychological disorders among children and youth. There is growing interest in interventions to reduce anxiety. Yoga is widely used in clinical, school, and community settings, but established evidence supporting its effectiveness in reducing anxiety is limited.

Method: This systematic review examined the evidence base (1996-2016) for yoga interventions addressing anxiety among children and adolescents (ages 3-18 yr). The search identified 214 references and 50 studies that were eligible for full-text review. The final analysis included 19 randomized controlled trials, 12 nonrandomized pre–post intervention, 13 case reports, and 2 nonrandomized pre–post intervention–post intervention–control group design studies.

Results: Fourteen studies involved yoga intervention, 7 provided post–pre intervention–post intervention comparisons, and 1 case study.

Conclusion: Limited evidence supports the use of yoga intervention, but research with larger, randomized, controlled trials is needed to establish the efficacy of yoga in reducing anxiety.


An estimated 21% of children and adolescents in the United States have a diagnosable psychiatric disorder resulting in at least minimal impairment, and upward of 4 million youth have a serious psychiatric disorder that causes significant functional impairments across social, familial, and community domains (Merikangas et al, 2010; U.S. Department of Health and Human Services, 1999). Anxiety disorders are the most prevalent of these disorders in children (Albright & Goodman, 2000; Carrwright-Heaton, McNicol, & Dadds, 2006), with 10–37% of community samples and 5–15% of children in mental health clinics affected (Luca, Perelis, Heenen, & Kandai, 1992; Wexler & Last, 2001). Prevalence data from a representative U.S. sample demonstrated that among adolescents affected by anxiety disorders, 50% had their onset by age 6 (Merikangas et al, 2010). These statistics demonstrate that anxiety disorders occur early and often in children. In addition, anxiety disorders in children are associated with mood and anxiety disorders in adolescence and adulthood, suicide attempts, and psychiatric hospitalization (Sorensen, 2009). Given the high prevalence and functional impairment associated with childhood anxiety disorders, the need for effective ways to nurture these children’s mental health and well-being is imperative.

Yoga has increasingly been used with a variety of child populations. In 2007, upward of 1.5 million children were participating in yoga programs across the United States (Barries, Bloem, & Nahn, 2009), and this number continues to increase as these programs are implemented in a growing number of community settings, clinical settings, and schools. Yoga, a subset of mindful and contemplative practice, includes structured activities that “require individuals to exercise volitional control” over their physical and mental activity (DeSantis et al., 2012, p. 147) through focus on improving attention, enhancing emotional regulation, and promoting relaxation.

Reflecting the swelling ranks of adult yogis, a growing number of kids are now doing yoga, as health experts, researchers and educators note the promise of initial research suggesting the ancient meditative movement practice may help little ones relieve stress, calm anxiety and improve mood — along with helping address ADHD, without drugs. The benefits seen in school-aged children and adolescents mirror many seen in adults — and extend to physical health as well, including improved flexibility and possible positive effects for heart and lung-related, or cardiopulmonary, health.

In all, 3 percent of children — or 1.7 million in the U.S. — did yoga in 2012, according to the latest data available from the National Health Interview Survey; that’s up about 429,000 kids from 2007.

More study is still needed, researchers say to evaluate the suggested benefits of yoga for children, as well as who might benefit most, and what type of yoga practices, duration and frequency would be optimal. “There’s a lot more we need to understand,” says Linda L. Weaver, clinical faculty at The Ohio State University School of Health and Rehabilitation Sciences. But, she says, “Overall we’re seeing a real wide variety of improvements in physical and psychological health in our children and adolescents who are participating in these types of yoga programs.” Research on yoga programs offered in clinical and classroom settings have found decreased levels of depression, stress and anger, plus improved coping skills, she says; that’s in addition to improved strength, flexibility and fitness.
Physical Activity, Clinical Implications

• Clinicians should emphasize the benefits of physical activity for ALL children, but especially for minorities, females, and those with disabilities\(^1\)

• Hours of TV per day is predictive of ill health\(^1\)

• 5+ physical activity sessions per week predicts good health\(^1\)

\(^1\) Harris, King, & Gordon-Larsen, 2005
Physical Activity, Clinical Practice

- Incorporate physical activity into plans of care
- Grade physical activities to individual abilities
- Monitor, measure, and document progress
- Revise protocols to avoid plateaus
Pediatric Case Study: Physical Activity

• What happens when I don’t get enough exercise?
• What happens when I get too much exercise?
• Three main types of exercise and how many times I use each per week?
  • Stretching:
  • Aerobic:
  • Strengthening:
• Am I getting enough exercise? Y/N
• If no, use this chart to track your exercise.
<table>
<thead>
<tr>
<th>Days</th>
<th>Stretching</th>
<th>Aerobic</th>
<th>Strengthening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideas and Daily Goals</td>
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<td>0</td>
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<td>Wednesday</td>
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<td>Yoga</td>
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<tr>
<td>Sunday</td>
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</tbody>
</table>
get kids walking!!

develop routines for the classroom

don’t underestimate standing

fitbit.com

yogastudioapp.com

pedometer
Movement Break
Nutrition in Typical Populations

• Nutrition is a key determinant of energy and obesity\textsuperscript{1}
• Healthy diet beneficial for all children\textsuperscript{2}
• 31.8\% of US children \& adolescents, ages 2-19, are overweight or obese\textsuperscript{3}
• Incidence and prevalence of childhood obesity are increasing\textsuperscript{3}

\textsuperscript{1} Harris, King, \& Gordon-Larsen, 2005
\textsuperscript{2} Fristad, Goldberg Arnold, \& Leffler, 2011
\textsuperscript{3} Ogden, Carroll, Curtin, McDowell, Tabak, \& Flegal, 2006

= \textit{What we eat} – \textit{What we expend}
Nutrition in At-Risk Populations

- Nutrition especially important for children with mood disorders\(^1\)
- Changes in appetite related to mood\(^1\)
- Changes in appetite related to medication side-effects\(^1\)
- Strong cravings for carbohydrates\(^2\)

\(^1\) Fristad, Goldberg Arnold, & Leffler, 2011
\(^2\) Christensen & Pettijohn, 2001
Medical Complications of Obesity

- Pulmonary disease
  - abnormal function
  - obstructive sleep apnea
  - hypoventilation syndrome

- Idiopathic intracranial hypertension

- Stroke

- Cataracts

- Nonalcoholic fatty liver disease
  - steatosis
  - steatohepatitis
  - cirrhosis

- Gall bladder disease

- Gynecologic abnormalities
  - abnormal menses
  - infertility
  - polycystic ovarian syndrome

- Coronary heart disease

- Diabetes

- Dyslipidemia

- Hypertension

- Severe pancreatitis

- Cancer
  - breast, uterus, cervix
  - colon, esophagus, pancreas
  - kidney, prostate

- Osteoarthritis

- Skin

- Phlebitis
  - venous stasis

- Gout
Malnutrition in At-Risk Populations

• Malnutrition negatively impacts intellectual development\textsuperscript{1,2}
• “Poor health and poor growth are likely to lead to poor school achievement via deficits in cognitive functioning, behavior...and increased absenteeism and school failure”\textsuperscript{3}
• Tennessee @ 49% Free & Reduced Lunch\textsuperscript{4}
  • In Nashville, 71% of MNPS students, or more than
  • 59,773 children, qualify for free and reduced lunch

\textsuperscript{1} Brown & Pollitt, 1996
\textsuperscript{2} Kozol, 2012
\textsuperscript{3} Crooks, 1995
\textsuperscript{4} MI, CEPI 2016
PERCENT OF LOW INCOME STUDENTS IN U.S. PUBLIC SCHOOLS 2013
National Average: 51%

Nutrition in At-Risk Populations

- Children w/ CP may experience difficulty maintaining nutrition\(^1\)
- Children w/ ASD may demonstrate picky-eating & require supplements\(^2\)
- Tactilely defensive children had poor/ fair appetite and refused foods based on smell, temperature, texture, and context\(^3\)

\(^1\) Gisel & Patrick, 1988
\(^2\) Lockner, Crowe, & Skipper, 2008
\(^3\) Smith, Roux, Naidoo, & Venter, 2005
A Healthy Diet is Good for Children

- Development/function of physiological systems\textsuperscript{1,2}
- Prevents deficiencies\textsuperscript{2}
- Enhances cognitive function\textsuperscript{3} and school performance\textsuperscript{4}
- Improves self-esteem & resiliency\textsuperscript{5}
- Decreased risk of disease\textsuperscript{5}

\textsuperscript{1} USDHHS, 1998
\textsuperscript{2} McLaren & Burman, 1992
\textsuperscript{3} Kretcher, Beard, & Carlson, 1996
\textsuperscript{4} Meyers, Sampson, & Weitzman, 1991
\textsuperscript{5} APA, 2013 (http://www.apa.org/topics/children/healthy-eating.aspx)
Diet, Clinical Implications

- Focus on developing healthy habits not dieting/ weight loss\(^1\)
- 2+ servings of fruits/ veggies per week predicts lower BMI\(^2\)
- Eating fast food 2+ times per week predicts increased TV\(^2\)
- In the schools, some children may not be ready to learn until after they have eaten\(^3\)

\(^1\) Fristad, Goldberg Arnold, & Leffler, 2011
\(^2\) Harris, King, & Gordon-Larsen, 2005
\(^3\) Crooks, 1995
Diet, Clinical Practices

1. Educate children & families about nutrition
2. Build awareness of eating patterns
3. Recommend feasible behavioral modifications
4. Develop structure & routines the facilitate healthy choices

1 Fristad, Goldberg Arnold, & Leffler, 2011
Pediatric Case Study: Healthy Nutrition

• What happens when I don’t get eat healthy foods?
• What happens when I eat healthy foods?
• Healthy and unhealthy foods:
  • Healthy foods I eat:
  • Unhealthy foods I eat:
• Am I getting enough healthy foods? Y/N
• If no, use this chart to track your food.
<table>
<thead>
<tr>
<th></th>
<th>Bread, Cereal, Rice, Pasta</th>
<th>Vegetables</th>
<th>Fruits</th>
<th>Meats, Fish, Eggs</th>
<th>Fats, Oils, Sweets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goals</strong></td>
<td>6-11 servings</td>
<td>3-5 servings</td>
<td>2-3 servings</td>
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Thank You!

Questions?