CONTEMPORARY
# Pediatrics

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DSM-5 NEW PSYCHIATRIC DIAGNOSTIC CRITERIA PG 29

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# ACL INJURIES in teen girls

## Screening kids for depression

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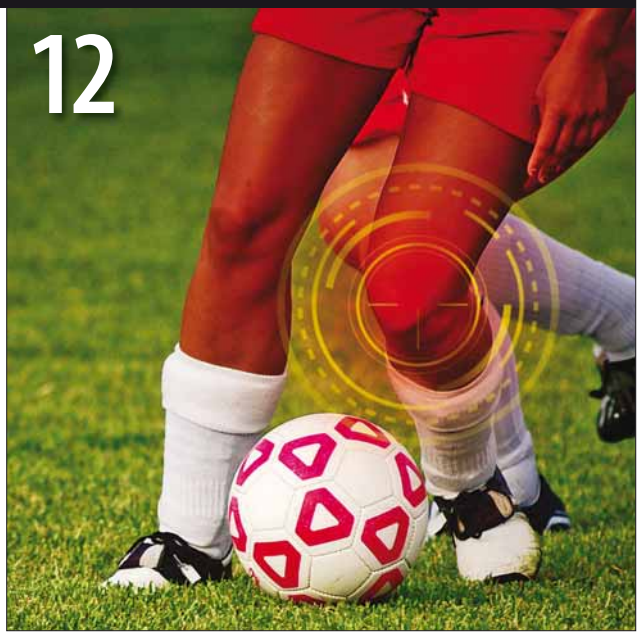


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## DEPARTMENTS

### NEWS & COMMENTARY



### IN ADDITION




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**Reference: 1.** Institute of Medicine Report Brief. Dietary reference intakes for calcium and vitamin D. http://www.iom.edu/Reports/2010/Dietary-Reference-Intakes-for-Calcium-and-Vitamin-D/DRI-Values.aspx. Accessed March 28, 2013.



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MICHAEL S JELLINEK, MD

# HELPING ADOLESCENTS TO OVERCOME DEPRESSION

**DR JELLINEK** is professor of psychiatry and of pediatrics, Harvard Medical School, and Chief Clinical Officer, Partners HealthCare System, Boston, Massachusetts. He also is a member of the *Contemporary Pediatrics* editorial advisory board.

Adolescent depression is a minefield for pediatricians that many—I dare to say, too many—try to avoid. The article in this issue, "Screening adolescents for depression" by Marissa Corona and doctors Carolyn McCarty and Laura Richardson, is an excellent review of adolescent depression that prepares pediatricians to deal with this common disorder. However, many pediatricians choose to avoid rather than navigate this minefield.

This choice is not one that should be taken lightly. Most pediatricians are aware of the prevalence and know that adolescent depression has a genetic basis with about half following a pattern of recurrence. Depressed teenagers are more prone to substance use including alcohol, which is associated with risk-taking behaviors. Depressed adolescents do poorly in school and have more family discord. Depressed adolescents may attempt suicide and, sadly, some complete this tragic act.

Many pediatricians have faced adolescent depression in their own children and certainly in their family's circle of friends.

So, knowing these risks, a pediatrician's decision to routinely screen for depression—a treatable disorder far more common than many other conditions we screen for—means navigating this minefield.

Although the diagnosis is readily definable symptomatically, conducting a meaningful interview with a depressed adolescent is not easy. He or she may be reluctant to share information. Really listening to the sadness and hopelessness of a depressed adolescent without excessive interruption is both a task and a burden. Rushing to give "answers" is tempting; however, premature suggestions limit the empathy and stop the listening.

The information gathered is also a burden. The pediatrician will have to weigh the issues of confidentiality. Should he or she keep some information private from the parents? That's not a simple decision and one that is always open to second-guessing. If the pediatrician keeps the confidence, will that make him or her more trustworthy and supportive of the relationship with the adolescent, or are the risks of dangerous behavior so high that the confidence must be broken to protect the teenager from harm over the short term?

Lastly, interviewing a depressed adolescent does not fit into the workflow of the usual pediatric practice. Furthermore, in the office visit, the pediatrician faces a tough decision. How serious is this depression? Is it an emergency, urgent, or is it mild to moderate? Some might say, better not to know.

Yet, I must argue that screening, recognizing, evaluating, and treating the milder forms of adolescent depression can be one of the most relevant and fulfilling aspects of pediatrics. Recognizing and referring the more seriously depressed adolescents can be lifesaving. Often these are patients you have seen grow up in your practice. You care about them and want them to navigate adolescence successfully. You know that depression can be treated through support, verbal therapies, and medication, and you know that the combination of treatments has the highest chance of success.

A depressed adolescent gives you the privilege of entering his or her world as well as working with the family and experiencing vital life issues through a meaningful relationship. It is intense and requires judgment, creativity, and bearing risk. Navigating the minefield of adolescent depression can remind you why you became a pediatrician. CP

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**Important Safety Information**
Auvi-Q should **ONLY** be injected into the anterolateral aspect of the thigh. DO NOT INJECT INTO BUTTOCK OR INTRAVENOUSLY.

Epinephrine should be administered with caution to patients with certain heart diseases, and in patients who are on medications that may sensitize the heart to arrhythmias, because it may precipitate or aggravate angina pectoris and produce ventricular arrhythmias. Arrhythmias, including fatal ventricular fibrillation, have been reported in patients with underlying cardiac disease or taking cardiac glycosides or diuretics. Patients with certain medical conditions or who take certain medications for allergies, depression, thyroid disorders, diabetes, and hypertension, may be at greater risk for adverse reactions. Adverse reactions to epinephrine include anxiety, apprehensiveness, restlessness, tremor, weakness, dizziness, sweating, palpitations, pallor, nausea and vomiting, headache, and/or respiratory difficulties.

Auvi-Q is intended for immediate self-administration as emergency supportive therapy only and is not a substitute for immediate medical or hospital care.

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**Brief Summary of Prescribing Information**

## 1 INDICATIONS AND USAGE

Auvi-Q™ is indicated in the emergency treatment of allergic reactions (Type I) including anaphylaxis to stinging insects (e.g., order Hymenoptera, which include bees, wasps, hornets, yellow jackets and fire ants) and biting insects (e.g., triatoma, mosquitoes), allergen immunotherapy, foods, drugs, diagnostic testing substances (e.g., radiocontrast media) and other allergens, as well as idiopathic anaphylaxis or exercise-induced anaphylaxis.

Auvi-Q™ is intended for immediate administration in patients who are determined to be at increased risk for anaphylaxis, including individuals with a history of anaphylactic reactions.

Anaphylactic reactions may occur within minutes after exposure and consist of flushing, apprehension, syncope, tachycardia, thready or unobtainable pulse associated with a fall in blood pressure, convulsions, vomiting, diarrhea and abdominal cramps, involuntary voiding, wheezing, dyspnea due to laryngeal spasm, pruritus, rashes, urticaria or angioedema.

Auvi-Q™ is intended for immediate self-administration as emergency supportive therapy only and is not a substitute for immediate medical care.

## 4 CONTRAINDICATIONS

None.

## 5 WARNINGS AND PRECAUTIONS

### 5.1 EMERGENCY TREATMENT

Auvi-Q™ is not intended as a substitute for immediate medical care. **In conjunction with the administration of epinephrine, the patient should seek immediate medical or hospital care.** More than two sequential doses of epinephrine should only be administered under direct medical supervision [*see INDICATIONS AND USAGE (1), DOSAGE AND ADMINISTRATION (2) and PATIENT COUNSELING INFORMATION (17.1 in the full prescribing information)*].

### 5.2 INCORRECT LOCATIONS OF INJECTION

Auvi-Q™ should **ONLY** be injected into the anterolateral aspect of the thigh [*see DOSAGE AND ADMINISTRATION (2) and PATIENT COUNSELING INFORMATION (17.1 in the full prescribing information)*].

- **Do not inject intravenously.** Large doses or accidental intravenous injection of epinephrine may result in cerebral hemorrhage due to sharp rise in blood pressure. Rapidly acting vasodilators can counteract the marked pressor effects of epinephrine if there is such inadvertent administration.
- **Do not inject into buttock.** Injection into the buttock may not provide effective treatment of anaphylaxis. Advise the patient to go immediately to the nearest emergency room for further treatment of anaphylaxis.
- **Do not inject into digits, hands or feet.** Since epinephrine is a strong vasoconstrictor, accidental injection into the digits, hands or feet may result in loss of blood flow to the affected area. Advise the patient to go immediately to the nearest emergency room and to inform the healthcare provider in the emergency room of the location of the accidental injection. Treatment of such inadvertent administration should consist of vasodilation, in addition to further appropriate treatment of anaphylaxis [*see ADVERSE REACTIONS (6)*].

### 5.3 ALLERGIC REACTIONS ASSOCIATED WITH SULFITE

Epinephrine is the preferred treatment for serious allergic reactions or other emergency situations even though this product contains sodium bisulfite, a sulfite that may, in other products, cause allergic-type reactions including anaphylactic symptoms or life-threatening or less severe asthmatic episodes in certain susceptible persons.

The presence of a sulfite in this product should not deter administration of the drug for treatment of serious allergic or other emergency situations even if the patient is sulfite-sensitive.

The alternatives to using epinephrine in a life-threatening situation may not be satisfactory.

### 5.4 DISEASE INTERACTIONS

Some patients may be at greater risk for developing adverse reactions after epinephrine administration. Despite these concerns, it should be recognized that the presence of these conditions is not a contraindication to epinephrine administration in an acute, life-threatening situation. Therefore, patients with these conditions, and/or any other person who might be in a position to administer Auvi-Q™ to a patient experiencing anaphylaxis should be carefully instructed in regard to the circumstances under which epinephrine should be used.

- Patients with Heart Disease
  Epinephrine should be administered with caution to patients who have heart disease, including patients with cardiac arrhythmias, coronary artery or organic heart disease, or hypertension. In such patients, or in patients who are on drugs that may sensitize the heart to arrhythmias, epinephrine may precipitate or aggravate angina pectoris as well as produce ventricular arrhythmias [*see DRUG INTERACTIONS (7) and ADVERSE REACTIONS (6)*].
- Other Patients and Diseases
  Epinephrine should be administered with caution to patients with hyperthyroidism, diabetes, elderly individuals, and pregnant women. Patients with Parkinson's disease may notice a temporary worsening of symptoms.

## 6 ADVERSE REACTIONS

Adverse reactions to epinephrine include anxiety; apprehensiveness; restlessness; tremor; weakness; dizziness; sweating; palpitations; pallor; nausea and vomiting; headache; and/or respiratory difficulties. These symptoms occur in some persons receiving therapeutic doses of epinephrine, but are more likely to occur in patients with hypertension or hyperthyroidism [*see WARNINGS AND PRECAUTIONS (5.4)*].

Arrhythmias, including fatal ventricular fibrillation, have been reported, particularly in patients with underlying cardiac disease or those receiving certain drugs [*see WARNINGS AND PRECAUTIONS (5.4) and DRUG INTERACTIONS (7)*].

Rapid rises in blood pressure have produced cerebral hemorrhage, particularly in elderly patients with cardiovascular disease [*see WARNINGS AND PRECAUTIONS (5.4)*].

Angina may occur in patients with coronary artery disease [*see WARNINGS AND PRECAUTIONS (5.4)*].

Accidental injection into the digits, hands or feet may result in loss of blood flow to the affected area [*see WARNINGS AND PRECAUTIONS (5.2)*].

Adverse events experienced as a result of accidental injections may include increased heart rate, local reactions including injection site pallor, coldness and hypoesthesia or injury at the injection site resulting in bruising, bleeding, discoloration, erythema or skeletal injury.

## 7 DRUG INTERACTIONS

Patients who receive epinephrine while concomitantly taking cardiac glycosides, diuretics, or anti-arrhythmics should be observed carefully for the development of cardiac arrhythmias [*see WARNINGS AND PRECAUTIONS (5.4)*].

The effects of epinephrine may be potentiated by tricyclic antidepressants, monoamine oxidase inhibitors, levothyroxine sodium, and certain antihistamines, notably chlorpheniramine, tripelennamine, and diphenhydramine.

The cardiostimulating and bronchodilating effects of epinephrine are antagonized by beta-adrenergic blocking drugs, such as propranolol.

The vasoconstricting and hypertensive effects of epinephrine are antagonized by alpha-adrenergic blocking drugs, such as phentolamine.

Ergot alkaloids may also reverse the pressor effects of epinephrine.

## 8 USE IN SPECIFIC POPULATIONS

### 8.1 PREGNANCY

Teratogenic Effects: Pregnancy Category C.

There are no adequate and well controlled studies of the acute effect of epinephrine in pregnant women.

Epinephrine was teratogenic in rabbits, mice and hamsters. Epinephrine should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus (fetal anoxia, spontaneous abortion, or both).

Epinephrine has been shown to have teratogenic effects when administered subcutaneously in rabbits at approximately 30 times the maximum recommended daily subcutaneous or intramuscular dose (on a mg/$m^2$ basis at a maternal dose of 1.2 mg/kg/day for two to three days), in mice at approximately 7 times the maximum daily subcutaneous or intramuscular dose (on a mg/$m^2$ basis at a maternal subcutaneous dose of 1 mg/kg/day for 10 days), and in hamsters at approximately 5 times the maximum recommended daily subcutaneous or intramuscular dose (on a mg/$m^2$ basis at a maternal subcutaneous dose of 0.5 mg/kg/day for 4 days).

These effects were not seen in mice at approximately 3 times the maximum recommended daily subcutaneous or intramuscular dose (on a mg/$m^2$ basis at a subcutaneous maternal dose of 0.5 mg/kg/day for 10 days).

### 8.3 NURSING MOTHERS

It is not known whether epinephrine is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when Auvi-Q™ is administered to a nursing woman.

### 8.4 PEDIATRIC USE

Auvi-Q™ may be given safely to pediatric patients at a dosage appropriate to body weight [*see DOSAGE AND ADMINISTRATION (2)*]. However, studies in pediatric patients weighing less than 15 kg (33 pounds) have not been conducted.

### 8.5 GERIATRIC USE

Clinical studies of Auvi-Q™ did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects. Other reported clinical experience has not identified differences in responses between the elderly and younger patients. Epinephrine should be administered with caution in elderly individuals, who may be at greater risk for developing adverse reactions after epinephrine administration [*see WARNINGS AND PRECAUTIONS (5.4), OVERDOSAGE (10)*].

## 10 OVERDOSAGE

Overdosage of epinephrine may produce extremely elevated arterial pressure, which may result in cerebrovascular hemorrhage, particularly in elderly patients. Overdosage may also result in pulmonary edema because of peripheral vascular constriction together with cardiac stimulation. Treatment consists of rapidly acting vasodilators or alpha-adrenergic blocking drugs and/or respiratory support.

Epinephrine overdosage can also cause transient bradycardia followed by tachycardia, and these may be accompanied by potentially fatal cardiac arrhythmias. Premature ventricular contractions may appear within one minute after injection and may be followed by multifocal ventricular tachycardia (prefibrillation rhythm). Subsidence of the ventricular effects may be followed by atrial tachycardia and occasionally by atrioventricular block. Treatment of arrhythmias consists of administration of a beta-adrenergic blocking drug such as propranolol.

Overdosage sometimes results in extreme pallor and coldness of the skin, metabolic acidosis, and kidney failure. Suitable corrective measures must be taken in such situations.

Revised September 2012

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# RESIDENT DUTY HOURS

Dr. Charles Lockwood's recent editorial "Restricting resident duty hours: Where is the evidence?" (*Contemporary Pediatrics*, April 2013) was like a breath of fresh air. Finally someone is starting to see the damage that is being done.

I never thought that I would feel like a relic at the age of 43. As I see the shifting sands of medicine swirl around me, I grow very concerned over the future of health care delivery in areas of the United States that are not close to major metropolitan areas.

It seems that current health care policy decision making has centered around these population-dense areas, and although I understand the "more bang for your buck" rationale behind this, I and many others work and live in flyover country, that vast expanse of the country that policymakers jet across between the coasts and the Capitol. Those of us who practice pediatrics in these areas still take night/weekend/holiday call and round on our patients in the hospital. The hospitals with which we are privileged cannot afford to staff pediatric hospitalists 24/7 because of the seasonal nature of our patient population, so we take care of our patients. I feel that the shift in physician training to time limitations is not adequately preparing new physicians for the realities of practice in small communities.

Couple this with the dangerous assumption that "everything you need to know will be in the electronic health record" and you have a recipe for disaster. When the baton is constantly passed from shift to shift, no one takes control of the proper weeding of the overgrown backyard of problem lists and bloated notes that clog the potentially bountiful garden that is the electronic medical record.

Another dangerous assumption is the idea that everyone is proceeding with implementation of the various changes that are overwhelming small medical practices. I believe that many physicians close to retirement are just treading water until they can get out. The incredible loss of experience from physicians who would have potentially practiced for many more years will be very challenging to replace. As newer graduates leave residency with fewer hours of training and patient care exposure, who will mentor them?

On a closing note, I think that it is a dangerous plan to start assigning providers and facilities to tiers of quality. This will inevitably lead to cherry-picking, as it is not very hard to demonstrate good quality results when you are providing medical care to a population that is healthy! The safety-net facilities will enter into what I call the "death spiral." They will never be able to demonstrate good quality results because they are caring for the sickest and least-desirable patients. I understand that a risk stratification scheme is proposed to account for this, but I honestly doubt that it could properly balance the equation. Many times patients make bad decisions regarding their health. Punishing providers for bad outcomes (or suboptimal quality measures) in unhealthy patient populations is like cutting the pay of law enforcement officers who are overwhelmed by an epidemic of crime in a gang-infested city that has already cut the police force down in size and training.

But, despite my concerns, I am optimistic! I believe that a large dose of reality is headed for everyone involved: policymakers, patients, providers, or payors. Maybe then someone will listen to those of us toiling in the trenches.

**ISH STEVENS, MD, MS, FAAP**
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# VARIOLATION NOT VACCINATION

Dr. Michael Brady, in his editorial "Alternate vaccine schedules are not safer and should be obsolete" (*Contemporary Pediatrics*, June 2013), makes important points about vaccine schedules with which I completely agree. He does, however, make an error. He states that Benjamin Franklin lamented not vaccinating his son against smallpox.

Franklin's son died many decades before Edward Jenner developed the smallpox vaccine in 1796. What Franklin regretted was not trying the riskier procedure of variolation.

Variolation was the intentional infection of a vulnerable person with smallpox material from a person having less virulent disease to induce immunity. Variolation lessened the potential for severe disease but, in itself, was risky. This places Franklin's lament in an interesting historical context.

**ROBERT BRAYDEN, MD**
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*University of Colorado School of Medicine*
*Denver, Colorado*

# Weight loss improves insulin sensitivity in obese teenagers

Participating in a weight loss program to reduce body mass index (BMI) by at least 8% yields improvement in insulin sensitivity for adolescents at high risk for type 2 diabetes.

In a trial including 113 obese adolescents aged 13 to 17 years, investigators evaluated the relationship between weight loss and insulin sensitivity, glucose tolerance, and metabolic syndrome (MS). They assessed changes in fasting insulin, homeostasis model assessment of insulin resistance, and whole body insulin sensitivity index (WBISI), as well as BMI and criteria for MS. All participants took part in a family-based lifestyle modification program.

The teenagers followed a nutritional, calorie-restricted diet or used prepackaged foods and met weekly for group counseling. Their parents also met weekly in a separate group and were asked to support their children's behavioral changes and to model healthful behavior for them.

At 4 months, all measures of insulin sensitivity were found to have improved. The adolescents' initial mean BMI decreased by 8% or more, leading to statistically significant improvement in WBISI ($P$=.03). A trend toward improvement in MS was also observed.

Abrams P, Levitt Katz LE, Moore RH, et al. Threshold for improvement in insulin sensitivity with adolescent weight loss. *J Pediatr.* 2013. Epub ahead of print.

# SCREENING AND INTERVENTIONS FOR SLEEP DISORDERS IN CHILDREN ALSO BENEFIT PARENTS

Sleep disorders in children are commonly screened via the BEARS (**B**edtime, **E**xcessive daytime sleepiness, **A**wakening during the night, **R**egularity and duration of sleep, **S**noring) questionnaire. Now investigators have shown that long-term benefits are seen through regular screening and timely interventions not only for children, but also for their parents.

Investigators examined the parentally perceived prevalence of sleep disorders in the pediatric waiting rooms of 2 family health centers. Parents filled out an anonymous modified BEARS questionnaire per child that asked whether they believed that a sleep disorder was present and if the perceived disorder affected their child's health or family life.

In 300 surveys collected from both sites, parents reported the sleep disorders present or affecting family life as bedtime problems, excessive daytime sleepiness, nocturnal awakenings, poor regularity of sleep, and snoring. Irregular sleep was reported by 21.3% and snoring by 13.7%; both problems were reported by 5% of parents as affecting family life.

The American Academy of Pediatrics recommends screening for pediatric sleep disorders by clinicians because parents may describe any sleep problem, particularly those disturbing their own sleep, as a disorder.

Krishna J, Lonzer D, Medina M. Parental perception of sleep disorders in urban family health centers in the greater Cleveland area. *Sleep.* 2013;36(Suppl):A349-A350. Abstract 1019.

# CANCER PREVALENCE HIGHER FOR CHILDREN WITH THYROID NODULES THAN FOR ADULTS

In pediatric patients with ultrasonographically confirmed thyroid nodules 1 cm or greater, cancer prevalence rates are higher than those in adults with such nodules, Boston researchers have shown. The rate of cancer in these children is 22% versus 14% for adults, a statistically significant 1.6-fold higher risk ($P$=.02). Most children with suspected nodules, however, are determined to have benign conditions.

Researchers evaluated presenting features and cancer risk of sporadic childhood thyroid nodules in 300 children. Serum thyroid-stimulating hormone levels were evaluated in those who had suspected nodules, with patients identified as hypothyrotropinemic undergoing $^{123}$I scintigraphy. The remaining patients had thyroid ultrasonography followed by ultrasound-guided fine-needle aspiration if nodules 1 cm or greater were confirmed. Thyroid biopsy was subsequently performed without complication in 125 children. The pediatric data was compared with that of 2,582 adult controls who had been identified using similar methods.

Scintigraphy identified 17 children with autonomous nodules. Biopsy was deemed unnecessary in more than

half of the remaining 283 children who underwent neck ultrasonography; in these cases, no discrete nodule or only nodules under 1 cm were present. In all, 28 children were diagnosed with thyroid cancer.

Gupta A, Ly S, Castroneves LA, et al. FullA standardized assessment of thyroid nodules in children confirms higher cancer prevalence than in adults. *J Clin Endocrinol Metab.* 2013. Epub ahead of print.

## RAPID NONINVASIVE SCREENING TEST FOR ASDS MAY AID DIAGNOSIS

Diagnosis of autism spectrum disorders (ASDs) may be made easier by the discovery of a biochemical marker for ASD. In fact, the development of a rapid, noninvasive screening test for ASDs may be based on high levels of aspartic acid in urine, Cleveland Clinic researchers have shown.

A subset of 69 individuals with ASDs and with or without macrocephaly in the presence or absence of *PTEN* gene mutations was evaluated in the study. Genetic screening through *PTEN* sequencing, physiologic measurements, and amino- and organic-acid analyses of urine and plasma samples were performed.

Six (27%) of 22 individuals with ASD and macrocephaly were found to have germline *PTEN* mutations. No individuals in the macrocephalic group, with or without *PTEN* mutations, had any common biochemical abnormalities.

When evaluated collectively, however, high levels of aspartic acid (an amino acid) in the urine were found in 54 (87%) of 62 participants.

The Centers for Disease Control and Prevention has estimated that ASDs may be occurring in some form in 1 in 88 children. These research findings on a diagnostic biochemical marker for ASDs are promising, given the significant variability in ASDs that may render the alternative of genetic screening impractical due to the labor required.

Hobert JA, Embacher R, Mester JL, Frazier TW 2nd, Eng C. Biochemical screening and PTEN mutation analysis in individuals with autism spectrum disorders and macrocephaly. *Eur J Hum Genet.* 2013. Epub ahead of print.

# Medicaid waivers give states greater flexibility for health care programs

KATHRYN FOXHALL

The system of federal waivers allowing states to try different strategies under Medicaid is actually a major way the program operates and a major reason the state programs differ from each other.

In general, a waiver is a way for the US Secretary of Health and Human Services—with that authority sometimes delegated to the Centers for Medicare and Medicaid Services (CMS)—"to allow a state to receive federal Medicaid dollars for an expenditure that otherwise would not qualify for the funds," said Cindy Mann, director of the Center for Medicaid and Children's Health Insurance Program (CHIP) Services.

The current administration is pledging that Medicaid flexibility will continue as health care reform is implemented, but it also promises there will be more transparency to the process.

In recent times, a number of states have used waivers to move into capitated managed-care arrangements with a broader group of beneficiaries and a broader group of services or to simplify and enhance enrollment and eligibility, she said.

Among the hundreds of waivers listed on Medicaid.gov, for example, is one under which Nebraska will provide "early intensive behavioral intervention to children with autism ages 0-17." Another is the Georgia Planning for Healthy Babies program that is intended to provide family planning and related services to certain low-income, uninsured women, as well as interpregnancy care for such women who have delivered a very low-birth-weight baby.

Mant states have waivers for home and community-based services, although there are ways to conduct such programs under the statute, including new provisions under the Affordable Care Act (ACA), Mann told the recent advisory meeting of the Medicaid and CHIP Payment and Access Commission in Washington, DC.

What waivers are used to do changes over time, she said, depending on "what states are interested in doing in any given point in time and what is happening in the marketplace." Some administrations encourage states to apply for certain kinds of waivers but indicate they will not approve others, she said. It is obvious, she noted, that under Section 1115 of the Social Security Act, one key type of waiver, "quite a bit of discretion lies with the secretary." Section 1115 waivers also can apply to other health programs, including CHIP.

Mann did say that the waiver process has long been criticized as being like deals cut between the federal government and the state's executive body, with the public not knowing exactly what the plan is until the final waiver is announced.

The ACA contains rules for waiver transparency that CMS has now implemented. A state must have at least a 30-day comment period and hold public hearings on a proposed waiver before submitting it to the federal level. After that, CMS checks it for completeness and opens a comment period of at least 30 days at the federal level.

All current, pending, disapproved, and expired waivers are on Medicaid.gov, she said.

In addition to statutory changes that allow states to do a number of things without a waiver, she said, this administration has been looking at ways to expand flexibility through the state plans. She indicated that 15 years ago, "we may have interpreted a statute or looked at a regulation this way, but the marketplace is changing."

She indicated there is a lack of understanding of the flexibilities available to states without waivers, due to the complexity and changing nature of the program and the sometimes rapid change in Medicaid directors.

She also said that "in some circles, waivers become synonymous with reform," and asking for them makes it seem as if a state is doing something more significant than doing something the program allows.

Mann noted that CMS has initiatives on quality and on better, consistent evaluation in waivers. CP


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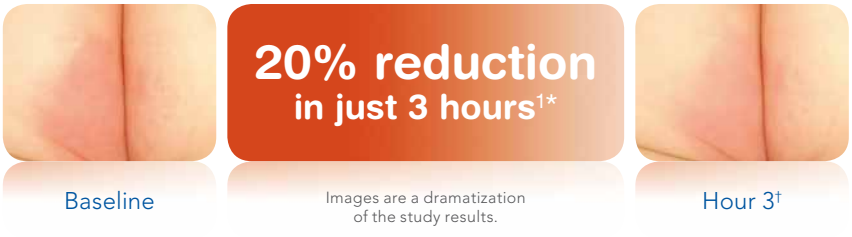


*Trial assessing the efficacy of DESITIN® Maximum Strength Original Paste for 3±1 hours in children (N=31) 3-36 months of age, with mild to moderate diaper rash, wearing diapers for 24 hours a day.[1]

†*P*=0.0001

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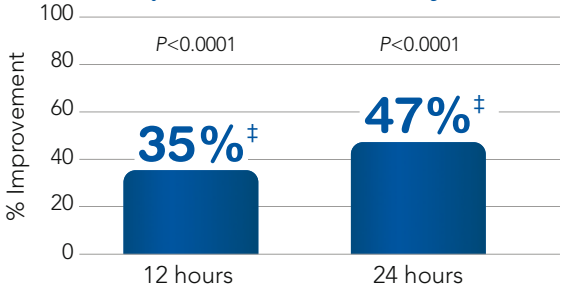


‡Efficacy and safety assessments were performed by a trained evaluator at baseline, and at 12 and 24 hours post-baseline (N=57). Subjects (2-36 months of age) must have received an "Overall Severity Score" of >1.5 as determined by evaluator at enrollment. Diaper rash severity was assessed using a 0- to 3-point scale (0=none; 3.0=severe).

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**References: 1.** Data on file. **2.** Brown WM, Berg JE, Li Q, Kohut BE. A clinical study to evaluate the efficacy of two marketed zinc oxide-based diaper rash ointments in children with diaper dermatitis. Poster presented at: Clinical Dermatology Conference; October 6-9, 2006; Las Vegas, NV. **3.** Product monograph. 68 FR 33377, June 4, 2003.

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# PREVENTION OF ACL INJURIES in adolescent female athletes

AISHA DHARAMSI, MD, AND CYNTHIA LaBELLA, MD

Adolescent girls who participate in competitive or recreational sports are at higher risk for anterior cruciate ligament injuries than adolescent boys, but through neuromuscular training and knowledgeable coaching some of these injuries may be preventable.

Over the past 20 years, the number of young athletes presenting with anterior cruciate ligament (ACL) injuries has increased, primarily because of the growing number of children participating in competitive sports at an early age and exposure to more intense levels of training, along with increasing awareness and detection of such injuries.[1-3] Female adolescent athletes have the greatest risk of ACL injuries, with rates 4 to 6 times as high as for their male counterparts in similar sports.[4,5] Some of these injuries may be preventable through neuromuscular training (NMT) programs. This article reviews the epidemiology, mechanisms, and risk factors for ACL injuries; describes the evidence for the protective effect of NMT in female athletes; and provides pediatricians with resources for educating patients, families, and coaches.

## Role of the ACL

Knee injuries, especially those involving the ACL, are a significant concern for adolescent athletes. The ACL is 1 of 4 major ligaments that stabilize the knee. Its primary role is to prevent knee instability by keeping the tibia from sliding forward in relation to the femur. It functions secondarily to restrict excessive knee extension, varus and valgus knee displacement, and tibial rotation.[6] Additionally, the ACL protects the cartilaginous shock absorbers of the knee (the menisci) from damage that could occur while jumping, cutting (rapid deceleration associated with a quick change in direction), and pivoting in sports.

## Consequences of an ACL injury

### *SHORT-TERM CONSEQUENCES*

ACL injuries have both immediate and long-term consequences for young athletes. Short-term consequences include pain and disability during the treatment phase, which involves surgery and 6 to 9 months of intensive rehabilitation before return to sports is considered. Treatment costs related to surgery, therapy, and rehabilitation are substantial. Estimates from 1999 to 2000 averaged

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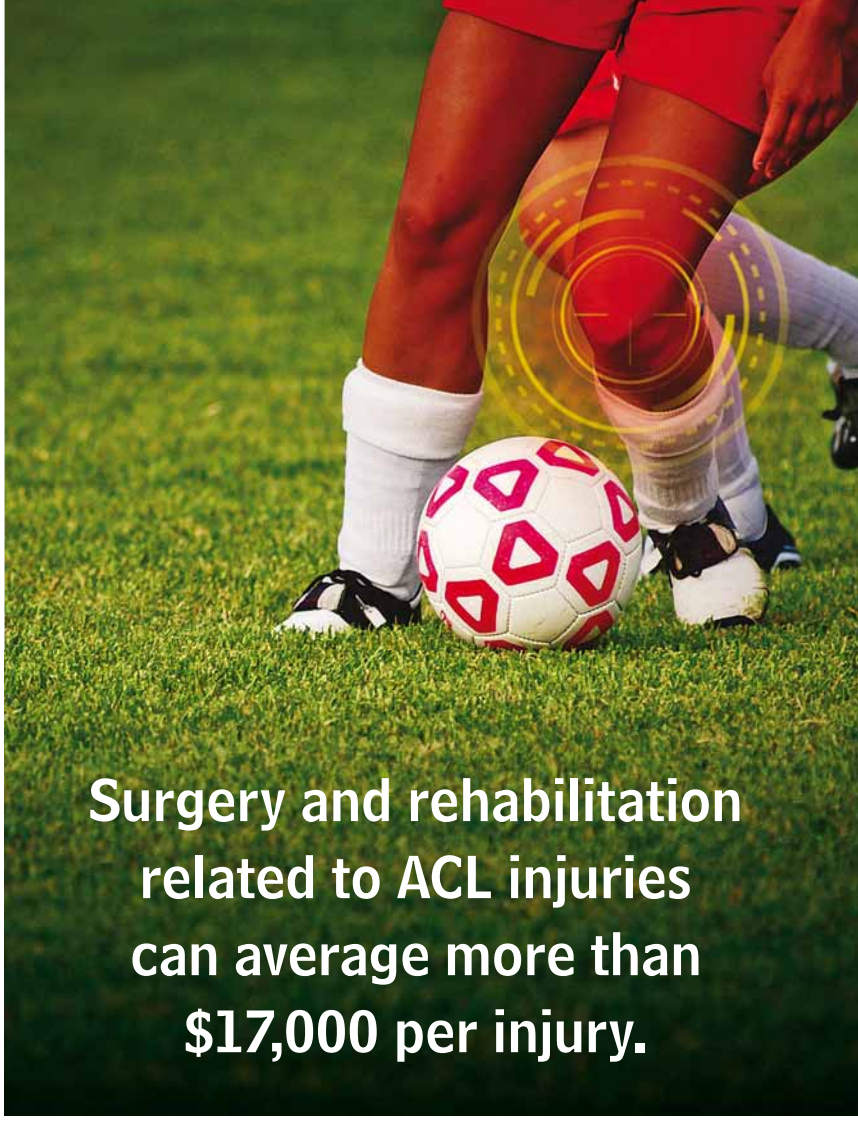
$17,000 per injury and are likely to have significantly increased since that time.[5,7] Furthermore, treatment of an ACL injury can considerably affect an athlete's academic performance. For example, 36% of athletes in 6th to 12th grades undergoing surgery during the school year were noted to fail an examination upon return to school, compared with 0% of those undergoing surgery during a holiday or summer break.[8] The potential consequences of an ACL injury may be more pronounced for girls than for boys. A study of high school athletes found that compared with boys in similar sports, girls were more likely to have surgery and less likely to return to sports after an ACL injury.[9]



**Surgery and rehabilitation related to ACL injuries can average more than $17,000 per injury.**

### *LONG-TERM CONSEQUENCES*

Perhaps more serious are the long-term consequences of an ACL injury. For many athletes, ACL injuries can limit future participation in physical activity, which has well-known benefits for adolescents including enhanced self-esteem and academic success, improved bone health, and lower rates of obesity, diabetes, depression, and teen pregnancy.[10-15]

It has also been well documented that regardless of whether the ACL is reconstructed, those with an ACL injury are at 10-fold higher risk of developing early-onset degenerative knee osteoarthritis compared with the noninjured population.[16,17] Lohmander et al reviewed 127 individual studies of follow-up after ACL rupture and/or surgery, most of which included subjects who injured their ACLs during their teenaged years, and found that on average, 50% had knee osteoarthritis with associated pain and functional impairment at 10 to 20 years after injury.[16] This means that adolescents with ACL injuries have a high risk of suffering from chronic pain and functional limitations from knee osteoarthritis by their twenties or thirties.

## Mechanisms of ACL injuries

Approximately 80% of ACL tears occur without any contact with another player, while the athlete is landing from a jump, decelerating suddenly, or quickly changing direction. Through video analyses of dozens of ACL injuries, researchers have noted that at the time of injury, the body's center of mass was usually behind and away from the base of support; the knee was most commonly in full extension or close to full extension; and the lower extremity was in "dynamic knee valgus," a position characterized by hip internal rotation and adduction, tibial external rotation, and foot eversion (Figure 1).[17-19] These findings corroborate those from biomechanical studies both in cadavers and in vivo showing that the highest strain on the ACL occurs during isolated quadriceps contraction with the knee relatively straight.

## Epidemiology of ACL injuries

ACL injuries are rare in children aged younger than 12 years.[20] Ligament sprains, in general, are less frequent in younger age groups, presumably because ligaments are stronger than bones and growth plates at this age, and, therefore, skeletally immature children are more

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likely to sustain a fracture than a ligament sprain. ACL injury rates begin to increase at ages 12 to 13 years for girls and at ages 14 to 15 years for boys.[21] Girls are 4 to 6 times more likely to sustain an ACL injury compared with boys participating in similar sports (Figure 2[3]).[5] This gender difference in ACL injury rates for girls peaks during adolescence, then declines in early adulthood.[4] The segment of the population that accounts for the highest number of ACL injuries is female athletes aged 15 to 19 years. Girls' high school sports associated with the highest rates of ACL injuries are soccer, basketball, and gymnastics, which account for 11.7, 11.2, and 9.9 injuries per 100,000 athlete exposures (an athlete exposure is 1 athlete participating in 1 practice or competition).[3]

**FIGURE 1**

*Female athlete landing from a jump with the right leg in dynamic knee valgus—hip internally rotated and adducted, tibia externally rotated, foot everted—and with poor control of the center of mass, with her weight unevenly distributed between the right and left legs and trunk and pelvis tilted to the left.*

## Risk factors for ACL injuries

### *EXTRINSIC RISK FACTORS*

A study of approximately 3,000 high school football players showed that those wearing shoes with longer, irregular cleats placed at the periphery of the sole may have an increased risk of ACL injury, presumably because of increased friction at the foot-to-turf interface.[22] Studies of football players also found that dry weather increased the risk of ACL injuries on natural grass.[23,24]

### *INTRINSIC RISK FACTORS*

Intrinsic factors that increase the risk of ACL injury include increased weight and body mass index, ligamentous laxity, subtalar overpronation, previous ACL injury, and female sex.[25-28] One study found that the incidence of ACL injury in athletes who had had ACL reconstruction was 15 times greater than that of control subjects.[25] Athletes with generalized ligamentous laxity were 2.8 times more likely to injure their ACL.[26] Flexible hamstring muscles, a larger quadriceps angle (Q angle), a steeper slope of the tibial plateau, and a narrow intercondylar notch where the ACL is housed have been proposed as risk factors for ACL injury; however, existing data regarding these factors have been either insufficient or inconclusive.[28]

## Why are girls at greater risk of ACL injuries?

### *HORMONAL FACTORS*

Similar to other ligaments, the ACL has receptors for estrogen, testosterone, and relaxin, which suggests that sex hormones may affect the mechanical properties of the ACL and thus influence the risk of ACL injury. However, data from studies investigating the effect of sex hormones on ACL injury risk have thus far been inconclusive. The female ACL does appear to have half a millimeter more laxity during the midpoint of the menstrual cycle. However, ACL injuries have been shown to cluster near the start of menses, at the polar opposite time in the cycle.[29]

The primary mechanism by which sex hormones influence ACL injury risk is likely to be through indirect effects on neuromuscular growth and maturation during puberty, rather than through direct effects on the ligament. During the pubertal growth spurt, as height and weight increase, control of these new body dimensions and the changing center of mass becomes more difficult, particularly during athletic movements such as landing, cutting, and pivoting. During puberty, boys undergo a large testosterone surge, which mediates significant increases in muscle mass and strength and allows them to better control their new body dimensions and changing center of mass during athletic maneuvers. Girls experience only a small increase in testosterone levels during puberty, resulting in a much smaller increase in muscle mass and strength, which may be insufficient to control their new body dimensions during athletic maneuvers.

### *NEUROMUSCULAR FACTORS*

Current evidence suggests that the primary reason girls are at greater risk than boys for noncontact ACL injuries is that girls tend to have less neuromuscular control of knee motion during athletic maneuvers. In other words, girls tend to use their muscles differently than boys when landing from a jump or quickly changing direction. Biomechanical studies have identified 4 neuromuscular strategies that are more common in girls and that may lead to dynamic knee valgus (Figure 1), a position that places the ACL at a high risk of tearing.

**1** Girls tend to use their quadriceps muscles much more than their hamstrings. Kinetic and kinematic analyses have found that during a jump landing or quick change in direction, girls have reduced knee flexion, increased quadriceps activity, and decreased hamstring activity compared with boys. This "quadriceps dominant" strategy has been shown to increase both anterior tibial translation and strain on the ACL.[30] Notably, ACL strain is significantly reduced when there is co-contraction of the hamstrings.[4]

**2** Girls tend to have 1 leg stronger than the other, whereas boys tend to have equal strength in both legs. Asymmetry in leg strength promotes asymmetric weight distribution between the feet upon landing, causing a shift of the body's center of mass away from its base of support, a position associated with increased risk of ACL injury.[31]

**3** Girls tend to have less core strength and stability, which makes it more difficult for them to control their center of mass and prevent it from shifting away from the base of support.[19]

**4** Girls tend to rely on bones and ligaments to stop joint motion, rather than contracting their muscles to control joint position and absorb the landing forces.[31]

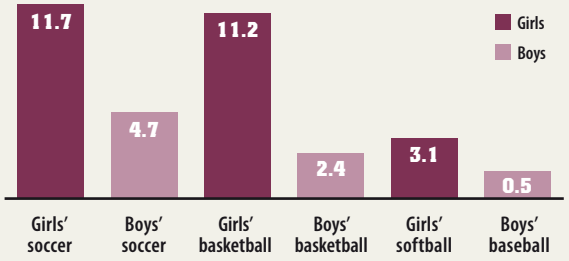
Fortunately, unlike anatomic risk factors, which are largely nonmodifiable, these neuromuscular risk factors can potentially be modified through training.

### *PREVENTION OF ACL INJURIES IN FEMALE ATHLETES*

Various neuromuscular training (NMT) programs designed to strengthen hamstring and core muscles, improve balance, and teach athletes how to recognize and avoid dynamic knee valgus have been studied.[5,32-37] Most of these programs have been shown to reduce ACL and other lower-extremity injuries. Pooled results from prospective cohort studies and randomized controlled trials have demonstrated a 72% reduction in ACL injury rates among adolescent female athletes.[31] This body of scientific research provides significant evidence to advocate that NMT be routine in girls' high school sports.

**FIGURE 2** **High school ACL injury rates**

High school anterior cruciate ligament (ACL) injury rates per 100,000 athlete exposures (AEs) by sport and sex. (An athlete exposure is 1 athlete participating in 1 practice or competition.)




Adapted from Comstock RD, et al.[3]

## Key components of NMT training programs

NMT programs are somewhat variable with respect to the number and types of exercises included and the frequency and duration of training. Some studies used only 1 or 2 types of exercises, such as plyometric exercises (repetitive jumping to build muscle strength and power) and/or balance exercises, whereas others applied a more comprehensive approach, incorporating plyometrics, strengthening, stretching, and balance training.[4,19] Pooled analysis of these studies showed that the most effective programs combined 3 key components: (1) progressive strengthening for the core and lower extremities, (2) plyometrics, and (3) feedback-driven technique modification.[38,39] NMT programs that included only balance training were not effective in reducing ACL injury risk. Additionally, compliance rates were highest with coach-led programs.[38]

**FIGURE 3**

*Squats strengthen the gluteal muscles, and when done properly with hips back and tibias vertical, they equally engage the hamstrings and quadriceps.*

### STRENGTHENING

Progressive strengthening exercises such as squats and lunges (Figures 3, 4) target the hamstrings, gluteal muscles, and hip external rotators, muscle groups that work to counteract the hip adduction, hip internal rotation, and external tibial rotation associated with dynamic knee valgus. Exercises such as planks (Figure 5) and prone lifts also strengthen the hamstrings and gluteal muscles and improve trunk strength and stability.

### PLYOMETRICS

Plyometrics are repetitive jumping exercises in which the targeted muscle group starts in the stretched position and then rapidly contracts with maximum force. This pairing of eccentric and concentric muscle contractions increases muscle power. Effective NMT programs incorporate plyometrics that gradually progress in difficulty from 2-legged takeoffs and landings (eg, squat jumps) to 1-legged takeoffs and landings (eg, hopping, or bounding, in place from 1 leg to the other), and from jumping in place to traveling jumps (eg, broad jump or single-leg hop for distance). Initially, the athlete performs as many repetitions as possible with good form for 20 seconds. As the program progresses and her strength improves, this interval increases to 30 seconds and then 40 seconds.

### FEEDBACK

An important component of NMT programs is supervision by a qualified instructor or coach who has been specifically trained in recognizing dynamic knee valgus. The coach teaches athletes how to recognize and avoid this unsafe knee position by correcting athletes' improper form and not allowing them to progress to more challenging exercises until they have demonstrated consistently proper form with less difficult exercises. Instructors use verbal cues such as "Don't let your knees cave inward or come together" and "Land softly and quietly." These cues remind athletes to contract their muscles to absorb the force while landing from a jump, rather than allowing their feet to just fall to the ground.

### OPTIMAL TIMING, FREQUENCY, AND DURATION OF TRAINING

Female athletes aged 15 to 18 years exhibit the largest decreases in ACL injury risk in response to

**FIGURE 4**

*In a forward lunge, athletes step forward into a lunge and then return to standing, keeping the back straight and not allowing the knees to pass the toes. Lunges are also performed in the sagittal plane (not shown) to evenly strengthen the quadriceps, hamstrings, and gluteal muscles; improve core stability; and minimize strength imbalance between legs.*

# count on the response

## Count on PedvaxHIB®
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Protective efficacy demonstrated against *Haemophilus influenzae* type b in a high-risk population

**Efficacy results at 15 to 18 months of age after primary 2-dose regimen** (n=3,486)

**93%** **protective efficacy**[a]
(95% CI, 57%–98%)

**After additional follow-up of 2 years and 9 months**[b]

**97%** **protective efficacy**[a]
(95% CI, 72%–99.9%)
in children under 18 months

**100%** **protective efficacy**[a]
(95% CI, 24%–100%)
in children over 18 months

- **3-dose series can spare baby a shot**[1]
- **Ready to use—no need to reconstitute**

PedvaxHIB[c] was initially evaluated in a randomized, double-blind, placebo-controlled study of Native American (Navajo) infants (n=3,486).

Each infant in this study received 2 doses of either placebo or lyophilized PedvaxHIB with the first dose administered at a mean of 8 weeks of age and the second administered approximately 2 months later; DTP and OPV were administered concomitantly.

Protective efficacy in such high-risk populations would be expected to be predictive of efficacy in other populations.

A booster dose of PedvaxHIB is required in infants who complete the primary 2-dose regimen before 12 months of age. This booster dose will help maintain antibody levels during the first 2 years of life when children are at highest risk for invasive Hib disease.

[a]Estimated from person-days at risk.

[b]Subjects in this portion of the study received 1 to 3 doses of PedvaxHIB.

[c]A lyophilized formulation was used in the study. A later study found the antibody response of Liquid PedvaxHIB to be comparable. The antibody responses induced by each formulation of PedvaxHIB were similar.

CI=confidence interval; DTP=diphtheria and tetanus toxoids and pertussis [vaccine]; OPV=oral polio vaccine; Hib=*Haemophilus influenzae* type b.

- **Discounted pricing may be available for PedvaxHIB. Speak to your Merck representative for more information**

## Indication

PedvaxHIB is indicated for routine vaccination against invasive disease caused by *Haemophilus influenzae* type b in infants and children 2 to 71 months of age. PedvaxHIB should not be used in infants <6 weeks of age.

PedvaxHIB will not protect against disease caused by *Haemophilus influenzae* other than type b or against other microorganisms that cause invasive disease such as meningitis or sepsis.

PedvaxHIB IS NOT RECOMMENDED FOR USE IN INFANTS YOUNGER THAN 6 WEEKS OF AGE.

PedvaxHIB is administered in a 2-dose primary regimen before 14 months of age. Infants 2 to 14 months of age should receive a 0.5 mL dose of vaccine, ideally beginning at 2 months of age, followed by a 0.5 mL dose 2 months later (or as soon as possible thereafter). When the primary 2-dose regimen is completed before 12 months of age, a booster dose (0.5 mL) should be administered at 12 to 15 months, but not earlier than 2 months after the second dose.

## Select Safety Information

PedvaxHIB is contraindicated in patients with hypersensitivity to any component of the vaccine. Persons who develop symptoms suggestive of hypersensitivity after an injection should not receive further injections of the vaccine.

Use caution when vaccinating latex-sensitive individuals since the vial stopper contains dry natural latex rubber that may cause allergic reactions.

The most frequently reported (>1%) adverse reactions, without regard to causality, were fever (≥101°F), irritability, sleepiness, injection-site pain/soreness, injection-site erythema (≤2.5 cm diameter), injection-site swelling/induration (≤2.5 cm diameter), unusual high-pitched crying, prolonged crying (>4 hours), diarrhea, vomiting, crying, pain, otitis media, rash, and upper respiratory infection.

As with any vaccine, vaccination may not result in a protective antibody response in all individuals given the vaccine. As with other vaccines, PedvaxHIB may not induce protective antibody levels immediately following vaccination.

**Please see the adjacent Brief Summary of the Prescribing Information.**

**Reference: 1.** Centers for Disease Control and Prevention. Catch-up immunization schedule for persons aged 4 months through 18 years who start late or who are more than 1 month behind—United States, 2013. http://www.cdc.gov/vaccines/schedules/downloads/child/catchup-schedule-pr.pdf. Accessed February 19, 2013.

MERCK



**PedvaxHIB®**
**[Haemophilus b Conjugate Vaccine (Meningococcal Protein Conjugate)]**

**Liquid PedvaxHIB® [Haemophilus b Conjugate Vaccine (Meningococcal Protein Conjugate)]**

**INDICATIONS AND USAGE**

Liquid PedvaxHIB is indicated for routine vaccination against invasive disease caused by *Haemophilus influenzae* type b in infants and children 2 to 71 months of age.

Liquid PedvaxHIB will not protect against disease caused by *Haemophilus influenzae* other than type b or against other microorganisms that cause invasive disease such as meningitis or sepsis. As with any vaccine, vaccination with Liquid PedvaxHIB may not result in a protective antibody response in all individuals given the vaccine.

BECAUSE OF THE POTENTIAL FOR IMMUNE TOLERANCE, Liquid PedvaxHIB IS NOT RECOMMENDED FOR USE IN INFANTS YOUNGER THAN 6 WEEKS OF AGE. (See PRECAUTIONS in full Prescribing Information.)

*Revaccination*

Infants completing the primary two-dose regimen before 12 months of age should receive a booster dose (see DOSAGE AND ADMINISTRATION in full Prescribing Information).

**CONTRAINDICATIONS**

Hypersensitivity to any component of the vaccine or the diluent.

Persons who develop symptoms suggestive of hypersensitivity after an injection should not receive further injections of the vaccine.

**PRECAUTIONS**

*General*

As for any vaccine, adequate treatment provisions, including epinephrine, should be available for immediate use should an anaphylactoid reaction occur.

Use caution when vaccinating latex-sensitive individuals since the vial stopper contains dry natural latex rubber that may cause allergic reactions.

Special care should be taken to ensure that the injection does not enter a blood vessel.

It is important to use a separate sterile syringe and needle for each patient to prevent transmission of hepatitis B or other infectious agents from one person to another.

As with other vaccines, Liquid PedvaxHIB may not induce protective antibody levels immediately following vaccination.

As reported with Haemophilus b Polysaccharide Vaccine and another Haemophilus b Conjugate Vaccine, cases of Hib disease may occur in the week after vaccination, prior to the onset of the protective effects of the vaccines.

There is insufficient evidence that Liquid PedvaxHIB given immediately after exposure to natural *Haemophilus influenzae* type b will prevent illness.

The decision to administer or delay vaccination because of current or recent febrile illness depends on the severity of symptoms and on the etiology of the disease. The Advisory Committee on Immunization Practices (ACIP) has recommended that vaccination should be delayed during the course of an acute febrile illness. All vaccines can be administered to persons with minor illnesses such as diarrhea, mild upper-respiratory infection with or without low-grade fever, or other low-grade febrile illness. Persons with moderate or severe febrile illness should be vaccinated as soon as they have recovered from the acute phase of the illness.

If PedvaxHIB is used in persons with malignancies or those receiving immunosuppressive therapy or who are otherwise immunocompromised, the expected immune response may not be obtained.

*Instructions to Healthcare Provider*

The healthcare provider should determine the current health status and previous vaccination history of the vaccinee.

The healthcare provider should question the patient, parent, or guardian about reactions to a previous dose of PedvaxHIB or other Haemophilus b Conjugate Vaccines.

*Information for Patients*

The healthcare provider should provide the vaccine information required to be given with each vaccination to the patient, parent, or guardian.

The healthcare provider should inform the patient, parent, or guardian of the benefits and risks associated with vaccination. For risks associated with vaccination, see ADVERSE REACTIONS in full Prescribing Information.

Patients, parents, and guardians should be instructed to report any serious adverse reactions to their healthcare provider who in turn should report such events to the U. S. Department of Health and Human Services through the Vaccine Adverse Event Reporting System (VAERS), 1-800-822-7967.

*Laboratory Test Interactions*

Sensitive tests (e.g., Latex Agglutination Kits) may detect PRP derived from the vaccine in urine of some vaccinees for at least 30 days following vaccination with lyophilized PedvaxHIB; in clinical studies with lyophilized PedvaxHIB, such children demonstrated normal immune response to the vaccine.

*Carcinogenesis, Mutagenesis, Impairment of Fertility*

Liquid PedvaxHIB has not been evaluated for carcinogenic or mutagenic potential, or potential to impair fertility.

*Pregnancy*

*Pregnancy Category C*: Animal reproduction studies have not been conducted with PedvaxHIB. Liquid PedvaxHIB is not recommended for use in individuals 6 years of age and older.

*Pediatric Use*

Safety and effectiveness in infants below the age of 2 months and in children 6 years of age and older have not been established. In addition, Liquid PedvaxHIB should not be used in infants younger than 6 weeks of age because this will lead to a reduced anti-PRP response and may lead to immune tolerance (impaired ability to respond to subsequent exposure to the PRP antigen). Liquid PedvaxHIB is not recommended for use in individuals 6 years of age and older because they are generally not at risk of Hib disease.

*Geriatric Use*

This vaccine is NOT recommended for use in adult populations.

**ADVERSE REACTIONS**

*Liquid PedvaxHIB*

In a multicenter clinical study (n=903) comparing the effects of Liquid PedvaxHIB® [Haemophilus b Conjugate Vaccine (Meningococcal Protein Conjugate)] with those of lyophilized PedvaxHIB, 1,699 doses of Liquid PedvaxHIB were administered to 678 healthy infants 2 to 6 months of age from the general U.S. population. DTP and OPV were administered concomitantly to most subjects. Both formulations of PedvaxHIB were generally well tolerated and no serious vaccine-related adverse reactions were reported.

During a three-day period following primary vaccination with Liquid PedvaxHIB in these infants, the most frequently reported (>1%) adverse reactions, without regard to causality, excluding those shown in the table, in decreasing order of frequency, were: irritability, sleepiness, injection site pain/soreness, injection site erythema (≤2.5 cm diameter, see table), injection site swelling/induration (≤2.5 cm diameter, see table), unusual high-pitched crying, prolonged crying (>4 hr), diarrhea, vomiting, crying, pain, otitis media, rash, and upper respiratory infection.

Selected objective observations reported by parents over a 48-hour period in these infants following primary vaccination with Liquid PedvaxHIB are summarized in the following table.

Fever or Local Reactions in Subjects First Vaccinated at 2 to 6 Months of Age with Liquid PedvaxHIB[a]

| Reaction | No. of Subjects Evaluated | Post-Dose 1 (hr) | | | No. of Subjects Evaluated | Post-Dose 2 (hr) | | |
|---|---|---|---|---|---|---|---|---|
| | | 6 | 24 | 48 | | 6 | 24 | 48 |
| | | Percentage | | | | Percentage | | |
| Fever[b] >38.3°C (≥101°F) Rectal | 222 | 18.1 | 4.4 | 0.5 | 206 | 14.1 | 9.4 | 2.8 |
| Erythema >2.5 cm diameter | 674 | 2.2 | 1.0 | 0.5 | 562 | 1.6 | 1.1 | 0.4 |
| Swelling >2.5 cm diameter | 674 | 2.5 | 1.9 | 0.9 | 562 | 0.9 | 0.9 | 1.3 |

[a]DTP and OPV were administered concomitantly to most subjects.
[b]Fever was also measured by another method or reported as normal for an additional 345 infants after dose 1 and for an additional 249 infants after dose 2; however, these data are not included in this table.

Adverse reactions during a three-day period following administration of the booster dose were generally similar in type and frequency to those seen following primary vaccination.

*Lyophilized PedvaxHIB*

In The Protective Efficacy Study (see CLINICAL PHARMACOLOGY in full Prescribing Information), 4,459 healthy Navajo infants 6 to 12 weeks of age received lyophilized PedvaxHIB or placebo. Most of these infants received DTP/OPV concomitantly. No differences were seen in the type and frequency of serious health problems expected in this Navajo population or in serious adverse experiences reported among those who received lyophilized PedvaxHIB and those who received placebo, and none was reported to be related to lyophilized PedvaxHIB. Only one serious reaction (tracheitis) was reported as possibly related to lyophilized PedvaxHIB and only one (diarrhea) as possibly related to placebo. Seizures occurred infrequently in both groups (9 occurred in vaccine recipients, 8 of whom also received DTP; 8 occurred in placebo recipients, 7 of whom also received DTP) and were not reported to be related to lyophilized PedvaxHIB.

In early clinical studies involving the administration of 8,086 doses of lyophilized PedvaxHIB alone to 5,027 healthy infants and children 2 months to 71 months of age, lyophilized PedvaxHIB was generally well tolerated. No serious adverse reactions were reported. In a subset of these infants, urticaria was reported in two children, and thrombocytopenia was seen in one child. A cause and effect relationship between these side effects and the vaccination has not been established.

*Potential Adverse Reactions*

The use of Haemophilus b Polysaccharide Vaccines and another Haemophilus b Conjugate Vaccine has been associated with the following additional adverse effects: early onset Hib disease and Guillain-Barré syndrome. A cause and effect relationship between these side effects and the vaccination was not established.

*Post-Marketing Adverse Reactions*

The following additional adverse reactions have been reported with the use of the lyophilized and liquid formulations of PedvaxHIB:

*Hemic and Lymphatic System*

Lymphadenopathy

*Hypersensitivity*

Rarely, angioedema

*Nervous System*

Febrile seizures

*Skin*

Sterile injection site abscess

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NMT.[31] Thus, the optimal time to begin NMT programs is during early adolescence. It appears that a minimum of 6 to 8 weeks of training is needed before neuromuscular changes are seen and athletic performance improves.[40] The most effective NMT programs trained athletes for a minimum of twice per week for 6 weeks. A combination of preseason and in-season training was more effective than either preseason or in-season training alone.[39] Some have proposed that the optimal method for implementing NMT programs may be through an integrative program incorporated into daily physical education classes, which would extend the benefits of such programs to individuals involved in recreational physical activities as well as competitive sports.[31]

## Resources for patients, families, coaches

Pediatricians caring for young people at increased risk of ACL injuries should counsel them on the potential benefits of NMT. Pediatricians can help athletes and their parents locate a qualified instructor in 1 of the following ways:

- Some sports coaches are already trained in NMT methods and have incorporated the exercises into their practice routines. Parents should inquire if their child's coaches have had formal training, and if not, they should encourage them to do so using 1 of the evidence-based programs listed below, where training is provided through instructional videos on a DVD or online at little or no cost.
  - Sportsmetrics: www.sportsmetrics.org
  - PEP (Prevent injury, Enhance Performance): www.smsmf.org/smsf-programs/pep-program
  - KIPP (Knee Injury Prevention Program) for Coaches: http://kipp.instituteforsportsmedicine.org
- Motivated parents may wish to take 1 of these instructional courses themselves so they can supervise their children in a home NMT program.
- Some of these programs provide NMT directly to athletes for a fee.
- The Sportsmetrics Web site has a search function to locate a certified instructor by zip code.

**FIGURE 5**

*Side planks strengthen the abdominal and gluteal muscles. The athlete holds the position for 30 seconds, keeping her body in a straight line.*

- Pediatricians can call their local physical therapy clinics and find out if any of their therapists have had formal training in NMT techniques. If the athlete has had a recent injury, health insurance plans may cover a physical therapy referral for NMT. CP


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# RSV infection appears related to recurrent wheeze in preterm infants

A study conducted in the Netherlands shows that the monoclonal antibody palivizumab significantly reduces wheezing days during premature infants' first year of life, in addition to preventing severe respiratory syncytial virus (RSV) infection in these high-risk children.

Investigators assigned 429 preterm infants, who were no more than 6 months old and born at a gestational age of 33 to 35 weeks, to receive either palivizumab injections or placebo during RSV season. Until the infants reached their first birthdays, parents reported on the number of days their babies wheezed, along with airway symptoms, doctor or hospital visits, and use of airway drugs. Parents also took a nasopharyngeal swab from infants who had respiratory symptoms that lasted more than 1 day; investigators tested the swabs for the presence of RSV. Median follow-up was 10 months in both study groups.

Infants in the palivizumab group wheezed fewer days than those in the placebo group, with rates of wheezing in the palivizumab group 2.7 percentage points lower than in the placebo group (1.8% vs 4.5%), for a relative reduction of 61%. These effects persisted during the post-prophylaxis period, for a relative reduction of 73%. Similarly, the palivizumab group experienced decreased wheezing days outside the RSV season. In addition, the proportion of infants with recurrent wheeze was 10 percentage points lower in patients treated with palivizumab (11% vs 21%). Similarly, the proportion of infants using bronchodilators was lower in the treatment group than in the placebo group (13% vs 23%).

As expected, the study confirmed that infants who were treated with palivizumab had a lower incidence both of RSV-related hospitalization and of medically attended nonhospitalized RSV infection than those who received placebo. Among children with any proven RSV infection, however, no significant differences were seen between the 2 groups in the incidence of wheezing or in the mean number of wheezing days during the first year of life (Blanken MO, et al. *N Engl J Med*. 2013;368[19]:1791-1799).

**COMMENTARY**

This investigation addresses pediatricians' age-old, chicken-or-egg question: Does early RSV infection cause later wheezing in childhood or are infants who develop severe symptoms with early RSV preprogrammed to be wheezers? This prospective, randomized, controlled study offers evidence that RSV is the egg rather than the chicken.

—Michael Burke, MD

# STUDY EXPLORES GENETIC FACTORS IN NEONATAL ABSTINENCE SYNDROME

In a prospective multicenter study, investigators found that, among infants with in utero opioid exposure, variants in 2 genes were associated with shorter length of hospital stay and less need for treatment of neonatal abstinence syndrome (NAS).

The study included 86 mother-infant dyads of 36 weeks' gestational age or older from 5 facilities in Massachusetts and Maine. All the infants had been exposed to maternal methadone or buprenorphine in utero for at least 30 days. Investigators genotyped DNA samples from cord blood, maternal peripheral blood, or saliva for single-nucleotide polymorphisms (SNPs) in 3 genes associated with risk for opioid addiction in adults: μ-opioid receptor (*OPRM1*), multidrug resistance (*ABCB1*), and catechol-O-methyltransferase (*COMT*). They then correlated NAS outcomes with genotype. Investigators also collected demographic information as well as medical diagnoses and results of NAS outcome measures, primarily length of hospital stay, a reflection of overall NAS severity.

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Variants in the *OPRM1* and *COMT* genes were associated with a shorter length of hospital stay and less need for NAS treatment. No such significant associations were seen with *ABCB1* variants (Wachman EM, et al. *JAMA*. 2013;309[17]:1821-1827).

**COMMENTARY**

In one sense, this study confirms what you already know: that every baby is different and that it is difficult to predict how an individual baby is going to handle in utero exposure to a given level of opiates. It is hard to guess which baby will become symptomatic and which will require brief or prolonged withdrawal therapy. The genetic markers identified here may someday help to eliminate some of that unpredictability. I wonder if identification of these genetic variables will eventually translate not only into prognostication, but also to focused individualized therapy.

**—Michael Burke, MD**

# PRACTICE GUIDELINES DECREASE CT USE IN APPENDICITIS EVALUATION

Implementation of a clinical practice guideline for evaluating appendicitis that focuses on early surgical consultation before obtaining advanced imaging markedly decreased reliance on computed tomography (CT) without loss of diagnostic accuracy, a study from a children's hospital showed. A team of pediatric surgeons, pediatric emergency medicine physicians, and pediatric radiologists developed the clinical pathway to evaluate abdominal pain suggestive of appendicitis to emphasize clinical examination, early pediatric surgeon involvement, and selective use of ultrasound (US) as the initial advanced imaging modality.

To measure the effects of implementation of the guideline, investigators compared the percentage change in imaging use among 70 patients who had appendectomy in the year before implementation and 90 patients who underwent appendectomy after implementation, finding a 41% decrease in CT use among those in the postimplementation group. Among children in the preguideline group, 90% had CT scans, 6.9% had US, and 5.7% had no imaging. In the postguideline group, 48% underwent CT, 39.6% underwent US, and 15.6% had no imaging. The similar negative appendectomy rate was 5.7% in the preguideline group and 5.2% in the postguideline group (Russell WS, et al. *Pediatr Emerg Care*. 2013;29[5]:568-573).

**COMMENTARY**

Through the American Board of Internal Medicine Foundation Choosing Wisely campaign, physician specialty organizations have been given an opportunity to identify a list of 5 tests or procedures that may be overused by their member physicians. Participating organizations have distributed these lists to physicians and to patient groups in an effort to encourage thoughtful discussion. The American Academy of Pediatrics (AAP) has included in its list the use of CT scan in routine evaluation of abdominal pain (http://www.choosingwisely.org/doctor-patient-lists/american-academy-of-pediatrics/). This doesn't mean that the AAP suggests that this modality never has a role in evaluating this complaint. Rather, the AAP suggests that physicians and parents discuss the risks and benefits of the test while considering other alternatives (such as US or no testing at all). The multidisciplinary effort described in this article is exactly the type of result that founders of the Choosing Wisely campaign had hoped for in beginning this initiative.

**—Michael Burke, MD**

## Also of Note

Mononucleosis "ampicillin rash" is not as common as previously reported. A retrospective study in Israel of 238 hospitalized children diagnosed as having acute infectious mononucleosis based on positive Epstein-Barr virus serology found that, of 61 children treated with amoxicillin, 29.5% developed a rash, a significantly lower rate than the 90% reported in past studies (Chovel-Sella A, et al. *Pediatrics*. 2013;131[5]:e1424-e1427).

# SCREENING ADOLESCENTS FOR DEPRESSION

MARISSA CORONA, MS; CAROLYN A McCARTY, MD; AND LAURA P RICHARDSON, MD

Pediatric primary care providers who screen, identify, and treat adolescents for depression and its comorbidities can make a positive difference in their patients' long-term health, social functioning, and interpersonal relationships.

Depressed adolescents experience emotional suffering and problems in daily living and functioning, such as impairment in social and interpersonal relationships.[1] Many parents ask their pediatrician about their adolescent's moodiness as well as potential misuse of substances. Because depressed adolescents often present with physical complaints, providers are in an important position to help screen and identify depression so that adolescents receive proper assessment and appropriate care. In addition, because adolescents with chronic diseases are at increased risk for developing depressive disorders when compared with the general population, it is particularly important that providers be well informed and use appropriate screening tools for depression.

It has been reported that as many as 50% of cases of major depression are missed because of the absence of screening by family physicians.[2] In recognition of the fact that depression goes undetected in many adolescents, organizations such as the American Academy of Pediatrics and the US Preventive Services Task Force (USPSTF) recommend routine screening for depression in adolescents and having a system in place to handle positive screenings.

This article reviews the criteria for adolescent depressive disorders, provides information on depression screening tools that can be used in everyday practice, and concludes with practical considerations in the implementation of screening.

## Differential diagnosis

Most screening tools focus on severity of depressive symptoms, yielding a continuous score (with cutoff values for differentiating youth at risk from those not at risk), rather than on diagnostic criteria for depression. An understanding of the diagnostic criteria, however, can help pediatric primary care providers distinguish between different presentations of depression. Depressive disorders are classified under major depressive disorder, dysthymia, and adjustment disorder with depressed mood in the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision* (DSM-IV-TR). Major depressive disorder requires the presence of a major depressive

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episode (Table 1).[3] It also includes significant impairment in functioning, which for adolescents includes interference with daily routines, school performance, and social relationships. Dysthymia is characterized by having depressed mood that is generally less severe but lasts longer in duration; that is, at least 1 year (Table 2).[3] Lastly, although depressive disorders and adjustment disorders overlap in the presentation of depressed mood, adjustment disorders are related to external stressors with symptoms emerging within 3 months of the stressor onset but not persisting longer than 6 months after cessation of the stressor.[4] Irritability has been identified as the most common symptom of depression among adolescents and may be an expression of depressed mood in adolescents.

## Prevalence

Transient depressive symptoms are common among typically developing adolescents, but adolescents with clinical depression, including major depressive disorder and dysthymia, experience a pervasive unhappy mood that is more severe than the occasional blues. The prevalence of depression increases with age. For example, the rates of major depression in preadolescent children are only 2%, but the rates increase 2- to 3-fold by adolescence and into adulthood.[5] Specifically, for adolescents aged 14 to 18 years, the rate of major depression ranges from 4% to 7%.[6] The average age for the first onset of depression is between the ages of 13 and 15 years, with some studies citing 14.9 years as the mean age of onset.[7] Many longitudinal studies indicate an extremely high rate of recurrence of depressive episodes, showing that as many as 60% to 70% of depressive episodes in adolescents recur within a year.[8] Depressive episodes by age 15 are considered "early-onset" and are associated with a more chronic and debilitating course of the disorder.[9]

## Gender differences and comorbidities

As youth move through puberty and into adolescence the rate for depression increases for both boys and girls, but the rate of rise is more dramatic for girls, resulting in a 2:1 female-to-male prevalence.[10] Family history of depression, family substance use disorders, and family conflict are important risk factors for youth depression.

**TABLE 1** DSM-IV-TR criteria for major depressive episode for children or adolescents

**A major depressive episode must include 5 or more of the following symptoms that are present during the same 2-week period and represent a change from previous functioning. At least 1 symptom is either item 1 or 2:**

1. Depressed or irritable mood most of the day, nearly every day.
2. Loss of interest or pleasure in all or almost all activities.
3. Significant weight loss or weight gain, failure to gain weight as expected with growth, or change in appetite.
4. Insomnia or hypersomnia.
5. Observable psychomotor agitation or retardation.
6. Fatigue or loss of energy.
7. Feelings of worthlessness or excessive inappropriate guilt.
8. Diminished ability to think or concentrate or indecisiveness.
9. Recurrent thoughts of death, recurrent suicidal ideation without a specific plan, or suicide attempt or a specific plan for committing suicide.

Abbreviation: DSM-IV-TR, *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision.*
From American Psychiatric Association.[3]

Depression in adolescence rarely occurs in isolation. Approximately two-thirds of adolescents with depression have at least 1 comorbid psychiatric disorder and 10% to 15% have 2 or more comorbidities. The most common comorbid disorders in adolescents with major depressive disorder are anxiety disorders and specific phobias.[11] Conduct disorder, dysthymia, attention-deficit/hyperactivity disorder (ADHD), and substance use disorders are also common in adolescents with depression.[12] If adolescent depression co-occurs with self-harm or problematic substance use, providers should consider this a warning sign for increased self-harm and/or suicide risk.

## Screening for depression

Given that depression is a widely prevalent but treatable condition among adolescents that creates long-term social, emotional, and economic burdens for the individual and the family, screening for depression is essential to ensure accurate diagnosis, follow-up, and effective treatment planning. The American Medical Association's Guidelines for Adolescent Preventive Services (GAPS) and Bright Futures suggest that primary care providers in pediatric settings begin

**TABLE 2 DSM-IV-TR criteria for dysthymia for children or adolescents**

1. Depressed or irritable mood for most of the day, for more days than not, for at least 1 year.
2. Presence of 2 or more of the following:
   - a. Poor appetite or overeating
   - b. Loss of self-esteem
   - c. Feelings of hopelessness
   - d. Insomnia or hypersomnia
   - e. Low energy or fatigue
   - f. Poor concentration or difficulty making decisions
3. During the 1-year disturbance, the person has never been without the symptom in criteria 1 and 2 for more than 2 months at a time.

Abbreviation: DSM-IV-TR, *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision.*
From American Psychiatric Association.[3]

screening for depression at age 11 years and continue to do so annually thereafter.[13,14] In addition the USPSTF now recommends depression screening in children and adolescents aged 12 to 18 years for major depressive disorder when systems are in place to ensure accurate diagnosis, psychotherapy, and follow-up.[15] Even seemingly asymptomatic adolescents should be screened because depression may go unrecognized. The most widely used and recommended screening approaches and tools are discussed herein.

## Physician interviews and forms

**GAPS.** GAPS provides templates and forms related to child and adolescent preventive services that can be utilized by all providers. Using these forms, providers are able to identify whether an adolescent is at risk for experiencing depression and also to inquire about suicidality. Age-specific GAPS forms are available for younger adolescents, middle/older adolescents, and parents, and can be found for free through the main GAPS Web site: http://www.ama-assn.org/ama/pub/physician-resources/public-health/promoting-healthy-lifestyles/adolescent-health/guidelines-adolescent-preventive-services.page.

**HEEADSSS.** A thorough psychosocial evaluation can yield important information, including the opportunity to gather specific information about depressive symptoms. An example of an evaluative approach that can be used in a pediatric primary care setting is the **H**ome, **E**ducation and employment, **E**ating, **A**ctivities with peers, **D**rugs, **S**exual activity, **S**uicide and depression, and **S**afety (HEEADSSS) assessment. This acronym is used to prompt providers to ask adolescents about each of these areas of risk. The symptoms of depression can be subtle; depression may be missed if providers do not explicitly ask about depression while under the assumption that adolescents appear to be doing well. Questions about suicidality naturally follow depression-specific questions. Providers should keep in mind that a trustworthy relationship with the adolescent is essential for openness and honesty.

When using either the GAPS or the HEEADSSS assessment, an adolescent might endorse having suicidal thoughts. Therefore, providers should be ready to address suicidality directly, assess thoroughly for safety, and take action if needed. Questions that may be asked of the adolescent are: "Have you had thoughts of dying or death?"; "Have you harmed yourself?"; and "Do you have a plan?" Asking such questions is essential to clarify the adolescent's risk for harm and will assist in developing a safety plan if needed.

## Questionnaires

There are a variety of options for structured questionnaires that screen for adolescent depressive symptoms, as well as many that screen for general adolescent mental health. The tools listed here are not exhaustive, but do represent the most commonly used depression measures in primary care settings. Important information such as cost, time to administer, completion time, applicability to specific age groups, cutoff scores, and how to obtain them is provided for each screening questionnaire. It is recommended that providers choose a screening option that best fits the needs of their practice, considering their own clinical and patient population.

### Depression-specific questionnaires

**Mood and Feelings Questionnaire (MFQ).** The MFQ is a 32-item measure that consists of questions regarding how the adolescent has been feeling or acting within the past 2 weeks.[16] A short version is also available that consists of 11 items and usually takes about 5 to 10 minutes to complete. For adolescents,

the cutoff score on the full version for distinguishing those who are likely to have a depressive disorder from those who are not is 12 or higher. The MFQ can be used with children aged 8 to 17 years, and also has a parent version that can be used to assess symptoms based on parental report. The MFQ can be downloaded free at http://devepi.duhs.duke.edu/mfq.html.

**Patient Health Questionnaire (PHQ-9).** The PHQ-9 was originally developed for adults in primary care, with 9 items directly related to each of the criteria listed in the DSM-IV-TR for major depression. The PHQ-9 has been strongly supported for its applicability as a screening tool for adolescent depression in primary care as well as in pediatric hospital settings.[17] The PHQ-9 takes approximately 5 to 10 minutes to complete. The optimal PHQ-9 cutoff score for adolescents is 11 or higher; it has been shown to have a sensitivity of 89.5% and specificity of 77.5% compared with a diagnosis of major depression on a structured mental health interview.[18] There are also algorithms to use to determine if the adolescent meets diagnostic criteria for major depressive disorder or dysthymia. The PHQ-9 is free and available to the public: http://www.agencymeddirectors.wa.gov/Files/depressoverview.pdf.

In addition, the PHQ-2, a very brief depression screening scale consisting of the first 2 items of the PHQ-9, has been found to have good sensitivity and specificity for detecting major depression.[19] The PHQ-2 may be used as a first step for screening. Adolescents who screen positive on the PHQ-2 may be further administered the rest of the PHQ-9.

**Beck Depression Inventory (BDI)-II.** The BDI-II is a 21-item instrument for detecting depression that can be completed by adolescents aged 13 years and older. The BDI-II aligns with the depressive symptom criteria of the DSM-IV-TR and takes about 10 minutes to complete. It was specifically constructed to measure the severity of self-reported depression in adolescents and adults.[20] Although the BDI-II is typically a self-report measure, providers can also verbally administer the measure to adolescents. It contains 21 questions with a scale value of 0 to 3. A cutoff score above 20 suggests moderate depression and a score of 29 or higher suggests severe depression. The BDI-II can be used with patients aged 13 to 80 years and is available in Spanish. The BDI-II can be ordered at http://www.pearsonassessments.com and costs $120 for a kit including a manual and 25 forms.

**Children's Depression Inventory (CDI)-2.** The CDI-2 is a 28-item scale used to assess for depressive symptoms in children and adolescents. It is derived from the BDI but modifies some questions to be more appropriate for younger ages.[21] The CDI-2 is a self-report measure that is completed by the child or adolescent and usually takes about 15 to 20 minutes. It can be administered and scored using paper-and-pencil forms or online. It asks about key symptoms of depression, such as a child's feelings of worthlessness and loss of interest in activities. The 28 items of the CDI-2 yield a total score, 2 scale scores (emotional problems and functional problems), and 4 subscale scores (negative mood/physical symptoms, negative self-esteem, interpersonal problems, and ineffectiveness). Each item allows the patient to respond to 3 choices that indicate 3 levels of symptoms: 0 (absence of symptoms), 1 (mild or probable symptoms), or 2 (definite symptoms). The CDI-2 can be used with patients who are aged 7 to 17 years, and can be particularly helpful for providers who want to track depressive symptoms over the course of treatment (http://www.mhs.com/CDI2). The CDI-2 can be obtained through http://www.pearsonassessments.com at a cost of $267 for a manual and 25 forms.

## General mental health questionnaires

**Pediatric Symptom Checklist (PSC).** The PSC is a 35-item psychosocial screening tool designed to cover cognitive, emotional, and behavioral problems. It is completed by the parent and takes approximately 3 minutes. The PSC can be used with patients aged between 3 and 16 years. There is a total possible score of 70. For children aged 6 to 16 years, a total score of 28 or higher indicates significant impairment in functioning. The PSC has an internalizing scale that examines depression and anxiety together. For adolescents who are aged at least 11 years, there is also a youth self-report version (Y-PSC). Additionally the PSC and Y-PSC are available in Spanish, and the PSC is available in Japanese. There is also a 17-item scale that performs similarly to the 35-item scale, although this shorter version has not been as widely

used. The PSC can be downloaded free at http://psc.partners.org/psc_order.htm. Scoring time is relatively brief and could be completed during the office visit. Response options within each category are added together and cutoff scores then indicate if there is significant psychosocial impairment.

**Youth Self-Report Scale (YSR).** The YSR is a youth version of the Child Behavior Checklist that consists of 112 items. The YSR can be used with adolescents aged 11 to 18 years and is meant to screen for a variety of behavioral concerns including depression, anxiety, attention problems, aggressive behavior, and social problems. The completion time for the YSR can be 15 minutes or longer because of the large number of questions. Therefore, the YSR may be most useful when a provider wants to get a full picture of the adolescent or suspects other areas of concern in addition to depression. Responses on the YSR are added together and a *t*-score is derived and compared to normative responses of children who are the same age and gender. If *t*-scores are above the 98th percentile, they are considered to be in the clinical range and the child should be further evaluated. The YSR has also been translated into various languages including Spanish, Chinese, and Japanese. The YSR can be ordered at http://www.aseba.org/ and costs $25 for a package of 50 forms. Separate scoring software is available for purchase, and with the software the scoring time averages 10 minutes. Because of the need to score with software or use of more involved manual methods, results of the YSR may be more difficult to complete during a clinic visit.

## Practical concerns about depression screening and follow-up

The USPSTF emphasizes the importance of implementing screening only when such screening is supported by systems that can assist with further evaluation, including confirming the diagnosis and initiating evidence-based treatments. Thus providers and clinics need to be certain when they institute screening that systems are in place to review screening results and take the next appropriate steps. Among the practical considerations to creating screening protocols, clinics need to determine which staff would be responsible for administering, scoring, and recording the questionnaire, as well as ordering and maintaining the screening supplies. A second consideration is when the screening questionnaire will be administered. For example, should it be administered to the adolescent in the waiting room prior to seeing the primary care provider, or in the room with the provider? If adolescents are asked to complete questionnaires in the waiting room, privacy needs to be ensured because adolescents may feel uncomfortable answering the questions when their parents or others are present. Providers should explicitly discuss confidentiality expectations with parents and adolescents. Although confidentiality laws vary by state, the National Alliance to Advance Adolescent Health provides a good resource for adolescent confidentiality: http://ww2.nasbhc.org/RoadMap/CareManagement/Special Topics/State Policies and Confidential Care for Adolescents NAAAH.pdf.

During the course of depression screening the adolescent may disclose information about suicidal thoughts, intents, or plans. For a patient who indicates any suicidality, providers should be prepared to complete a thorough assessment prior to the adolescent leaving the room to ensure his or her safety. For a patient with suicidal thoughts but no plan or intent, a safety plan may be appropriate in which the adolescent agrees to stay safe and has a plan in place to seek assistance (from a trusted adult or the provider) if his or her suicidal thoughts worsen while the provider finds mental health specialty care. It is also important that providers counsel the parents and family of any suicidal adolescent to safeguard the home from medications, weapons, and lethal objects. Prior to assessment, providers should have an understanding of the resources available in their community if further assessment is warranted. The Centers for Disease Control and Prevention includes useful information on safety planning and resources on its Web page for suicide prevention in youths: http://www.cdc.gov/violenceprevention/pub/youth_suicide.html.

## Active monitoring for mild depression

After assessment for depressive symptoms has been conducted with the assessment tools previously discussed, a provider will have information about the level and severity of the adolescent's symptoms. If an adolescent endorses symptoms that are consistent with mild depression, providers should engage in active monitoring practices according to the Guidelines for

## DSM-5 WHAT YOU NEED TO KNOW ABOUT THE NEW PSYCHIATRIC DIAGNOSTIC CRITERIA

The recent release of the American Psychiatric Association's 5th edition of its *Diagnostic and Statistical Manual of Mental Disorders*, known as DSM-5, has sparked some controversy. Autism and Asperger syndrome are lumped together. Attention-deficit/hyperactivity disorder symptoms now have up to age 12 years to manifest. New disorders have been added. Existing disorders are recategorized. For community pediatricians, this adds confusion to an already complex patient assessment process.

However, the DSM-5 has much to offer, according to Gary G. Gintner, PhD, associate professor and program leader of the counseling program at Louisiana State University in Baton Rouge. Gintner served as the DSM-5 task force chair for the American Mental Health Counselors Association. The task force reviewed various DSM-5 draft proposals and provided review comments over the past 3 years.

Pediatricians screening for depression need to consider new disorders, including disruptive mood dysregulation disorder (DMDD). The DSM-5 added this disorder to address potential overdiagnosis of bipolar disorder in children. Researchers found that some children diagnosed as bipolar did not develop bipolar disorder as adults, instead being more likely to develop depressive or anxiety disorders. Diagnostic criteria for DMDD include common episodes of severe anger outbursts. Between these outbursts, there is a persistent angry or irritable mood. Symptoms have to appear by age 10 years and last for at least 1 year. "These are pretty significant criteria," Gintner says, and they can help pediatricians differentiate DMDD from bipolar disorder in children (for which diagnostic criteria are the same as in adults).

The DSM-5 also adds premenstrual dysphoric disorder (PMDD), previously flagged in the DSM-IV appendix, as a new depressive disorder. "It's not specific to adolescents," Gintner says, but it can complicate diagnostics if pediatricians do not consider PMDD when screening their female patients for depression.

While the updated manual modifies diagnostic criteria, it also incorporates components to streamline the process. "DSM-5 changes how you diagnose relative to DSM-IV," Gintner says, through the use of a single axis system similar to the International Classification of Diseases (ICD). Also, ICD-10 codes are noted with every disorder, eliminating the need to look them up.

Other major benefits of the DSM-5 are its numerous assessment tools. Available online at http://www.psychiatry.org/dsm5, these assessment measures can assist the pediatrician in the diagnostic process and enhance clinical decision making.

Adolescent Depression—Primary Care (GLAD-PC; http://glad-pc.org/). This is important because more than half of adolescents who screen positive for depression will have resolution of their symptoms without requiring psychotherapy or medications.[22] Active monitoring is analogous to watchful waiting practices used in adult populations. Key aspects of active monitoring as emphasized by the GLAD-PC guidelines include increasing the frequency of follow-up visits, encouraging the adolescent to engage in regular exercise and activities, and identifying peer and adult support.[23,24] Providers should also involve parents and engage them in being aware of their child's symptoms and assisting in problem solving. Adolescents who are treated with active monitoring and who have persistent symptoms 6 to 8 weeks after screening should receive evidence-based treatment for depression with regular follow-up visits until their symptoms have resolved.

### Evidence-based treatment for moderate-to-severe depression

If an adolescent endorses symptoms consistent with moderate-to-severe depression, providers should discuss different treatment options, including psychotherapy, medication, or both. Evidence-based psychotherapies for adolescent depression exist; the most common treatments include cognitive-behavioral therapy (CBT) and interpersonal psychotherapy for adolescent depression (IPT-A), both of which have shown effectiveness in treating children and adolescents with depression.[25,26] Behavioral activation (BA) is also a promising treatment that has been adapted to treating adolescent depression.[27] Providers should be ready with

referrals to therapists who can provide these psychotherapeutic treatments.

In advance of implementing screening, clinics can create a list of potential resources for psychological treatment so that this information is readily available when needed. Medication for depression may also be indicated as part of treatment. Specifically, selective serotonin reuptake inhibitors (SSRIs) have proven effective in reducing symptoms of depression in adolescents.[28] Any adolescent who is started on antidepressants such as SSRIs, as well as his or her parents, should be counseled for the potential increased risk for suicidality and monitored closely in the beginning of medication treatment. Because medications and psychotherapy have similar efficacy, one reasonable approach would be to work with patients and families to determine their treatment preferences and needs of the adolescent. Similar to active monitoring, the key to the use of evidence-based treatments is to monitor adolescents closely and to advance treatment for those who are not improving after 6 to 8 weeks of treatment. If multiple treatment providers are involved in managing the depression, obtaining a waiver of confidentiality to allow communication on progress and needs is ideal.

## Summary

Screening for adolescent depression can make a difference to adolescent health. The tools and resources described herein are intended to equip providers with the resources to conduct screening and follow-up with adolescent populations in primary care. CP

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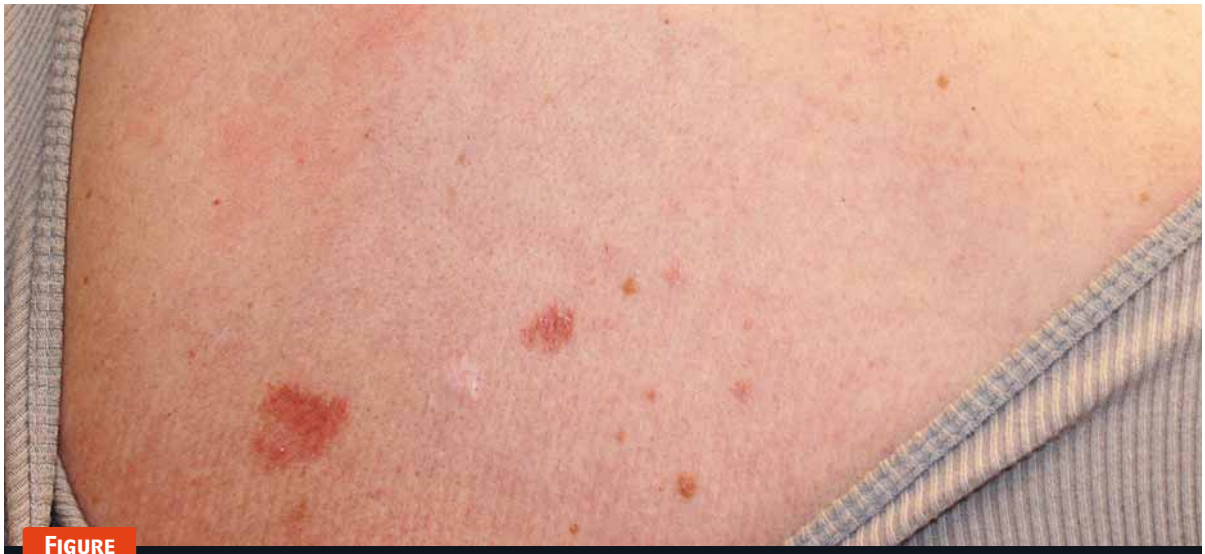

FIGURE

*Two pearly round red plaques on an adolescent girl.*

# Persistent pearly plaques in a fair-skinned adolescent girl

**SEAN CHEN, BA, MS3**

## THE CASE

**You are asked to evaluate 2 persistent, pearly red plaques on the back of a healthy 19-year-old girl. Her mother says she saw them last week when her children were walking to the neighborhood pool. The patient says that the plaques have been present for at least the last 6 months but have not bothered her. Of note, she is active in outdoor sports and works as a lifeguard and swimming instructor on weekends during the summer. What's the diagnosis?**

FOR DISCUSSION SEE PAGE 32

### TELL US ON FACEBOOK

If you have experienced a case such as this in your practice, how did you resolve it? We'd like to hear from you. Share your story with us and our readers on Facebook.
facebook.com/ContemporaryPediatrics

IMAGE CREDIT/ AUTHOR SUPPLIED

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DIAGNOSIS:

# Basal cell carcinoma (BCC)

## EPIDEMIOLOGY

Basal cell carcinoma is a common skin cancer arising from the basal layer of the epidermis. These cancers have low metastatic potential but may become locally invasive and disfiguring. The American Cancer Society estimates that more than 2 million nonmelanoma skin cancers were treated in the United States in 2006, of which the majority were BCCs.[1] The incidence of BCC has increased by more than 10% per year, particularly among American women aged younger than 40 years.[2]

## RISK FACTORS

Exposure to natural and artificial ultraviolet radiation is the most important risk factor. Patient-specific risk factors include fair skin, light-colored eyes, red hair, childhood freckling, use of tanning beds, and increased number of past sunburns.[3,4] Although basal cell carcinomas may occur in the pediatric population in the context of cancer-related genodermatoses such as basal cell nevus syndrome, they can also occur independently in high-risk patients with light skin and increased sun exposure.

## MOLECULAR PATHOGENESIS

Basal cell carcinoma is thought to derive from the basaloid epithelia where pluripotent progenitor epithelia arise. Mutations in *PTCH1* and *BCL2* have been implicated in tumorigenesis.[5]

Typical BCCs are pearly pink or flesh-colored papules and plaques with overlying telangiectasia. Lesions may be translucent or slightly erythematous with a violaceous or pearly rolled border, sometimes accompanied by scaling, crusting, and/or ulceration. Approximately 80% of BCCs occur on the head and neck with the remainder occurring mainly on the trunk and lower limbs.[6]

## DIFFERENTIAL DIAGNOSIS

Early nodular variants of BCC may look like benign growths such as dermal nevi, small epidermal inclusion cysts, or sebaceous hyperplasia. Lesions may also resemble *Molluscum contagiosum* and amelanotic melanoma. Larger lesions may resemble squamous cell carcinoma and keratoacanthomas.

## DIAGNOSIS AND TREATMENT

The diagnosis can often be made upon the clinical examination with skin biopsy for histological confirmation. Tumor characteristics including size, location, and pathology guide treatment. Basal cell carcinomas at low risk for recurrence are most commonly managed with electrodesiccation and curettage or surgical excision. Topical 5-fluorouracil, imiquimod, cryosurgery, and photodynamic therapy may also be employed, although less frequently. Patient-specific factors related to the ability to tolerate surgery and preference should also play a role.

## PROGNOSIS

The prognosis is excellent for most patients with BCCs, which are slow growing and rarely metastasize. A third of patients with 1 BCC develop another primary lesion within 1 year. There is increased risk for development of subsequent squamous cell carcinoma and melanoma in patients with a history of BCC, necessitating close follow-up care.[7] Early detection may mean detecting smaller, less-aggressive tumors with good treatment outcomes. Patients should be educated on sun avoidance, use of broad-spectrum sunscreen (UVA and UVB), wearing sun-protective clothing, avoiding tanning salons, and performing monthly skin self-exams, by the patients themselves or by a family member.


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# Preventive health care in the high-tech practice

One of the most important things we do as pediatricians is to attempt to improve the quality of children's health via preventive health care visits. In this article, we'll review the current American Academy of Pediatrics (AAP) Recommendations for Preventive Pediatric Health Care (RPPHC) and discuss how we can best use technology to ensure that our patients are as healthy as possible.

## Kids have "Bright Futures"

The Bright Futures initiative was launched in 1990 under the leadership of the Maternal and Child Health Bureau (MCHB) of the Health Resources and Services Administration (HRSA). In 2001, the MCHB awarded cooperative agreements to the AAP to lead the Bright Futures initiative. The linchpin of Bright Futures is the RPPHC, a wide-ranging set of guidelines that represent a single standard of care for pediatric providers. Bright Futures and the AAP continually update these recommendations, also called the periodicity schedule, which guide pediatricians and parents as to when well visits should be performed and which screening tests should be done at each visit. Because the periodicity schedule was last updated in 2008, there are new recommendations that have yet to be integrated into the periodicity schedule. For example, there are new recommendations regarding screening newborns for critical congenital heart disease (CCHD) before discharge from the hospital and screening young children for iron deficiency at 1 year of age.[1,2] There are also modifications to previous recommendations for screening pediatric patients for hyperlipidemia as well as an endorsement of photoscreeners to electively screen for amblyopia in children.[3,4] The Table lists screening guidelines that are current as of this writing.[5]

## Putting preventive health care into practice

There is no question that pediatric medicine does an extremely good job of identifying significant medical problems in newborns so that corrective measures can be implemented. All babies are screened in the hospital for metabolic diseases, hyperbilirubinemia, hearing deficits, and CCHD. In addition, those newborns at risk for neonatal withdrawal syndrome may have their urine, meconium, or cord tissue screened for drugs. Some premature babies may have screening head ultrasounds, retina exams, and car seat tests prior to discharge. Following discharge from the newborn nursery, babies are seen a few days after birth to monitor for jaundice and adequacy of feeding. Babies born prematurely or those with complex medical problems have timely follow-up with necessary pediatric specialists, and those who are born via breech presentation or otherwise at risk will have a screening hip ultrasound at 6 weeks of age. Despite our many screening successes, there is clearly much room for improvement. Pediatricians are currently challenged with "new morbidities" that

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**TABLE** Current screening guidelines from Bright Futures 2008 Recommendations for Preventive Pediatric Health Care.

### Hospital screening
- Metabolic screen
- Immunizations
- Transcutaneous bilirubin
- Hearing screening
- Screening for critical congenital heart disease
- Urine/Meconium/Cord screen when neonatal withdrawal suspected
- Car seat test for babies less than 37 weeks' gestation
- History and physical exam

### 3-5 day visit
- Measurements
- Immunizations
- Transcutaneous bilirubin if available for babies noted to be jaundiced, otherwise total serum bilirubin
- Developmental surveillance
- History and physical exam

### 2-month visit
- Measurements
- Immunizations
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 4-month visit
- Measurements
- Immunizations
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 6-month visit
- Measurements
- Immunizations
- Developmental surveillance/ Behavioral assessment
- Elective screening for amblyopia using photoscreener
- History and physical exam

### 9-month visit
- Measurements
- Immunizations
- Screen for developmental delay using a screening tool (ie, PEDS or Ages and Stages Questionnaires)
- Elective screening for amblyopia using photoscreener
- Behavioral assessment
- History and physical exam

### 1-year visit
- Measurements
- Immunizations
- Screening for anemia and iron status with Hb and reticulocyte count (for reticulocyte Hb level)
- Elective screening for amblyopia using photoscreener
- Lead screening done on immigrants, children enrolled in Medicaid or WIC, and those in houses built in 1970s or earlier
- Developmental surveillance/ Behavioral assessment
- Referral to dental home
- History and physical exam

### 15-month visit
- Measurements
- Immunizations
- Elective screening for amblyopia using photoscreener
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 18-month visit
- Measurements
- Immunizations
- Modified Checklist for Autism in Toddlers (M-CHAT)
- Screen for developmental delay using a screening tool (ie, PEDS or Ages and Stages Questionnaires)
- Elective screening for amblyopia using photoscreener
- Behavioral assessment
- Referral to dental home
- History and physical exam

### 2-year visit
- Measurements
- Immunizations
- Repeat lead screening (see above)
- M-CHAT
- Elective screening for amblyopia using photoscreener
- Referral to dental home
- History and physical exam

### 30-month visit (reimbursed by insurance companies)
- Measurements
- Immunizations
- Screen for developmental delay using a screening tool (ie, PEDS or Ages and Stages Questionnaires)
- Lead screening if not done previously
- Elective screening for amblyopia using photoscreener
- Behavioral assessment
- Referral to dental home
- History and physical exam

### 3-year visit
- Measurements
- Immunizations
- BP with VS
- Elective screening for amblyopia using photoscreener; use standard visual acuity testing if child is capable
- Anemia: universally screen for anemia in low-income, WIC, and refugee child using Hb
- Developmental surveillance/ Behavioral assessment
- Referral to dental home
- History and physical exam

### 4-year visit
- Measurements
- Immunizations
- BP with VS
- Elective screening for amblyopia using photoscreener; use standard visual acuity testing if child is capable
- Hearing screen
- Anemia: universally screen for anemia in low-income, WIC, and refugee child using Hb
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 5-year visit
- Measurements
- Immunizations
- BP with VS
- Visual acuity screen
- Hearing screen
- Anemia: universally screen for anemia in low-income, WIC, and refugee child using Hb
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 6-year visit
- Measurements
- Immunizations
- BP with VS
- Hearing screen
- Visual acuity screen
- Developmental surveillance/ Behavioral assessment
- Referral to dental home
- History and physical exam

### 7-year visit
- Measurements
- Immunizations
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 8-year visit
- Measurements
- Immunizations
- Hearing screen
- Visual acuity screen
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 9-year visit
- Measurements
- Immunizations
- BP with VS
- Lipid screening with fasting lipid profile or nonfasting total cholesterol and HDL
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 10-year visit
- Measurements
- Immunizations
- Hearing screen
- Visual acuity screen
- Lipid screening with fasting lipid profile or nonfasting total cholesterol and HDL
- CDC recommends screening all nonpregnant women every 5-10 years for anemia starting at menarche
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 11-year visit
- Measurements
- Immunizations
- CDC recommends screening all nonpregnant women every 5-10 years for anemia starting at menarche
- Lipid screening with fasting lipid profile or nonfasting total cholesterol and HDL
- Chlamydia and gonorrhea screening on all sexually active girls
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 12-year visit
- Measurements
- Immunizations
- Visual acuity screen
- CDC recommends screening all nonpregnant women every 5-10 years for anemia starting at menarche
- Chlamydia and gonorrhea screening on all sexually active girls
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 13-year visit
- Measurements
- Immunizations
- CDC recommends screening all nonpregnant women every 5-10 years for anemia starting at menarche
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 14-year visit
- Measurements
- Immunizations
- CDC recommends screening all nonpregnant women every 5-10 years for anemia starting at menarche
- Chlamydia and gonorrhea screening on all sexually active girls
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 15-year visit
- Measurements
- Immunizations
- Visual acuity screening
- CDC recommends screening all nonpregnant women every 5-10 years for anemia starting at menarche
- Chlamydia and gonorrhea screening on all sexually active girls
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 16-year visit
- Measurements
- Immunizations
- CDC recommends screening all nonpregnant women every 5-10 years for anemia starting at menarche
- Chlamydia and gonorrhea screening on all sexually active girls
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 17-year visit
- Measurements
- Immunizations
- CDC recommends screening all nonpregnant women every 5-10 years for anemia starting at menarche
- Lipid screening with fasting lipid profile or nonfasting total cholesterol and HDL
- Chlamydia and gonorrhea screening on all sexually active girls
- Developmental surveillance/ Behavioral assessment
- History and physical exam

### 18-year visit
- Measurements
- Immunizations
- Visual acuity screening
- Lipid screening with fasting lipid profile or nonfasting total cholesterol and HDL
- Chlamydia and gonorrhea screening on all sexually active girls
- Developmental surveillance/ Behavioral assessment
- History and physical exam

**Note that blood pressure should be included in vital signs taken at routine preventive-care visits beginning at age 3 years unless other risk factors are present (ie, history of kidney disease).**

Abbreviations: BP, blood pressure; CDC, Centers for Disease Control and Prevention; Hb, hemoglobin; HDL, high-density lipoprotein; PEDS, Parents' Evaluation of Developmental Status; VS, vital signs; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.
Adapted from Bright Futures/American Academy of Pediatrics.[5]

include obesity and developmental problems, as well as high-risk behaviors among teenagers that can be associated with sexually transmitted diseases, substance abuse, and depression.

Much needs to be accomplished in a preventive health care visit, which typically is allotted only 20 minutes on a pediatrician's schedule. Fortunately, many high-tech tools are available to facilitate this process and make it possible to make use of time before and after the routine office well-child visit to screen for problems and educate parents regarding important health care issues.

## Getting them in the door

Even the most well-meaning parents need to be reminded to attend their scheduled office visits and to make appointments for health maintenance visits. While your staff may be expert at placing reminder calls, this is a chore that is best assigned to a growing number of "reminder services" that are affordable and effective at getting patients in the door. Practices merely transmit a copy of your schedule and patient demographics to the reminder service via the Internet and they take care of the rest. Automated phone call reminders continue to be effective, but reminder services often get the best results by using software to send text messages or e-mails. If your electronic health record (EHR) can generate a list of patients overdue for their well-child visits, these services can also make sure parents are reminded to make appointments for these as well.

## Using patient portals

If you have invested in a full-featured (meaning expensive) EHR, chances are you also have a Web portal to facilitate communication with patients. Web portals allow secure communication with patients' parents to schedule office visits, collect payments, refill prescriptions, and provide educational materials for review. I recently became aware of a novel new pediatric office portal that does not require purchase of an EHR. The product is **konciergeMD.com** (konciergeMD; Newton Square, Pennsylvania), which features a customized practice Web portal and mobile applications that provide all the features mentioned above and then some.



**konciergeMD.com:** Features customized Web portals for communicating with patients.

Because it is pediatric oriented, it prepares parents for office visits by advising them which immunizations will be administered, lists age-appropriate milestones, and helps parents organize their questions so they can make optimal use of their limited time with the pediatrician. From the pediatrician's perspective, konciergeMD.com will work with practices to extract data from their EHRs to facilitate communication with patients. Lists of medications are maintained on the site, as are current immunization reports. The pricing model is very interesting because the company charges a reasonable per-physician yearly fee, or, alternatively, parents can "subscribe" to the practice portal for a $10-per-month fee that provides access to "premium features" designated by the practice, such as the ability to correspond with their physician or obtain forms electronically.

## Efficient use of time

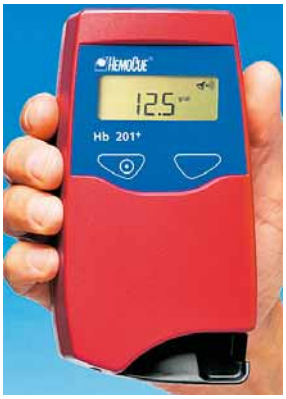
Previous installments of Pediatric V2.0 have discussed optimizing practice efficiency and reducing dependency on traditional paper forms. Once a parent checks in at the reception window and demographic and insurance information are confirmed, the parent is given a visit questionnaire to complete via clipboard or tablet. If your practice has already upgraded to V2.0 status, then the parents would have completed a visit questionnaire available on the practice Web site or e-mailed to them in advance of the visit. As I suggested in prior articles, if your practice uses the **Child Health and Development Interactive System (CHADIS**; Total Child Health; Baltimore, Maryland) online service, the parent would have completed the age-appropriate questionnaire and screening tools in advance of the visit. At the time of the visit itself, the CHADIS documentation is recalled electronically and results pasted into your EHR well-visit note after they are reviewed with the parent.

## Expediting vital signs

Welch Allyn (Skaneateles Falls, New York) has been a pioneer of office technology for a very long time. Over the past few years, the company has developed devices that facilitate obtaining patients' vital signs and transmit results wirelessly to dozens


**Connex Integrated Wall System:** Facilitates taking vital signs and transmits data to the EHR.

of popular EHRs. This obviates the need for nurses to manually input the vital signs every time a patient is roomed. Its **Connex Integrated Wall System** combines an adult and/or pediatric sphygmomanometer that rapidly records blood pressure and pulse rate with a pulse oximeter, as well as an ear or digital thermometer, with its standard LED macroview otoscope and ophthalmoscope. The system also integrates with a number of adult and pediatric scales.




**HemoCue Hb 201+:** Screens for anemia in seconds using finger-stick blood.

## Point-of-care testing

When nurses prep a patient for a preventive care visit, they can perform point-of-care testing that can provide physician and parent with a patient's lead levels, transcutaneous bilirubinometry, lipid levels, and hemoglobin when indicated. Investing in other technology such as otoacoustic emissions (OAE) hearing screeners and photoscreeners can speed screening at well visits. I recommend that in areas where children are at risk for lead poisoning, practices consider purchasing the $2,500 **LeadCare II Analyzer** (Magellan Diagnostics; North Billerica, Massachusetts), which enables practices to screen for lead poisoning by testing either finger stick or venous specimens. As you know, children at high risk for lead poisoning are those in Medicaid, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), immigrants, or those occupying or frequently visiting housing built in the 1970s or earlier. Lead screening is typically performed at 12 months of age and repeated at the 2-year health maintenance visit. It should also be performed at the 3-to-5-year visits if the child is at risk and not previously screened. If the LeadCare II identifies a child with an elevated level, the child should be retested with results sent to a reference lab for confirmation.

Children can also be screened for anemia (Table) at age 1 year when they are high risk. Many devices are available to make this possible at the time of the office visit. These include the well-known **HemoCue Hb 201+** system (HemoCue AB; Angelholm, Sweden), and several other devices that produce results from finger-stick blood in mere seconds. Unfortunately, there are no rapid tests that provide a quick assay of a patient's iron status. So, if you want to combine a hemoglobin measurement with an assay to determine if the child has iron deficiency, you will need to send a child to your lab for a phlebotomy. Likewise, if you are screening sexually active teenage girls for chlamydia or gonorrhea, a urine test will need to be sent to your screening lab, although rapid tests are available for use with swabs obtained if a pelvic exam is performed. Point-of-care testing can also facilitate lipid screening when indicated. Screening for anemia in adolescent girls can be easily accomplished with the **Masimo Pronto-7** device (Masimo; Irvine, California), which allows clinicians to screen for anemia transcutaneously. Unfortunately, as of this writing, this device doesn't work reliably in toddlers.


**Pronto-7:** Use to screen older children for anemia transcutaneously.

PHOTO COURTESY OF MASIMO CORPORATION

## Make immunizations less traumatic

Perhaps the most stress-producing part of the visit for patient and parent is the administration of immunizations. Consider distraction techniques and devices that may blunt the pain associated with injections. These options include the **Shot Blocker** from Bionix Medical Technologies (Toledo, Ohio), a studded piece of plastic that presses against the skin at the injection site, blocking transmission of pain. The **Buzzy Pain Relief System** (MMJ Labs; Atlanta, Georgia) is a vibrating, kid-friendly gadget that is attached to a cold pack and placed on the arm above the injection site. By overwhelming nerves with cold and vibration impulses, children are less likely to experience significant discomfort from injections. Lastly, the **PharmaJet** (PharmaJet; Golden, Colorado) is a needle-free injection system that may eventually prove to be the best device for immunizing children. Studies are currently underway that hope to demonstrate that equivalent antibodies levels can be achieved with PharmaJet immunizations compared with those administered via standard needle injections. This would be a very good thing because PharmaJet injections are less painful and less frightening to our needle-phobic patients.

## Education

An important component of the well visit is educating parents and children regarding age-appropriate issues. These include, but are not limited to, weight concerns, getting appropriate exercise, accident-proofing a home, sunblock and insect repellent use, and avoiding firearm injuries—just to name a few. Teenagers should be educated regarding depression, smoking, drug use, and other risk behaviors. Undoubtedly, we identify issues at our well-child visits that need follow-up. Education handouts help parents understand issues identified, be they bed-wetting, depression, or a murmur not previously heard. Practices should be prepared to hand out information regarding such issues. A more efficient way of educating parents following a visit is to direct parents to your Web portal that has appropriate content for them to review, or use the CHADIS system to provide not only information about medical problems, but also local resources in the patient's own community. The most efficient practice will e-mail parents a copy of the visit summary, health and immunization forms, and any information sheets deemed appropriate.

**Buzzy Pain Relief System:** Cold and vibration impulses dull discomfort from injections.

## The future of preventive health care visits

In the future, we can anticipate that we will have more sophistical office-based technologies that will make our preventive care visits even more efficient. I am especially looking forward to the introduction of devices that will give us the ability to perform screenings that will no longer require painful phlebotomy, or immunizations that no longer need painful injections. That day, hopefully, is not far off. CP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# MY MENTOR, MY FRIEND

## Teaching life's lessons with grace and humor.

My story doesn't involve a parent or a child. Rather, mine involves a mentor.

In September 1978, I was a perplexed senior medical student at the University of Arkansas for Medical Sciences (UAMS), Little Rock, unable to decide between a career in family practice or pediatrics. Tom Ed Townsend, a general pediatrician in private practice in Pine Bluff, Arkansas, had the reputation of being the best pediatrician in the state, and was well respected by the entire faculty at Arkansas Children's Hospital (ACH) in Little Rock. My advisor and the chair of pediatrics at UAMS, Dr. Robert Fiser, told me, "If you want to see how pediatrics should be practiced, you need to schedule an elective with Tom Ed." I have rarely been given better advice.

Although I was a bit intimidated to work with someone so revered, I went to Pine Bluff determined to be the finest senior medical student Dr. Townsend had ever seen. An event that occurred during my first week with him has had a significant impact on the way I approach my teaching duties with students and residents.

I had seen a febrile 2-month-old boy, spending about 30 minutes in the room taking a careful history and physical and trying to do my best. I then presented the child and his problem to Dr. Townsend. Because I could find no focus of infection, I felt it would be best to admit the young lad to the hospital and perform an entire workup to detect sepsis. I then proposed that we treat the child with intravenous ampicillin and chloramphenicol—those were the right choices in 1978—while we were awaiting the results of the cultures.

Dr. Townsend listened carefully to my thoughts and plans and then went into the room to examine the young boy. He took a few moments to look at the child in his mother's lap and then asked the one important question I had forgotten: "Anyone else sick at home?" The mother then proceeded to list a host of family members who had the same symptoms as her child.

As the realization dawned on me that this infant had the same virus that everyone else at home had, and that in less than 30 seconds and with only one question this sage pediatrician had gleaned more important information than I had been able to obtain in 30 minutes, I became quite chagrined. Dr. Townsend, observing my facial flush, said, "Young Dr. Burke, would you mind stepping out into the hallway with me for a minute?" Once outside, Dr. Townsend put his arm around my shoulder, grinned, and said, "You know, Bryan, I don't think we can keep this young 'un from getting well!"

Dr. Townsend taught me with grace and humor: grace because he did not embarrass me in front of the patient's mother, and humor because he knew he had no need to teach me my mistake. With his touch and grin, he assured me that I was accepted and respected, even though I had made such an obvious beginner's mistake.

The story, for me, gets even better. Dr. Townsend's practice pattern confirmed my love of pediatrics, so I applied for and was blessed to do a pediatric residency at UAMS and ACH. During the last year of my residency, Dr. Townsend asked me to become his partner. The 5 years I was able to spend with him were among the best of my life.

Although I am now a professor of general pediatrics at UAMS and ACH, and 26 years removed from the last time I was Dr. Townsend's partner, I have trouble practicing a single day without using something he taught me, including how to teach with grace and humor. He remains the finest physician I have ever known. CP

**BRYAN L BURKE JR, MD, FAAP**
*Little Rock, Arkansas*

**EDITOR'S NOTE:** Tom Ed Townsend, MD, passed peacefully on June 7, 2013. He practiced pediatrics for 60 years, until a few weeks before his death.

**DR BURKE** is professor, Section of Neonatology, University of Arkansas for Medical Sciences, Little Rock.

PROFESSIONAL MESSAGES

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# CALENDAR

## JULY

**22-24:** Pediatric and Adult Infectious Diseases: An Evidence-Based Approach to Common Problems (CME).
Anaheim, California.
**CONTACT:** MCE Conferences, www.mceconferences.com/conference-detail.php?conf_id=PN939-6-5-19-32

**28-2:** 31st Annual Conference on Pediatric Infectious Diseases.
Vail, Colorado.
**CONTACT:** Children's Hospital Colorado, www1.childrenscolorado.org/Events/calendar-detail/?eventId=c52e487c-7571-e211-8f54-2c768a4e1b84

## AUGUST

**1-4:** Pediatric Hospital Medicine Conference.
New Orleans, Louisiana.
**CONTACT:** American Academy of Pediatrics, www.aap.org/en-us/about-the-aap/Committees-Councils-Sections/Section-on-Hospital-Medicine/Pages/Pediatric-Hospital-Medicine-2012.aspx

**24-29:** International Congress of Pediatrics 2013.
Melbourne, Australia.
**CONTACT:** International Pediatric Association, www2.kenes.com/IPA/Pages/home.aspx

**26-30:** 19th Annual Pediatric Board Review Symposium.
Cleveland, Ohio.
**CONTACT:** Cleveland Clinic, www.clevelandclinicmeded.com/live/courses/pediatric/overview.asp

## SEPTEMBER

**19-22:** Pediatric Urology Fall Congress.
Las Vegas, Nevada.
**CONTACT:** Society for Pediatric Urology, http://fallcongress.spuonline.org/

**27-30:** SDBP 2013 Annual Meeting.
Baltimore, Maryland.
**CONTACT:** Society for Developmental and Behavioral Pediatrics, www.sdbp.org/annual_meeting.cfm

## OCTOBER

**11:** Pediatric Nursing Conference.
Pittsburgh, Pennsylvania.
**CONTACT:** Children's Hospital of Pittsburgh of UPMC, www.chp.edu/CHP/pediatric+nursing+conference

**12-18:** Aloha Update: Pediatrics 2013. Kauai, Hawaii.
**CONTACT:** Children's Hospital Los Angeles Medical Group, www.childrenshospitallamedicalgroup.org/site/c.pjK0KdMVKwG/b.4903949/k.9135/CME_Conferences.htm

**15-16:** Pediatric Neurorehabilitation Symposium 2013. Chicago, Illinois.
**CONTACT:** Rehabilitation Institute of Chicago, http://pediatric-nrs2013.com

**23-26:** 29th Annual Fall Conference on Pediatric Emergencies.
Paradise Island, Bahamas.
**CONTACT:** Symposia Medicus, http://symposiamedicus.org/assets/conference/1273/1273.html

**26-29:** AAP National Conference and Exhibition. Orlando, Florida.
**CONTACT:** American Academy of Pediatrics, www.aapexperience.org

## NOVEMBER

**7-8:** 22nd Annual Amazing Newborns Conference, Little Bugs, Big Hearts: Infectious Diseases of the Newborn and Congenital Heart Disease.
Albuquerque, New Mexico.
**CONTACT:** University of New Mexico, Continuing Medical Education, www.medical-events.com/congress/22nd-annual-amazing-newborns-conference-little-bugs-big-hearts-infectious-diseases-of-the-newborn-and-congenital-heart-disease-2498

**7-10:** 7th Biannual Conference on Pediatric Sleep Medicine.
Amelia Island, Florida.
**CONTACT:** Warren Alpert Medical School of Brown University, http://brown.edu/academics/medical/education/other-programs/continuing-medical-education/pedsleepmedconference

**8-10:** Southwest Regional NAPNAP Conference.
Palm Springs, California.
**CONTACT:** National Association of Pediatric Nurse Practitioners, http://southwestregionalnapnapconference.com/

## DECEMBER

**3-6:** AANS/CNS Joint Section on Pediatric Neurosurgery 2013 Pediatric Section Meeting.
Toronto, Canada
**CONTACT:** American Association of Neurological Surgeons/Congress of Neurological Surgeons, Section on Pediatric Neurological Surgery, http://pedsneurosurgery.org/meetings/current-meeting/

**9-11:** Hot Topics in Neonatology.
Washington, DC.
**CONTACT:** Alfred I duPont Hospital for Children, www.hottopics.org/

**20-21:** 5th Annual Conference on Emergencies in Pediatrics.
New York, New York
**CONTACT:** Symposia Medicus, http://symposiamedicus.org/Assets/Conference/1281/1281.html

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**References: 1.** Data on file. Galderma Laboratories. **2.** Bigotti C, Guala F, Merlo E, Gazzaniga G, Villa G. Zinc and its derivatives: their applications in cosmetic. *J Appl Cosmetol.* 2005;23:139-147. **3.** Rigano L, Merlo E, Guala F, Villa G. Stabilized solutions of zinc coceth sulfate for skin cleansing and skin care. *Cosmetics Toiletries.* 2005;120:103-108. **4.** Schwartz JR, Marsh RG, Draelos ZD. Zinc and skin health: overview of physiology and pharmacology. *Dermatol Surg.* 2005;31:837-847. **5.** Castiel-Higounenc I, Chopart M, Ferraris C. Stratum corneum lipids: specificity, role, deficiencies and modulation. *OCL.* 2004;11(6):401-406.

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# Conditions that present nutritional challenges

## APPETITE SUPPRESSION IN ADHD

Suppressed appetites can lead to weight loss and delayed growth.

## GLUTEN SENSITIVITY

Gluten-free diets can create macronutrient and micronutrient imbalances, including calcium, iron, folate, and fiber deficiencies.[1]

## AUTISM

Texture aversion or extreme food selectivity can lead to nutritional deficiencies.[2–4]

## PICKY EATING

The *USDA Dietary Guidelines for Americans 2010* state that low intakes of calcium, vitamin D, potassium, and fiber are a public health concern.[5]

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**Calories**

| | |
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For kids aged 2–13

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For kids aged 2–13


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References:
**1.** Thompson T, et al. Gluten-free diet survey: are Americans with coeliac disease consuming recommended amounts of fiber, iron, calcium and grain foods? *J Hum Nutr Diet.* 2005;18(3):163-169. **2.** Hediger ML, et al. Reduced bone cortical thickness in boys with autism or autism spectrum disorder. *J Autism Dev Disord.* 2008;38(5):848-856. **3.** Geraghty ME, et al. Nutritional intake and therapies in autism: a spectrum of what we know: part 1. *ICAN: Infant Child Adolecs Nutr.* 2010;2:62-69. **4.** Geraghty ME, et al. Nutritional interventions and therapies in autism: a spectrum of what we know: part 2. *ICAN: Infant Child Adolesc Nutr.* 2010;2:120-133. **5.** US Department of Agriculture and US Department of Health and Human Services. *Dietary Guidelines for Americans 2010.* 7th ed. Washington, DC: US Government Printing Office; 2010.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Serving size | 8 fl oz | 8 fl oz | 182 g | 2 oz | 1 oz | 4 pc | 3 pc (34 g) | 6 oz | 24 g | 1 oz | 37 g unpop | 28.35 g |
| **Calcium, mg** | **250** | **250** | **11** | **50** | **7** | **0** | **7** | **240** | **175** | **40** | **3** | **40** |
| **Vitamin D, IU** | **160** | **160** | **0** | **0** | **0** | **0** | **0** | **80** | **4** | **0** | **0** | **0** |
| **Potassium, mg** | **310** | **390** | **195** | **184** | **466** | **n/a** | **73** | **300** | **23** | **44** | **68** | **67** |
| **Fiber, g** | **1** | **3** | **4.5** | **1** | **1** | **0** | **1** | **0** | **0** | **<1** | **4** | **1** |
| Calories | 240 | 150 | 95 | 280 | 155 | 160 | 160 | 70 | 70 | 140 | 125 | 150 |
| Protein, g | 7 | 7 | 0.5 | 4 | 2 | 1 | 2 | 7 | 6 | 3 | 4 | 2 |
| Total Carbs, g | 33 | 21 | 25 | 35 | 15 | 36 | 24 | 13 | 1 | 20 | 21 | 18 |
| Sugars, g | 18 | 17 | 19 | 29 | neg | 18 | 14 | 13 | 0 | 1 | <1 | 1 |
| Total fat, g | 9 | 5 | 0.3 | 14 | 10 | 1 | 7 | <1 | 4.5 | 7 | 3 | 7 |
| Sat fat, g | 1 | 1 | 0 | 5 | 1 | 0 | 2 | 0 | 3 | 1.5 | <1 | 1 |
| Cholesterol, mg | 10 | <5 | 0 | 7 | 0 | 0 | 0 | <5 | 15 | 1 | 0 | 0 |
| Sodium, mg | 90 | 90 | 2 | 136 | 136 | 130 | 156 | 100 | 170 | 276 | 140 | 174 |
| Vitamin A, IU | 500 | 500 | 98 | 92 | 0 | 0 | neg | 10 | 145 | 44 | 42 | 0 |
| Iron, mg | 2.7 | 2.7 | neg | <1 | neg | neg | 3 | neg | 0 | 1.39 | <1 | <1 |
| Vitamin E, IU | 6 | 6 | <1 | 1 | 3 | 0 | 1 | 0 | <1 | <1 | 2 | 0 |
| Vitamin C, mg | 24 | 24 | 8 | neg | 5 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Phosphorus, mg | 200 | 200 | 20 | 108 | 44 | n/a | 34 | 185 | 126 | 57 | 75 | 73 |
| Magnesium, mg | 40 | 40 | 9 | 41 | 20 | n/a | 17 | 22 | 6 | 7 | 43 | 22 |
| Number of V&M at 10% or more | 25 | 25 | 2 | 3 | 2 | 0 | 2 | 3 | 1 | 2 | 0 | 2 |

PediaSure® with Fiber has 3 g of fiber

*Top 10 midday snack foods for kids 2–12. NPD Group's Snack Fact, year ending March 2011.


**Reference:**
1. US Department of Agriculture and US Department of Health and Human Services. *Dietary Guidelines for Americans 2010.* 7th ed. Washington, DC: US Government Printing Office; 2010.


Snack Meal Occasions are divided into morning snacks 22%, midday snacks 46%, and evening snacks 32%. http://www.npd.com/lps/pdf/Sept_Snack_Fact_Sa.pdf / HealthAffairs March 2010: pdf of snacking trends article. http://content.healthaffairs.org/content/29/3/398.full.html / Nutrient data rounded from USDA database data and market leader manufacturers websites.



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