Failure to thrive
How to assess & mitigate faltering growth
Contemporary PEDIATRICS

office and hospital-based pediatricians and nurse practitioners use Contemporary Pediatrics’ timely, trusted, and practical information to enhance their day-to-day care of children. We advance pediatric providers’ professional development through in-depth, peer-reviewed clinical and practice management articles, case studies, and news and trends coverage.

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Our MISSION

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**PRESCRIBE EMVERM. THE ONLY FDA-APPROVED RX TREATMENT FOR PINWORM.**

95% CURE RATE AGAINST PINWORM

- EMVERM contains mebendazole, the active ingredient that has been prescribed by physicians for MORE THAN 40 YEARS.
- Recommended by the AAP Red Book as one of the DRUGS OF CHOICE for highly contagious pinworm infections.
- The CDC recommends TREATING THE ENTIRE HOUSEHOLD, since family members are frequently infected.
- ONE 100 mg CHEWABLE TABLET, for ONE DAY, is the same dosage schedule for children and adults.

INDICATION

EMVERM® is indicated for the treatment of patients two years of age and older with gastrointestinal infections caused by Ancylostoma duodenale (hookworm), Ascaris lumbricoides (roundworm), Enterobius vermicularis (pinworm), Necator americanus (hookworm), and Trichuris trichiura (whipworm).

IMPORTANT SAFETY INFORMATION

Contraindication: EMVERM is contraindicated in persons with a known hypersensitivity to the drug or its excipients (mebendazole, microcrystalline cellulose, corn starch, anhydrous lactose, sodium starch glycolate, magnesium stearate, sodium lauryl sulfate, sodium saccharin, and FD&C Yellow #6).

Warnings and Precautions:

- Risk of Convulsions: Convulsions in infants below the age of 1 year have been reported.
- Hematologic Effects: Neutropenia and agranulocytosis have been reported in patients receiving mebendazole at higher doses and for prolonged duration. Monitor blood counts in these patients.
- Metronidazole and Serious Skin Reactions: Stevens-Johnson syndrome/toxic epidermal necrolysis (SJS/TEN) have been reported with the concomitant use of mebendazole and metronidazole. Avoid concomitant use of mebendazole and metronidazole.

Adverse Reactions Reported in Mebendazole-treated Subjects from 39 Clinical Trials:

- anorexia, abdominal pain, diarrhea, flatulence, nausea, vomiting, rash.

Adverse Reactions Identified During Postmarketing Experience with Mebendazole:

- agranulocytosis, neutropenia, hypersensitivity including anaphylactic reactions, convulsions, dizziness, hepatitis, abnormal liver tests, glomerulonephritis, Stevens-Johnson syndrome/toxic epidermal necrolysis, exanthema, angioedema, urticaria, alopecia.

Includes mebendazole formulations, dosages and treatment duration other than EMVERM 100 mg chewable tablet.

Drug Interactions: Concomitant use of EMVERM and metronidazole should be avoided.

Pregnancy: The available published literature on mebendazole use in pregnant women has not reported a clear association between mebendazole and a potential risk of major birth defects or miscarriages. There are risks to the mother and fetus associated with untreated helminthic infection during pregnancy.

Unreported side effects may occur. Please see full prescribing information at www.EMVERMHCP.com and brief summary on following pages.

References:


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EMVERM® (mebendazole) 100 mg Chewable Tablets

BRIEF SUMMARY: Complete information about EMVERM® can be found in the Full Prescribing Information.

INDICATIONS AND USAGE
EMVERM® is indicated for the treatment of patients two years of age and older with uncomplicated* intestinal helminthic infections caused by hookworm (Hookworm), whipworm (Whipworm), roundworm (Roundworm), pinworm (Pinworm), or mixed infections of any of these parasites.

DOSEAGE AND ADMINISTRATION
The recommended dosage for EMVERM® is one chewable tablet per day taken with water. The tablet may be chewed or crushed and mixed with food.

Table 1: Dosage of EMVERM® in Adult and Pediatric Patients (two years of age and older)

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Dose</th>
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<tbody>
<tr>
<td>Pinworm (enterobiasis)</td>
<td>1 tablet, once morning</td>
</tr>
<tr>
<td>Whipworm (trichuriasis)</td>
<td>1 tablet, morning and</td>
</tr>
<tr>
<td>Roundworm (ascariasis)</td>
<td>1 tablet, morning and</td>
</tr>
<tr>
<td>Hookworm</td>
<td>1 tablet, morning and</td>
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<tr>
<td></td>
<td>evening</td>
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</tbody>
</table>

Table 2: Adverse Reactions Reported in Mebendazole-treated Subjects from 39 Clinical Trials*

Adverse Reaction(s)

Gastrointestinal Disorders
Anorexia, Abdominal Pain, Diarrhea, Flatulence, Nausea, and Vomiting

Skin and Subcutaneous Tissue Disorders
Rash

* Includes mebendazole formulations, dosages and treatment duration other than EMVERM® 100 mg tablet

Postmarketing Experience
The following adverse reactions have been identified in adult and pediatric patients postmarketing with mebendazole formulations and dosages other than the EMVERM® 100 mg chewable tablet. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Table 3: Adverse Reactions Identified During Postmarketing Experience with Mebendazole®

<table>
<thead>
<tr>
<th>Adverse Reaction(s)</th>
<th>Blood and Lymphatic System Disorders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immune System Disorders</td>
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<tr>
<td></td>
<td>Nervous System Disorders</td>
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<tr>
<td></td>
<td>Hepatobiliary Disorders</td>
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<tr>
<td></td>
<td>Renal and Urinary Disorders</td>
</tr>
<tr>
<td></td>
<td>Skin and Subcutaneous Tissue Disorders</td>
</tr>
<tr>
<td>Agranulocytosis, Neutropenia</td>
<td>Agranulocytosis</td>
</tr>
<tr>
<td>Hypersensitivity including anaphylactic reactions</td>
<td>Convulsions, Dizziness</td>
</tr>
<tr>
<td>Hepatitis, Abnormal liver tests</td>
<td>Glomerulonephritis</td>
</tr>
<tr>
<td>Urinary tract disorders</td>
<td>TEN, SJS, Exanthema, Angioedema, Urticaria, Alopecia</td>
</tr>
</tbody>
</table>

* Includes mebendazole formulations, dosages and treatment duration other than EMVERM® 100 mg chewable tablets

DRUG INTERACTIONS
Concomitant use of mebendazole, including EMVERM®, and metronidazole should be avoided.

USE IN SPECIFIC POPULATIONS

Pregnancy

Risk Summary
The available published literature on mebendazole use in pregnant women has not reported a clear association between mebendazole and a potential risk of major birth defects or miscarriages [see Data]. There are risks to the mother and fetus associated with untreated helminthic infection during pregnancy [see Clinical Considerations]. In animal reproduction studies, adverse developmental effects (i.e., skeletal malformations, soft tissue malformations, decreased pup weight, embryo lethality) were observed when mebendazole was administered to pregnant rats during the period of organogenesis at single oral doses as low as 10 mg/kg (approximately 0.5-fold the total daily maximum recommended human dose [MRHD]). Maternal toxicity was present at the highest of these doses [see Data]. The estimated background risk of major birth defects and miscarriage for the indicated populations is unknown. All pregnancies have a background risk of birth defect, loss, or other adverse outcomes. In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2–4% and 15–20%, respectively.

Clinical Considerations

Disease-Associated Maternal and/or Embryo/Fetal Risks
Untreated soil transmitted helminthic infections in pregnancy are associated with adverse outcomes including maternal iron deficiency anemia, low birth weight, neonatal and maternal death. Data

Human Data
Several published studies, including prospective pregnancy registries, case-control, retrospective cohort, and randomized controlled studies, have reported no association between mebendazole use and a potential risk of major birth defects or miscarriage. Overall, these studies did not identify a specific...
CLINICAL STUDIES
Efficacy rates derived from various studies are shown in Table 4 below:

Table 4: Mean Cure Rates and Egg Reductions from Clinical Studies

<table>
<thead>
<tr>
<th></th>
<th>Pinworm (enterobiasis)</th>
<th>Whipworm (trichuriasis)</th>
<th>Roundworm (ascariasis)</th>
<th>Hookworm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cure rates mean</td>
<td>95%</td>
<td>68%</td>
<td>98%</td>
<td>96%</td>
</tr>
<tr>
<td>Egg reduction</td>
<td>—</td>
<td>93%</td>
<td>99%</td>
<td>99%</td>
</tr>
</tbody>
</table>

PATIENT COUNSELING INFORMATION
Advising the patient to read the FDA-approved patient labeling (Patient Information).
Advising patients that:
- Taking EMVERM® and metronidazole together may cause serious skin reactions and should be avoided.
- EMVERM® can be taken with or without food.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088. To report SUSPECTED ADVERSE REACTIONS contact Impax Laboratories, Inc. at 1-877-994-6729.

Please see Full Prescribing Information including Patient Information at www.emvermhcp.com.

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Hayward, CA 94544

07/2017 PP-XPI-MEB-US-0008
Known HRV infection may not decrease risk of IBI in neonates

Infection with human rhinovirus (HRV) confirmed by polymerase chain reaction (PCR) does not decrease the likelihood of concurrent urinary tract infection (UTI) in infants aged from 1 to 90 days old, according to a study in well-appearing febrile infants in this age group. Nor does HRV positivity affect the risk of invasive bacterial infection (IBI) in the youngest infants, those aged from 1 to 28 days. However, in infants aged 29 to 90 days, the presence of HRV decreases the likelihood of IBI (bloodstream infection or meningitis).

These were the findings of a study in about 4000 well-appearing febrile infants who underwent respiratory viral testing by PCR in 1 of 22 hospitals in Utah. Investigators calculated and compared the relative risk of bacterial infection for infants who were positive for HRV or another virus or in whom no virus was detected. Overall, 55% of the infants were positive for 1 or more respiratory viruses, although those aged 29 to 90 days had a significantly higher rate of respiratory infection than did younger infants (61% vs 39%, respectively). The most common virus was HRV, which was detected by itself in 35% of infants (more than all other respiratory viruses combined) and was more common among infants aged 29 to 90 days than in those who were younger. About 20% of participants had a non-HRV virus, such as adenovirus, respiratory syncytial virus (RSV), or influenza.

The presence of respiratory viruses other than HRV was associated with an almost fourfold reduction in frequency of bacterial infection compared with no virus being detected. However, in infants in whom HRV was detected this risk reduction was smaller—a 7.8% decrease in those with non-HRV respiratory viruses vs 3.7% for those with HRV. Two-thirds of bacterial infections were UTIs (Blaschke AJ, et al. Pediatrics. 2018;141[2]:e20172384).

**Thoughts from Dr. Burke**

Previous studies have shown that febrile infants with a known influenza or RSV infection are less likely than those without viral disease to have an invasive bacterial infection. The viral infections explain some of the fevers. This study shows that this is not the case for human rhinovirus, at least in the first 28 days of life. For the first 90 days of life, UTIs are not less likely in children with HRV.

So, if you are working in a setting where rapid viral PCR panels are available and you are looking for a viral source to spare a child a septic workup, forget it if you are dealing with HRV: Presence of this virus doesn’t mean absence of a bacterial source.
BRUE in infancy does not increase risk of death

A meta-analysis of 12 studies of the risk of death after a brief resolved unexplained event (BRUE) found that such an event does not increase an infant’s risk of dying during his or her first year. The American Academy of Pediatrics (AAP) introduced BRUE, a sudden alteration in an infant’s breathing, color, tone, or responsiveness, as a replacement for “apparent life-threatening event” (ALTE) in a 2016 clinical practice guideline.

The 12 studies involved 3005 children whose parents sought emergency care for a BRUE (termed ALTE in the pre-2016 studies). Twelve babies died, several in the hospital, within a few days of the event, but most weeks, months, or years later. Specifically, 8 infants died within 3 months of the BRUE and the remaining 4 between 4 months and 5.5 years after the event. The mortality rate after a BRUE, therefore, was 3.1 postevent deaths per month per 10,000 events.

Further analysis, using a 4-month time horizon, determined that the upper bound of the probability of death after a BRUE is about 1 in 800. This compares with a baseline risk of death during a 4-month period in the first year of life of 1 in 1200 for all infants (after excluding neonatal deaths), according to US infant mortality statistics (Brand DA, et al. J Pediatr. February 2, 2018. Epub ahead of print).

Urinalysis identifies the youngest infants with UTIs

Urinalysis is extremely sensitive and specific for screening for urinary tract infections (UTIs) in febrile infants aged 60 days and younger, especially when the UTI is associated with bacteremia, a recent study showed.

Investigators evaluated the test characteristics of the urinalysis in aggregate and of 3 individual components—leukocyte esterase (LE), nitrites, and pyuria—for diagnosing UTIs with and without associated bacteremia. They used 2 definitions of UTI: growth of 50,000 or more, or of equal to or greater than 10,000 colony-forming units (CFU) per mL of a pathogen.

The study was in almost 4500 febrile infants aged 60 days or younger from whom blood cultures were obtained as part of an emergency department evaluation for bacterial infection; 289 (7%) had UTIs with equal to or greater than 50,000 CFU/mL, including 27 (9.3% of the 289) with bacteremia. A positive urinalysis showed perfect sensitivity when accompanied by bacteremia (100%) and an excellent 94% sensitivity without bacteremia. Specificity was 91%. For UTIs defined by colony counts equal to or greater than 10,000 CFU/mL, sensitivity of the urinalysis was 87% and specificity 91%.

Most infants with UTIs had urinalyses positive for LE or pyuria, although nitrites generally were absent irrespective of UTI status. All patients with UTIs with bacteremia had either moderate or large concentrations of LE (Tzimenatos L, et al. Pediatrics. 2018;141[2]:e20173068).
Infant’s leg swelling could be malignancy

CHRISTINE CHANG, MD; RONEN ZIPKIN, MD

A 5-month-old previously healthy, full-term female presented to a pediatric emergency department (ED) with 2 weeks of left leg swelling. Her parents denied any history of trauma, pain, fevers, weight loss, and easy bruising or bleeding, and family history was negative for cancer. The patient had been feeding and eliminating well. The parents said that x-rays of the patient’s left leg were obtained at a different ED soon after they had noted the sudden-onset swelling. At the time they were told that the x-rays were abnormal, and they decided to report to the pediatric ED because authorization for an outpatient magnetic resonance imaging (MRI) study ordered by the patient’s primary pediatrician was taking too long.

Physical examination
In the pediatric ED, the patient was well appearing. Her temperature was 98.42°F; heart rate was 164 beats per minute; respiratory rate was 28 breaths per minute; blood pressure was 127/68 mm Hg (although she was moving while the measurement was obtained); and her oxygen saturation level was 99% on room air. She weighed 6.8 kg.

Physical examination showed significant swelling below the patient’s left knee without erythema, warmth, or apparent tenderness. The infant had intact pulses, no lymphadenopathy, no hepatosplenomegaly, no rash, and no swelling noted elsewhere. She moved all extremities equally with normal range of motion and strength.

Laboratory studies and imaging
Laboratory studies revealed an elevated white blood cell count of 20.15 K/uL as well as an elevated platelet count (722 K/uL) and elevated inflammatory markers (C-reactive protein, 5.0 mg/dL; erythrocyte sedimentation rate, 44 mm/h). A comprehensive chemistry panel, lactate dehydrogenase, and uric acid were unremarkable. Additionally, x-rays of the patient’s left lower extremity and chest were obtained, which preliminarily showed marked periosteal reaction involving the left tibia and fibula and multiple ribs on the left (Figures 1A and 1B).

Differential diagnosis
The differential diagnosis in the ED included trauma, osteomyelitis, and malignancy (Table). Other conditions on the differential for unilateral lower extremity soft tissue swelling can be ruled out by the patient’s age of presentation, other associated symptoms, and pattern of bone involvement.1

Primary bone malignancies such as osteosarcoma and Ewing sarcoma are very rare in infants. Benign bone and soft tissue tumors such as chondroblastomas and osteoid osteomas do not typically present with marked...
periosteal reaction in multiple areas. Vitamin deficiencies such as scurvy and rickets are not self-limiting and typically present with other clinical findings (eg, petechiae, corkscrew hairs, and gum disease in scurvy). Exposure to medications such as prostaglandin E (eg, in infants with cyanotic congenital heart disease) and vitamin A can be obtained on history. Prostaglandin E is thought to promote osteogenesis by decreasing bone resorption and vitamin A is thought to regulate osteoblasts and osteoclasts. Accidental and nonaccidental trauma should be ruled out with careful history taking and scrutiny of the distribution of bone involvement. Other important diagnoses to include in the differential are infection (eg, osteomyelitis), endocrine disorders, and rare metabolic disorders.

Consultations and additional studies
The Orthopedic Surgery and Oncology services were consulted due to a strong concern for malignancy. A skeletal survey was obtained (Figures 2A and 2B), and the patient was admitted to the Oncology Service for further management, with the tentative plan by Oncology to obtain an MRI of the left leg and a computed tomography (CT) scan of the chest the following morning.

Upon further review of the patient’s x-rays and skeletal survey, multiple specialists—including pediatric radiologists—agreed that the imaging showed marked cortical hyperostosis of the mandible, ribs, and left tibia and fibula—diagnostic of Caffey disease.

Discussion
Caffey disease (also known as infantile cortical hyperostosis, Caffey-Silverman syndrome, or Smyth syndrome) is a rare, self-limiting condition that should be included in the differential diagnosis of soft tissue swelling in infants. It presents

> FIGURES 1A, 1B
Patient’s x-rays show periosteal reaction involving the left tibia and fibula (1A), and multiple ribs on the left (1B).

> FIGURES 2A, 2B
Patient’s skeletal survey shows marked cortical hyperostosis of the mandible (2A) and ribs (2B).
in approximately 3 per 1000 infants prior to 6 months of age, although this is thought to be an underestimation due to underdiagnosis. The condition affects males and females equally and has no ethnic predilection. The average age of onset is 9 weeks. It is usually characterized by irritability, soft tissue swelling, and cortical bone thickening; however, irritability was not seen in this patient.

Delayed diagnosis may occur because the disorder can present with nonspecific symptoms such as fever, fussiness, and decreased appetite, and therefore can mimic other diagnoses, such as malignancy, trauma, and infection. Swelling usually occurs suddenly and may be red, firm, and/or tender. Laboratory tests may reveal leukocytosis, thrombocytosis, and/or elevated inflammatory markers, all of which were noted in this patient.

The etiology of Caffey disease is uncertain, but it is thought to be a type I collagenopathy. Both sporadic and familial forms occur. The mandible is the most likely affected bone in sporadic cases, whereas the tibia is most likely affected in familial cases. Autosomal dominant and autosomal recessive patterns of inheritance have been reported by reviewing pedigrees of unrelated families.

In families with autosomal dominant inheritance, a missense mutation has been found in COL1A1, which codes for the alpha 1 chain of type I collagen. Interestingly, other reported mutations that affect the synthesis of type I collagen include osteogenesis imperfecta (OI) and Ehlers-Danlos syndrome. It is unclear why a missense mutation would stimulate hyperostosis, and it is also unclear why this mutation would affect individuals at a specific age.

The autosomal recessive pattern is distinct from the classic presentation of Caffey disease in that it is associated with prenatal onset and has a much more severe course (eg, angulations and shortness of long bones, polyhydramnios, and fetal hydrops, in addition to marked hyperostosis) and a poorer prognosis.

With good clinical suspicion and multidisciplinary input, early identification of Caffey disease can prevent unnecessary workup and invasive procedures. Diagnosis is made by physical exam and radiographic findings. Although imaging may be variable during the clinical course, the classic finding is cortical diaphyseal periosteal new bone formation. Usually x-ray suffices to clinch the diagnosis; however, MRI could add additional value in diagnosis if infection or malignancy is high on the differential or if there is a question of subperiosteal hemorrhage.

Because Caffey disease doesn’t affect epiphyses or metaphyses, growth potential should not be affected. The pattern of bone involvement is usually multifocal and asymmetric. Involved bones typically include the mandible, clavicles, ribs, and long bones. The involvement of the mandible—the most frequently affected bone—is usually pathognomonic and affected in 70% to 90% of cases. With mandibular involvement, infants may refuse to eat, leading to delayed diagnosis or misdiagnosis as a feeding problem.

### TABLE

<table>
<thead>
<tr>
<th>Differential Diagnosis for Unilateral Lower Extremity Swelling in Children</th>
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<tbody>
<tr>
<td><strong>Malignancy</strong></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Benign bone/soft tissue tumor</strong></td>
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<tr>
<td><strong>Vitamin deficiency</strong></td>
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<tr>
<td><strong>Medication exposure</strong></td>
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<tr>
<td><strong>Trauma</strong></td>
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<tr>
<td><strong>Infection</strong></td>
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<tr>
<td><strong>Endocrine/metabolic disorder</strong></td>
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<tr>
<td></td>
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<tr>
<td><strong>Other</strong></td>
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</tbody>
</table>


The patient had mandibular involvement, which is associated with prenatal onset and has a much more severe course. Imaging findings were consistent with Caffey disease, including cortical hyperostosis, subperiosteal new bone formation, and soft tissue swelling. The differential diagnosis included malignancy, trauma, and infection, but these were ruled out by laboratory tests and clinical examination. The diagnosis was confirmed by imaging studies.
Caffey disease usually resolves within 6 to 12 months. Treatment typically consists of nonsteroidal anti-inflammatory drugs (NSAIDs) as needed. The use of steroids has been proposed to accelerate bone remodeling and may be trialed if there is a poor response to NSAIDs. In rare cases, Caffey disease can cause enough long-term bony deformity (eg, excessive hyperostosis leading to fusion of adjacent bones) that surgical correction is needed. Other complications include exophthalmos, pleuritis, and recurrence of disease.  

Patient outcome
For this patient, no additional imaging was obtained, and she did not require any medical or surgical intervention. She was discharged home with plans to follow up with Orthopedic Surgery. Serial x-rays obtained during outpatient clinic visits with Orthopedic Surgery demonstrated interval bone remodeling (Figures 3A, 3B, 3C), with marked improvement and minimal residual deformity noted 10 months after discharge.

For references, go to ContemporaryPediatrics.com/puzzler-0418

Neonate with bilateral breast enlargement
A 10-day-old female infant presents for a weight check. Her mother is concerned about the child’s newly swollen breasts. ContemporaryPediatrics.com/puzzler-0318

Child with abnormal eye lesions
A 12-year-old girl is referred after a routine dilated eye exam shows unusual retinal lesions. She has had headaches for 2 years. ContemporaryPediatrics.com/puzzler-0218

Suspicious fever of unknown origin
A 5-month-old boy, previously healthy, presents to the ED for 5 days of fever, 3 days of diarrhea/rash, and 2 days of vomiting. ContemporaryPediatrics.com/puzzler-0118
Failure to thrive
Early intervention mitigates long-term deficits

Pediatric providers have an essential role in the ongoing care of a child with failure to thrive (FTT). Here’s how routine growth assessments identify effective treatment.

JOYEE G VACHANI, MD, MED

The term “failure to thrive” (FTT) first appeared in the literature more than 80 years ago, and although it continues to be widely used, it has no precise definition. Recent terms to describe FTT include undernutrition, malnutrition, and faltered growth. In 2017, guidelines by the National Institute for Healthcare and Excellence in the United Kingdom were published to aid in recognizing, assessing, and monitoring of “faltering growth” in infants and children in the United Kingdom. With a lack of any other formal practice recommendations, however, clinical practice is variable, with an overuse of resources, including unnecessary laboratory testing, subspecialist referrals, and hospitalization.

Historically, FTT has been classified as organic and nonorganic, but it is now recognized that only a small minority of children with FTT have an underlying organic cause.

Instead, FTT often has a multifactorial etiology involving a complex interaction between medical, nutritional, emotional, and social issues. Although this range of contributing factors can pose a diagnostic challenge, the evaluation and coordination of a management plan for FTT can often be done successfully by providers across the continuum of pediatric care when guided by findings from a detailed history and thorough physical examination.

With a focus on promoting high-value care for patients, this article presents a practical, systematic approach that pediatric providers can use for the differential diagnosis and management of FTT.

Identifying FTT
Failure to thrive has classically been identified when a child’s weight drops off the standardized weight curve before and to a greater extent than the length/height. Its recognition depends on reliable serial mea-
measurements for growth assessment. Individuals gathering data must be properly trained and use appropriate equipment with a standardized technique. Stature (length/height) should be measured with the child lying supine on a length board for children aged 0 to 2 years and using a stadiometer for older children. Weight should be determined using a digital scale, and head circumference also should be measured in children aged younger than 3 years.

Data should be recorded and plotted on a standardized growth chart for age and gender or using another appropriate chart when special circumstances exist (eg, premature birth, genetic syndrome). The Centers for Disease Control and Prevention (CDC) recommends using the World Health Organization’s weight-for-length growth chart for children aged younger than 2 years (Figure) and the CDC body mass index (BMI) growth chart for older children. 6

**Diagnostic evaluation**

Diagnostic evaluation is key in determining underlying cause(s) for FTT and appropriate management. Pediatric providers should initiate the diagnostic evaluation for FTT by taking a detailed feeding/eating history and performing a clinical, developmental, and social assessment that aims to identify issues that can lead to undernutrition. These etiologies can then be categorized as inadequate caloric intake, inadequate caloric absorption/usage, and/or increased metabolic demands (Table 1). 7

**History and physical examination**

A dietary history may be obtained through a 24-hour recall provided by the parent/caregiver. Whenever possible, providers should enlist the help of a dietician who can conduct a more formal assessment including calorie counts.

The patient history should identify types of foods and calories consumed along with frequency of meals and snacks. It also should include questions to determine the child’s behavior at feedings/mealtimes and parental reactions and ideas about
Some common issues underlying inadequate calories include excessive intake of juice or other beverages that provide poor nutrition and limit appetite for other foods, and improper formula preparation. Mothers who are breastfeeding should be asked about their diet and use of medications, alcohol, or other substances that can affect milk production and let-down.

Psychosocial issues should be investigated to determine if the child is not being provided with adequate food because of neglect/abuse or as a consequence of parental economic, intellectual, or mental health problems.

A good history also can help identify clues of an underlying medical cause for FTT by asking about symptoms of gastrointestinal illnesses, such as vomiting, reflux, diarrhea, constipation, and blood or mucus in the stool; respiratory signs, including breathing difficulty, chronic cough, and snoring; or recurrent infections. In addition, a thorough family history should be obtained to understand the stature and growth pattern of siblings, parents, and grandparents as well as identifying illnesses such as food allergies, genetic diseases, inflammatory bowel disease, celiac disease, asthma, and cystic fibrosis.

The physical examination should include looking for physical impediments to feeding and swallowing, such as cleft lip/palate, oral abcesses, or enlarged tonsils/adenoids; dystrophic features indicative of a genetic disorder; abdominal distention or organomegaly; neurologic signs of developmental delay; and bruises or other evidence of trauma and abuse. Observation of the parent-child interaction in general and during feeding is also a key part of the physical examination.

Diagnostic testing

Laboratory testing in the workup of a child with FTT only rarely adds useful information unless the assessments are indicated based on the clinical findings. If a medical cause is suspected, then testing should be guided by clinical assessment. Examples of targeted studies to consider only when a thorough history and physical suggest a specific diagnosis include transglutaminase antibodies.

### TABLE 1

| POTENTIAL ETIOLOGIES UNDERLYING FAILURE TO THRIVE |
|---------------------------------|---------------------------------|---------------------------------|
| **INADEQUATE CALORIC INTAKE**   | **INADEQUATE CALORIC ABSORPTION/USAGE** | **INCREASED METABOLIC DEMANDS** |
| Breastfeeding failure          | Celiac disease                  | Adrenal diseases                |
| Excess juice consumption       | Cystic fibrosis                 | Blood disorders                 |
| Feeding problem                | Gastroesophageal reflux         | Cardiopulmonary diseases        |
| Incorrect formula preparation  | Inflammatory bowel disease      | Diabetes mellitus               |
| Oromotor dysfunction           | Increased intracranial pressure  | Genetic diseases                |
| Psychosocial issues leading to | Liver disease                   | Hyperthyroidism                 |
| insufficient food              | Milk protein allergy            | Renal diseases                  |

Adapted from Vachani JG.7

### ICD-10 CODES FOR FAILURE TO THRIVE

The following are suggested ICD-10 codes for the diagnosis and treatment of failure to thrive (FTT) in infants and children. Check with your contracted plan and individual state Medicaid program for coverage policy.

<table>
<thead>
<tr>
<th>P92.6</th>
<th>R62.51</th>
<th>R62.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure to thrive in newborn</td>
<td>Failure to thrive (child)</td>
<td>Adult failure to thrive</td>
</tr>
</tbody>
</table>

**NOTE:** Newborn: birth through age 28 d; child: age 28 d to 18 y

**K90.0** Celiac disease  
**E03.1** Congenital hypothyroidism  
**R11.10** Vomiting, unspecified  
**R53.83** Other fatigue  
**E86.0** Dehydration

Continued on Page 19
if celiac disease is suspected; a sweat chloride test for cystic fibrosis; stool analysis for suspected malabsorption or infestations; and thyroid function tests for hypothyroidism.

Inborn errors of metabolism are often considered for children with FTT, but it is an unlikely diagnosis in most children with mild-to-moderate FTT. Anthropometric criteria for classifying malnutrition in pediatric patients as mild, moderate, or severe were described in a consensus statement from the Academy of Nutrition and Dietetics and the American Society for Parenteral and Enteral Nutrition. Before pursuing a more comprehensive investigation for an inborn error of metabolism, clinicians should look for relevant clues in the history and physical (Table 2). If any of these clues are not present, an inborn error of metabolism is less likely.

**Management**

Management for FTT integrates creation of a nutritional plan and attention to the causes for undernutrition. Ideally multifactorial management includes a multidisciplinary team with a pediatric provider, dietitian, social worker, and other services as indicated.

The nutritional plan targets provision of sufficient calories, protein, and micronutrients, including iron and zinc. The following formula can be used to determine the daily caloric intake (kcal/kg) required for catch-up growth:

\[
\text{Ideal body weight in kg (50th percentile weight/height)} \times \frac{[\text{kcal/kg/d (Dietary Reference Intake)}]}{[\text{current weight (kg)}]}
\]

Strategies for achieving the target weight depend on the child’s age and problems underlying FTT and may involve giving supplementary formula to breastfed infants and seeking lactation support for the mother; supplementation with energy dense formula for formula-fed babies; and dietary fortification with energy-dense foods or nutritional supplements in toddlers and older children.

Ideally, the required nutrition can be provided orally, but tube feeding should be considered if the child is unable to obtain the desired intake through the oral diet alone. Delivery through a nasogastric tube is preferred over a gastrostomy tube unless it is anticipated that the duration will exceed 6 months or if the child is not tolerating the tube feeding after a trial. Decisions on providing continuous versus bolus feeding are individualized.

When a child is very malnourished, caloric intake should be increased gradually as aggressive nourishment can lead to refeeding syndrome, a dangerous complication related to electrolyte and fluid shifts. A child with severe FTT/malnutrition is at risk for refeeding syndrome and should be admitted to the hospital for close clinical monitoring.

**Follow-up**

Parents should be instructed to keep a log of dietary intake and bring the child in for frequent weight checks to monitor progress. Although it is reasonable to expect that early intervention for FTT should mitigate long-term deficits associated with malnutrition, there is a paucity of longitudinal data in this area and findings from available studies are equivocal. Therefore, follow-up of children with FTT should also include attention to their intellectual and emotional development and referrals as needed to resources that can optimize their outcomes.

**Hospitalization**

Children with FTT should be admitted to the hospital if outpatient management fails. In addition, hospitalization is indicated when there is concern about abuse; if close observation of the parent-child interaction is deemed necessary; and for children with severe FTT or malnutrition, moderate or severe dehydration or electrolyte disturbances; or serious infection. The inpatient setting allows for coordinated delivery of care and services.
LAIIV will return for next flu season


RACHAEL ZIMLICH, RN

FluMist will return to the pediatrician’s arsenal next year, thanks to a vote last month by the Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP) to reinstate the quadrivalent live-attenuated influenza vaccine (LAIV).

The ACIP members voted in favor of reinstating the recommendation for LAIV at its February 21 meeting, and also voted unanimously in favor of including the formulation in the Vaccines for Children program for the 2018-2019 flu season.

The LAIV—an intranasal vaccine marketed as FluMist—was popular among pediatric patients due to ease of administration and as an alternative to the traditional injected vaccine. However, reduced effectiveness in recent years led the ACIP and numerous stakeholders to recommend against the use of this formulation since 2016. Despite recommendations against the LAIV formulation in the United States, FluMist remained available and recommended for use in Canada and Europe, according to AstraZeneca.

What happened?

Chris Ambrose, MD, MBA, franchise head of US Medical Affairs, Respiratory for AstraZeneca, says the company began investigating the cause of the vaccine’s decreasing performance in 2014, and noted that 1 of the strains in LAIV, the H1N1 strain, did not replicate as well after 2009.

“As a result, we enhanced our strain selection process ahead of the 2017-2018 influenza season, and a new H1N1 LAIV strain with better replication in laboratory tests was selected and included in the vaccine,” Ambrose says. “A randomized clinical study evaluating postvaccination antibody responses in US children demonstrated that the new 2017-2018 H1N1 LAIV strain performed significantly better than the 2015-2016 H1N1 LAIV strain that was associated with reduced effectiveness. Importantly, the antibody responses induced by the new H1N1 LAIV strain were comparable to responses observed with a highly effective H1N1 LAIV strain included in the vaccine before the 2009 influenza pandemic. The results of the study affirm that we have successfully improved our strain selection process, which we will apply to all strains in future seasons.”

A study of 200 children aged 2 to 4 years found responses to the new formulation were similar to those in earlier, highly effective LAIV formulations.

The H1N1 component in 2015-2016 (A/Bolivia strain) in particular was ineffective in the LAIV, but that component has been replaced (with A/Slovenia strain) in new formulations of the vaccine, according to AstraZeneca. As to how the new formulation will perform in comparison to its predecessor, there won’t be any data until after the 2018-2019 flu season, but a study of 200 children aged 2 to 4 years found responses to the new formulation were similar to those in earlier, highly effective LAIV formulations. The study compared administration of the 2015-2016 FluMist formulation with the 2017-2018 formulation, and antibody levels to the H1N1 strain increased 4-fold in 23% of participants after the first dose of the 2017-2018 formulation compared with just 5% with the 2015-2016 formulation. After the second dose, antibody rise was 45% in children who received the new formulation compared with 12% of those who received the old formulation.
Data supported reinstatement

At the ACIP meeting, the CDC presented studies evaluating the effectiveness of LAIV, as well as traditional injected vaccines, in addition to data on how pulling the LAIV vaccine impacted vaccination rates. According to a report published in Pediatrics in October 2017, flu vaccination rates did not change after FluMist was discontinued—at least not in Oregon. The study evaluated statewide data comparing vaccination rates in children during the 2015–2016 flu season and the 2016–2017 season. Although there were no significant changes noted in the overall vaccination rates from one year to the next, the researchers did note that children who had previously received a flu shot were more likely to return for a flu shot in the second year of the study, moreso than children who had previously received the intranasal vaccine.

Another study, involving more than 12,000 children in Pennsylvania, found different results. In that study, researchers found a decline in the end-of-season vaccination rates among children once the LAIV was no longer available. Administration for the reintroduced LAIV vaccine will be the same as before the change in formulation. Individuals aged 2 to 49 years who are healthy, nonpregnant, and not immunocompromised may receive the LAIV formulation, although 2 doses may be required in children aged younger than 9 years, based on previous influenza vaccination status.

Ms Zimlich is a freelance writer in Cleveland, Ohio. She writes regularly for Contemporary Pediatrics and sister publications Managed Healthcare Executive and Medical Economics. She has nothing to disclose in regard to affiliations with or financial interests in any organizations that may have an interest in any part of this article.

REFERENCES
Animal study reveals how bone cells “age” during adolescence

Premature cellular aging induced by glucocorticoids during puberty may cause children’s bone loss, osteoporosis, and fracture risk later in life.

MARY BETH NIERENGARTEN, MA

Research into the mechanisms underlying bone growth rate change in young mice is providing critical information on factors that affect bone growth and mineral accrual in children, including the profound effects of corticosteroid use on bone aging and fracture risk in children and young adults.

“Adolescence is a critical period for optimizing bone growth and mineral accrual,” says Mei Wan, PhD, professor of Orthopaedic Surgery at Johns Hopkins University School of Medicine, Baltimore, Maryland. “During childhood, those with genetic bone disorders or chronic diseases have bone growth and mineral accrual that are often compromised and lead to bone loss, osteoporosis, and a high rate of bone fracturing.”

One such factor contributing to this loss of bone, osteoporosis, and bone fracturing in children is the use of glucocorticoids to treat chronic inflammatory childhood illnesses such as rheumatoid arthritis, Crohn disease, nephrotic syndrome, acute lymphoblastic leukemia, and rarer conditions such as muscular dystrophy.

Glucocorticoid use is the most common cause of secondary osteoporosis in children, and Wan highlights that 6% to 10% of children and adolescents started on high-dose, long-term corticosteroid therapy will develop osteoarthritis, and between 29% to 45% of children already on glucocorticoid therapy already have it.

In addition, she points out that epidemiologic data show that long-term glucocorticoid therapy is associated with a 34% prevalence of fracture in children and young adults.

“Even though it is known that glucocorticoids adversely affect the skeleton, I think sometimes pediatricians neglect focusing on the bones in children until there is a bone fracture,” says Wan. “For children who use long-term glucocorticoids, especially at high doses, they need guidance on bone health to offset the adverse effects of glucocorticoids.”

As the lead investigator of the study that looked at the mechanisms underlying bone growth and aging in young mice, Wan emphasizes that what she and her colleagues found sheds light on potential new therapies to treat secondary pediatric osteoporosis, for which current therapies with frontline bisphosphonates are limited at best.

Mechanisms of bone growth change

Because of the importance of bone growth in adolescence on bone mass and strength, Wan and her colleagues at Johns Hopkins Medicine...
The message of our work is that pediatricians should be aware that the use of an anabolic drug to stimulate bone formation is more ideal to treat pediatric osteoporosis [than the current frontline therapy with bisphosphonates].

Mei Wan, PhD

wanted to better understand the mechanisms underlying how bone cells change during adolescence and the regulatory mechanisms underlying these changes.

To do this, they focused on a region in long bones (legs and arms) that sits underneath the growth plate on either end of the long bone. Called the primary spongiosa, this region of rich bone precursor cells supports bone growth by containing the blood vessels and mesenchymal stem cells (MSCs) that mature into bone-forming osteoblasts.

Building on what is already known about bone growth in adolescence—that is, long bones rapidly elongate during adolescence and taper off in later puberty primarily driven by the division of (or lack of) cartilage cells in the growth plate—they questioned whether the primary spongiosa contributed to changes in the growth rate of bones and mineral accrual.

To answer this question, the researchers looked for cellular senescence in the primary spongiosa in femurs of adolescent mice. Cellular senescence, or aging cells, is a mechanism that stops cellular division and is an important contributor to aging and age-related disease. Wan’s study suggests that cellular senescence may also be used by the body to control tissue growth.

The research team found that the number of senescence cells increased with the age of the mice, with mice in late puberty showing 3 to 4 times as many senescent cells compared with mice in early puberty.

Importantly, they found that the senescence of the bone precursor cells (or mesenchymal stem/progenitor cells in the area of the primary spongiosa) are controlled by epigenetic factors.

“This is a very new finding,” says Wan. “We found the novel cellular mechanism on how the precursor cells change in bone during adolescence and then we figured out the mechanisms that control that change.”

In addition to discovering the importance of cellular senescence in primary spongiosa as a marker for the transition from the rapid-growing phase to the slow-growing phase of long bones in mice, Wan and colleagues also identified a key protein in the cellular senescence in the primary spongiosa of long bones that is lost in late puberty. Called nestin, the protein is needed for self-renewal, proliferation, and cell cycle progression of the cells. Wan and colleagues found that deletion of a key marker (Ezh2) in nestin-expressing cells during early puberty increases the risk of osteoporosis in later adulthood.

“This suggests that premature cellular senescence in the primary spongiosa region during the prepubertal or early pubertal phase may also be a major cause of osteoporosis/bone loss in later life,” state the authors in the conclusion of their study.

Importantly, one of the variables that can induce premature cellular senescence in the primary spongiosa region is the use of glucocorticoids.

Better therapies on the horizon
What this research points to is a new direction for treating bone loss in children induced by glucocorticoid therapy. According to Wan, she and her researchers are now looking at the efficacy of an anabolic drug to stimulate bone formation. Findings so far show that use of an epigenetic inhibitor in mice has led to increased bone mass with no obvious adverse effects. Currently, the inhibitor is used to treat malignant brain tumors in young large animals.

To date, Wan and her colleagues are working toward submitting their preliminary findings of whether this anabolic agent can prevent or reduce the adverse effects of glucocorticoids on bones. Further study will then be needed in large animals to see its full potential use for preclinical and clinical trials, she says.

“The message of our work is that pediatricians should be aware that the use of an anabolic drug to stimulate bone formation is more ideal to treat pediatric osteoporosis [than the current frontline therapy with bisphosphonates],” she says.
Early puberty in girls has long-term psychosocial effects

Pediatricians need a better understanding of the effects of early puberty for girls beyond adolescence into adulthood.

MARY BETH NIERENGARTEN, MA

It is well known that early puberty in girls is associated with a myriad of psychosocial effects that make them vulnerable to depression and antisocial behavior during adolescence. Less known is how these effects play out over time and into adulthood.

Into this gap comes research from a new study that tracked the psychosocial effects of early puberty beyond adolescence and into adulthood to look at how long the psychosocial effects of early puberty may last.

“Our study tracks girls through adolescence into their late 20s … and we see that girls who went through earlier puberty are still showing higher rates of depressive symptoms and antisocial behavior than their peers,” says Jane Mendle, PhD, associate professor, Department of Human Development, College of Human Ecology, Cornell University, Ithaca, New York, and lead author of the study.

Not simply ‘growing pains’

To examine the associations of age at menarche with development and duration of depressive symptoms and antisocial behaviors, Mendle and colleagues collected and analyzed data on 7802 female participants taken from the National Longitudinal Study of Adolescent to Adult Health (Add Health). Conducted between 1994 and 2008, Add Health is a national survey study that assessed adolescent health and risk behavior in a large socioeconomic, ethnic, and racially diverse cohort.

Data was collected by interviewing participants over 14 years (in 4 different time periods or waves) to determine the age at menarche (used as a proxy for pubertal development) and development and duration of depressive symptoms and antisocial behaviors. To assess depressive symptoms, participants completed the Center for Epidemiologic Studies Depression Scale (CES-D) during the first and last time periods of the study. The CES-D is a self-report evaluation that measures cognitive, affective, and physiologic symptoms of depression experienced by the participant over the past week. Antisocial behaviors (ie, doing damage to property, stealing, breaking into building, selling drugs) were also assessed twice (during the first and last time periods).

The study found that the onset of menarche was about age 12 years for most of the girls (31%) followed by age 13 (24%) and age 11 (19%), but ranged from age 7 to 24 years. About 10% of girls reported age of menarche at age 10 years or younger.

Using various regression models to assess associations of age at menarche to depressive symptoms and antisocial behaviors, the investigators found a significant association between later ages of menarche and lower levels of depressive symptoms during adolescence and over time. For example, compared with a girl with an onset of menarche at age 12 years (the average age), a girl who

“Our study tracks girls through adolescence into their late 20s … and we see that girls who went through earlier puberty are still showing higher rates of depressive symptoms and antisocial behavior than their peers.”

–JANE MENDLE, PHD

CONTINUED ON PAGE 26
FDA restricts opioid-containing cold medicines for children

New FDA restrictions on medications for children that contain codeine and other opioids aim to prevent cases of misuse, abuse, and overdose.

RACHAEL ZIMLICH, RN

The opioid crisis is in full swing, and young adults are among the top abusers of prescription drugs. Now, the US Food and Drug Administration (FDA) is taking a step to try and curb pediatric opioid use in an effort to prevent cases of abuse or overdose.

The FDA’s new rules restrict pediatric opioid prescribing, specifically, in the use of cough and cold medicines containing opioids for children.¹ The agency announced the changes to its safety labeling on January 11. The changes affect opioid cough and cold medicines with codeine or hydrocodone for children aged younger than 18 years. The changes mean that these products can no longer be prescribed in children aged younger than 18 years because of the FDA’s concerns that the safety risks of these medications outweigh any potential benefits.

The FDA says the changes were made after extensive review of safety data and expert advice on the use of pediatric medications containing opioids. The new move expands previous restrictions put in place by the FDA in 2016,² as well as a move last year to restrict the use of codeine and tramadol to treat pain or cough in children aged younger than 12 years.³

Typically, the FDA’s advisory committees have broken their recommendations on opioid use into 2 pediatric categories—ages 6 to 12 years, and ages 12 to 18 years. This new recommendation covers both groups.

From expert consensus
Tara Rabin, a spokesperson for the FDA, says the agency developed the recommendations based on an expert roundtable⁴ and a meeting of its Pediatric Advisory Committee.

Rabin says pediatric providers should review the new recommendations and alter their treatment practices accordingly.

“The use of prescription, opioid-containing medicines to treat cough and cold in children comes with serious risks that don’t justify their use.”
—FDA COMMISSIONER SCOTT GOTTLIEB, MD

“Given the epidemic of opioid addiction, we’re concerned about unnecessary exposure to opioids, especially in young children. We know that any exposure to opioid drugs can lead to future addiction. It’s become clear that the use of prescription, opioid-containing medicines to treat cough and cold in children comes with serious risks that don’t justify their use in this vulnerable population,” the FDA Commissioner Scott Gottlieb, MD, wrote in a statement on the changes: “It’s critical that we protect children from unnecessary exposure to prescription cough medicines containing codeine or hydrocodone. At the same time, we’re taking steps to help reassure parents that treating the common cough and cold is possible without using opioid-containing products.”

Reassuring parents
The FDA acknowledges that some pediatric cough symptoms may require advanced treatment, but says most do not. The agency encourages parents who have outstanding prescriptions that fall under the new restriction to contact their clinician for updated instruction.

For parents who feel their children need advanced care, Rabin says clinicians should offer guidance and alternatives. “Healthcare professionals should reassure parents that cough changes affect opioid prescribing, specifically, in the use of cough and cold medicines containing opioids for children.¹ The agency announced the changes to its safety labeling on January 11. The changes affect opioid cough and cold medicines with codeine or hydrocodone for children aged younger than 18 years. The changes mean that these products can no longer be prescribed in children aged younger than 18 years because of the FDA’s concerns that the safety risks of these medications outweigh any potential benefits.

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Early puberty  CONTINUED FROM PAGE 24

has an onset of menarche at age 10 years is 8% more likely to have depressive symptoms in adolescence and 6% more likely to still have depressive symptoms in her 20s. When looking at a girl who begins menarche at age 8 years, the percentages of depressive symptoms increase to 25% in education and 20% into her 20s.

Similar findings were seen for antisocial behavior, with younger age at onset of menarche associated significantly and linearly with a higher frequency of antisocial behavior. For example, the study found that compared with a girl with an onset of menarche at 12 years, girls with early menarche at age 10 years had a 5% greater chance of displaying antisocial behavior in adolescence that persisted into their 20s (although only marginally significant). Highlighting that these findings show that the magnitude of the association between puberty and depressive symptoms and antisocial behavior remain stable over time, Mendle underscored that psychological vulnerability of earlier puberty lingers longer than previously expected.

“It’s not simply a question of adolescent ‘growing pains,’” she says.

What this means for pediatricians
Given that more girls are entering puberty at a younger age, Mendle and colleagues highlight that a better understanding of the long-term psychosocial effects of early puberty are needed. Their study provides a needed step in that direction by showing that the psychosocial vulnerabilities associated with early puberty can extend into adulthood. This finding shines a light on the importance of pediatricians and other healthcare providers who care for children and adolescents to recognize the potential adverse psychosocial effects of early puberty on the psychosocial well-being of children long after they’ve shed their adolescence.

Emphasizing that puberty is a complicated psychological experience, as well as a biological transition, Mendle underscores the need to recognize the effect of puberty on all domains of life both during adolescence and in what it portends for adulthood.

“The best thing that pediatricians can do is to be sensitive to the psychological importance of puberty for early maturing girls, and recognize the duration of its effects,” she says.

Ms Nierengarten is a medical writer in Minneapolis, Minnesota. She has nothing to disclose in regard to affiliations with or financial interests in any organizations that may have an interest in this article.

FDA restrictions  CONTINUED FROM PAGE 25

due to a cold or upper-respiratory infection is self-limited and generally does not need to be treated,” she says. “For those children in whom cough treatment is necessary, alternative medicines are available. These include over-the-counter (OTC) products such as dextromethorphan, as well as prescription benzonatate products.”

When asked whether off-label uses will still be permitted, Rabin says there is still some discretion left to the provider. “From the FDA perspective, with few exceptions, healthcare professionals generally may choose to prescribe or use a legally marketed human drug or medical device for an unapproved or uncleared use when they judge that the unapproved use is medically appropriate for an individual patient,” she says.

More than anything, however, Rabin says that the FDA is hopeful that the new mandate will increase safeguards for children.

“It’s important that parents and healthcare providers have the best information available regarding safety and effectiveness of particular medications, as well as understand their risks, to inform the decisions they make about a child’s health,” Rabin says.

“Among other priorities related to the opioid epidemic, the FDA is focused on decreasing exposure to opioids, including in children, and continuing to look at how opioid drugs that are already on the market are used, in both medical settings and also illicit ones, and take action where needed.”

Ms Zimlich is a freelance writer in Cleveland, Ohio. She has no conflicts to disclose.

For references, go to ContemporaryPediatrics.com/ early-puberty

For references, go to ContemporaryPediatrics.com/ FDA-opioid-restrictions
Follow-up of children with FTT also should include attention to their intellectual and emotional development and referrals as needed to resources that can optimize their outcomes.

Hospitalized children may be discharged once diagnostic testing and consultations are complete and they show consistent weight gain. A plan for continuing care and follow-up also must be in place and parents must demonstrate understanding of the management recommendations.

Summary
The role of the outpatient pediatric provider is fundamental to the ongoing monitoring and care of a child with FTT. Routine growth assessments allow providers to identify FTT, and by using history-taking and physical examination skills alone, providers can often determine its etiology in a timely, cost-effective manner.

Specific diagnostic findings guide the need for further evaluation and appropriate management, and multidisciplinary treatment is often needed as FTT tends to be multifactorial. A standardized approach to care of children with FTT would allow pediatric providers to optimize the care for these patients.

For references, go to ContemporaryPediatrics.com/failure-to-thrive
5 biggest business mistakes independent pediatricians make

Independent pediatricians truly are small service business owners. Expert advice can help your practice avoid problems and achieve success.

CHIP HART

In nearly 30 years of visiting independent pediatric practices all over the country, I’ve learned that the biggest challenges that confront you are self-inflicted. That’s right—more than the insurance companies who behave like organized crime, more than the government mandates that force you to click nonsensical boxes in your electronic health record (EHR), and even more than all the ridiculous paperwork and cuts to Medicaid—the most important business problems you face start in your own office.

Too many pediatricians fail to operate like the small service businesses you really are. In your exam room, you are in control and get immediate, positive feedback about the work you do. However, making changes to your small business isn’t easy and your practice gets stuck in a rut.

Being a good, or even great, pediatrician is no longer enough to be a successful pediatrician.

Why do good independent pediatricians fail to be successful? How can you get out of the rut?

1. Focus on preventive care and chronic disease management

This topic alone could fill an entire issue of Contemporary Pediatrics. If your practice depends on 100˚F fevers, runny noses, and diaper rash-es to fill your schedule, your days are numbered. The retail and minute clinics of the world will gladly take those visits from you. You need to focus on the distinctive competency of pediatrics: well visits and, to a growing extent, helping children manage their chronic conditions such as asthma, obesity, and mental health.

Your connection to parents and helping them raise healthy children are the most important things you can do to stay clinically and financially viable. Preventive care pays well; fills your schedule; is required by your pay-ors; is a crucial part of being a patient-centered medical home; establishes your position as the trusted medical source for your families; and, most of all, it is good for your patients.

WEBINAR SERIES  For Chip Hart’s webinar series about the 5 biggest business mistakes independent pediatricians make, visit http://bit.ly/2on4Hal
2 Do your homework
Do the small businesses you see on your way to work ignore the data that drives their businesses? Not if they want to stay open for long. Every real estate agency, gas station, and restaurant does its homework to survive. They look at their financial reports on a daily, weekly, monthly, and annual basis. They benchmark their performance both against themselves and their peers. They know their targets and they can predict future success and challenges.

If you don’t understand your data, you are in trouble. Who really is your best payor? How much revenue do you generate per visit? What is your well-visit coverage really like? How many opportunities do you miss to provide screening? When is the last time you calibrated your pricing? Are you paying too much for vaccines? What are your staffing ratios? Is your billing staff adjusting off too many charges?

Most importantly, don’t answer any of these questions about your practice based on how you feel. It’s time for evidence-based practice management. You use many different measures to care for your patients, from vital signs to lab results. Can you imagine working without that data? Apply the same thinking to your business.

3 Stop hiding in your office
Every year, there are a limited number of amazing opportunities to get real, pediatric-specific practice management training and instruction. In addition to the American Academy of Pediatrics (AAP) services, such as the Section on Administration and Practice Management (SOAPM) and its website, there are publications, including Contemporary Pediatrics, and a variety of pediatric practice management blogs you must read.

More importantly, get out of your office. Go to the AAP National Conference and Exhibition or one of the state chapter meetings with good practice management content. Attend one of the handful of private pediatric-specific conferences and events. Check the AAP management blogs you must read.

It’s time for evidence-based practice management. You use many different measures to care for your patients . . . Apply the same thinking to your business.

—CHIP HART

4 Update your look and feel
In 2018, it’s obvious to remind people to check their websites and Facebook pages. Your primary audience is mothers, especially young mothers, most of whom are tied to their smartphones.

Is your website up to date? Do your parents have to use the 2-fingered pinch-and-squint just to see your page? Is your Facebook page active and helpful? Are you sharing good, online pediatric content with your patients?

You are? Good. Then head out into your waiting room, sit in one of your chairs, and look around. Feel under the chair—is there gum? Are there rips or tears? Anything stained? Is this a practice you want to visit?

How are your handouts? Are they up-to-date? Do they look nice, include your contact information, and are they easily shared on your patient portal?

Sit in every chair and visit every room your patients will see in your office. From your patients’ literal perspective, what do they see, hear, feel, smell? Is there a desk that needs to be cleaned, a 4-year-old sign that needs to be removed, a carpet that needs cleaning?

Have a friend visit your office in the middle of the day and ask to meet you without an appointment. Ask parents you know how the experience of booking the appointment and being checked in felt for them. Find out how your staff, the face of your practice, treats people when you aren’t looking.

Don’t forget that only a small part of the experience patients have with your office is with you.

5 Stop working with the wrong people
Nearly every struggling practice I meet suffers from this malady: They work with the wrong people.

The “wrong” people almost always fall into 1 of 3 categories:

ONE The incompetent—or wildly divisive—high-ranking employee who has been there forever but you “just can’t do
without.” You can do without, and the sooner, the better. I’ve never, even once, had a practice call me to say, “I wish I had taken longer to fire my office manager.” It’s always, always recognition that it should have been done sooner.

TWO The underpaid, underorganized, low-ranking employee whom no one takes the time or effort to shape up, because they ship out on their own every couple of months. I hear it all the time: “We can’t find good people!” You know why? Because smart businesses create and keep their good people. Good people don’t just turn up—you have to make them.

THREE The last and most important category: your partners. At least a half-dozen times a year I meet with practices that should consider “breaking up” but just don’t want to face it. Do you disagree strongly with any of your partners, clinically or financially? Is someone a bully or not at all attentive to partner duties? Do you feel like you do all the management work? Are you ready to embrace the changes facing your practice, but others want to keep doing things the way they’ve always been done?

If you and your partner(s) aren’t working well together, fix it or move on. Life is too short to be miserable or to be forced to practice in a manner you don’t enjoy. A business partnership is not like a marriage. There are no moral implications of promises made at the altar. Now is the time to create the work environment that you want.

Over the last few years, the consultants I know have been busy with startup practices born from pediatricians with high standards leaving their large healthcare systems or hospitals. For most communities in the United States, this is an amazing time to be a pediatrician. Don’t let that opportunity slip by because you were tethered to the wrong people.

Owning a small business is not easy, especially with the increasing demands of your customers, new daily paperwork requirements, and what feels like diminishing financial return. For pediatricians, at least, the rewards, both intrinsic and external, are substantial. Think about each of the common business mistakes above and pick 1 to address this quarter. I promise that you won’t regret it. Measure the impact, share your victory, and keep moving forward.

Mr. Hart is the director of Physician’s Computer Company’s pediatric solutions consulting group and the author of the popular blog “Confessions of a Pediatric Practice Management Consultant.” His pediatric practice management expertise has helped hundreds of pediatricians increase their clinical and financial health.

For Contemporary Pediatrics, Dr. Bobby Lazzara discusses a multicenter observational study published in JAMA Neurology that looked at time to treatment with first-line benzodiazepines in children with refractory convulsive status epilepticus and the impact of rapid treatment on mortality and morbidity.

For Contemporary Pediatrics, Dr. Bobby Lazzara discusses a case control study published in Pediatrics that looked at whether associations existed between mothers receiving influenza and/or tetanus/diphtheria/acellular pertussis vaccinations during pregnancy and infant hospitalization or death occurring in the first 6 months of life.

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Infantile psoriasis

CONTINUED FROM PAGE 34

**Differential diagnosis**

Infantile psoriasis is often confused with irritant contact dermatitis, allergic contact dermatitis, seborrheic dermatitis, or candidiasis. Irritant contact dermatitis is the most common cause of diaper dermatitis, and it results from wet, soiled diapers rubbing against the skin. This affects only the areas of skin exposed to the diaper, and it often affects the prominent skin most in contact with the diaper while sparing the skin folds.6

Allergic contact dermatitis may occur after using a product that contains an ingredient to which the infant is sensitized. This outbreak may involve skin beyond the confines of the diaper area, and it will subside 2 to 4 weeks after the discontinuation of the culprit product.6

Seborrheic dermatitis presents as erythematous, well-demarcated patches in the diaper area, but it is often erythematous with an overlying greasy scale when present in the scalp, face, ears, and neck. Erythematous plaques also may be present in intertriginous areas in infants, including in the skinfolds on legs and arms.6

Candidiasis presents as a bright red eruption that starts in the inguinal folds and may involve the entire diaper area. Erythematous or pustular satellite lesions may be scattered around the periphery of the involved areas.7

**Management**

Infantile psoriasis is characteristically resistant to standard diaper dermatitis treatments. Topical therapies, including low potency topical steroid ointments and barrier creams, often provide temporary control, but lesions commonly return. Short courses of mid- or high-potency steroids can be used for recalcitrant lesions if necessary. Topical calcineurin inhibitors such as tacrolimus and pimecrolimus also can be used safely and effectively in the diaper area.5

**Infantile psoriasis is resistant to standard diaper dermatitis treatments. Topical therapies often provide temporary control but lesions commonly return.**

**Patient outcome**

The patient was prescribed hydrocortisone 2.5% ointment to apply twice daily for up to 2 weeks, and tacrolimus 0.03% ointment to apply thereafter. His parents were counseled to use a barrier cream during every diaper change.

**References**


Mrs Crouse is a fourth-year medical student at the Brody School of Medicine at East Carolina University, Greenville, North Carolina. She will begin her dermatology residency at the University of North Carolina at Chapel Hill in July 2019. Dr Cohen, section editor for Dermcase, is professor of Pediatrics and of Dermatology at Johns Hopkins University School of Medicine, Baltimore, Maryland. The author and section editor have nothing to disclose in regard to affiliations with or financial interests in any organizations that may have interest in any part of this article. Vignettes are based on real cases that have been modified to allow the author and editor to focus on key teaching points. Images also may be edited or substituted for teaching purposes.

**MORE CASES**

**Baby boy bleeds into neck hemangioma**
A 4-month-old boy presents with sudden onset of a massive hematoma on the right side of his neck and bruising on his legs.

ContemporaryPediatrics.com/dermcase-0318

**New violaceous nodules in a neonate**
A healthy 13-day-old girl presents with a 2-day history of violaceous nodules on her mid-upper back and right arm just above the axilla.

ContemporaryPediatrics.com/dermcase-0218

**Protuberant blister over a newborn’s lumbar spine**
A healthy full-term newborn presents with a prominent sacral dimple within an oval patch that became elevated and red.

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Contemporary PEDIATRICS
More than stubborn diaper rash?

LAUREN CROUSE, BS

An 11-month-old boy was brought to the doctor by anxious parents for the evaluation of persistent diaper dermatitis. Despite trying multiple barrier creams and over-the-counter antifungal products, the rash did not resolve.

Etiology and epidemiology
Psoriasis is a chronic inflammatory condition that has a prevalence of approximately 1% in children. Of those who develop psoriasis, up to 30% start with psoriasis in the diaper area, also known as napkin psoriasis, within the first 2 years of life. Infantile psoriasis is more commonly preceded by an infection or trauma than in adult psoriasis, and the Koebner phenomenon from repeated wiping and rubbing on a diaper is a likely culprit for napkin psoriasis. Family history of psoriasis is also a risk factor for developing this entity, and those who have dissemination of psoriatic plaques beyond the diaper area are at a higher risk of having psoriasis later in life.

Clinical findings
Infantile psoriasis typically presents as a persistent, well-demarcated red plaque with absent or scant scale distributed in the diaper area (Figure). The plaques can involve the skinfolds. Some infants may have psoriatic plaques elsewhere on the body, but the groin involvement often precedes the more widespread eruption. Some infants exclusively have involvement of the diaper area.
practical pediatrics

DR FARBER SAYS

Some personal language (and other) peeves

For clearer communication, clinicians should say what they mean.

1. Parents and professionals often observe that a baby only takes 1 breast at a time. This is normal. I suspect what is meant is that the baby only takes 1 breast per feeding.

2. I have often seen abrasions described as “superficial.” Are there any other kinds?

3. Why is a medicine sometimes written for “every 4 to 6 hours prn”? How is that different from “every 4 hours prn”?

4. I have no problem in theory with patient-first language (“a child with autism” rather than “an autistic child”), but even strong advocates do not seem to use it consistently. Thus, I rarely hear “boy with a cough,” and never hear “baby with a cry” or “girl of 8 years.”

5. I often see a statement that a child can “hop on both feet.” The technical term for this in humans is “jump.” “Hopping on either foot,” when appropriate, is an acceptable phrase.

6. I do not like redundant tautologies or grandiloquent phraseology. Examples include “upper/lower extremity” (showy; “arm” or “leg” is fine), or “anterior chest” and “dental caries” (both redundant and showy; I know a bone can have “caries,” but does anyone ever use it as such? “Cavity” is a fine word). My least favorite is “static encephalopathy,” used so that a provider can avoid telling parents that their child has cerebral palsy or an intellectual disability.

7. Be careful tossing out medical terms for minor conditions, even when accurate. A “dermoid tumor,” as opposed to a “cyst,” suggests cancer to a parent; a “small umbilical hernia,” as opposed to an “outie,” suggests surgery in the future.

8. I often see a recommendation to air-dry a diaper rash. Is that really something a parent is going to do with a mobile child?

9. Quackery versus fraud is based on whether the practitioner truly believes what he/she says, or is just doing it for the money. One cannot be certain, unless the person admits to being a fraud, but one can take an educated guess in many cases. For example, a television doctor has had someone who claims to communicate with the dead demonstrate this ability on his show. He has also presented numerology as a science to his audience. Numerology is akin to astrology, in that one’s date of birth (in the Gregorian calendar only) is said to influence individual aspects such as personality and health. According to this “theory,” based on my time of birth I would have been a very different person had I been born less than 1 hour earlier. Is this an example of quackery or fraud?

10. On another front, many celebrities try to position themselves as lay health experts. As far as I am concerned, being a smoker (as some of these individuals are) disqualifies them from claiming expertise.

Jon Matthew Farber, MD, is a pediatrician in Woodbridge, Virginia. He has nothing to disclose in regard to affiliations with or financial interests in any organizations that may have an interest in any part of this article.

Read more from Dr Farber’s treasure chest of pediatric “pearls” and “gems.”
Find the popular series at: ContemporaryPediatrics.com/practical-pediatrics

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