Dysmenorrhea affects ~20% to 90% of US teenaged girls, making it the leading cause of recurrent short-term school absenteeism in this group.

I am a pediatrician mom. I became a pediatrician before I became a mom, but I always considered myself a mom first and a pediatrician second. However, the reality is that the 2 are intrinsically linked. This was never more apparent to me than in the last 2 years.

I have 3 children. My daughter Tessa is 4 years old; my daughter Isabelle is 9 months old; and 2 years ago, my healthy, happy son Conor died suddenly and unexpectedly at the age of 17 months. As a mom, my life was shattered. How could I live without my baby? How did my healthy child go to sleep for a nap and just not wake up?

As a pediatrician, the questions continued to build. I felt betrayed by my medical training. I had told parents a million times, “You don’t need to wake your child up. If there’s a problem, they will give you a sign.” In medical school, one of the first things they teach you is the ability to walk into a room and make the determination of sick or not sick. While Conor had a fever the morning he died, he did not look sick.

**Our saddest day**

On October 25, 2016, Conor woke with a fever of 102°F and a slight runny nose but was otherwise happy and content. I gave him a dose of ibuprofen and fed him his breakfast, which he happily ate while watching Elmo. My husband and I set up our game plan. He would stay with Conor for the morning, bring him to my office around 11:30 so his ears could be checked, and then I would spend the afternoon with him.

When I called my husband to check in at 9:30, Conor was fever free and happily chasing his sister around the living room. My husband put him down for a nap around 10:30, and less than an hour later, when he went to get him ready to go, he was unresponsive. He called 911 and started CPR, but Conor’s heartbeat never returned. I can remember the exact location I was when I received the call that EMS was taking Conor to the hospital. I can remember the loss of feeling in my body and the feeling that he was gone. I try not to remember how he looked in the emergency department (ED) and the sight of them trying to resuscitate him. What I will always remember is the kindness and compassion of everyone in that ED. They brought us to a separate room where we could spend time with Conor and hold him. Family members were able to come in and hold Conor and say their goodbyes. The ED staff made calls to our churches for us and offered to call family members. They brought us food and water; they held our hands; they cried with us. They made a beautiful memory box with Conor’s handprints, footprints, and a lock of hair. They wrapped him...
# Table of Contents

1. Your Voice
2. Point/Counterpoint
3. Journal Club
4. Pharmacologist’s Notebook
5. Puzzler

## Peer-Reviewed Feature
6. Menses: A “vital sign” for teenaged girls

## Clinical Feature
7. Influenza and RSV: How to suspect, diagnose, treat

## Clinical Briefs
8. Staggering consequences of healthcare cost cutting
9. CDC: Teens missing the nutritional mark

## Practice Improvement
10. How to limit your risk of legal liability
11. Dermcase

## Practical Pediatrics
12. To test or not to test
13. Advertising Index

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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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†RSV-Respiratory Syncytial Virus

in a blanket and, when it was time to say goodbye, promised that they would take good care of him. Most importantly, they said his name to us when they talked about him.

As we lay that night in shock, the questions kept coming. What could have happened? In the weeks that followed, many of my colleagues speculated about myocarditis or an arrhythmia, but the vast majority said they had never seen anything like this. However, it does occur. We are not the only ones.

According to the Centers for Disease Control and Prevention (CDC), 236 children succumbed to sudden unexplained death in 2016, making it the fifth-leading category of death for this age group.1 Yet, it is a topic that is completely lacking in our pediatric curriculum. We learn about sudden infant death syndrome (SIDS), but this is not SIDS. Rather, SUDC is the sudden and unexpected death of a child aged 12 months or older that remains unexplained after a thorough death investigation is concluded.

The SUDC Foundation

We were fortunate to hear about the SUDC Foundation from another family in our town who had undergone a similar loss 9 years before us. Sadly, the majority of the families within the SUDC Foundation are referred through their own research.

There are 800 families within the SUDC Foundation, which is a staggering number. As physicians, we need to know that this nonprofit foundation exists and be able to connect families to it. Becoming a part of the SUDC Foundation meant that my family could receive support from other families who truly understood what we were experiencing. The SUDC Foundation guides families through the emotional trauma, but also helps navigate the process of the autopsy and communication with the medical examiners.

Families within the SUDC community have an opportunity to participate in a research study (SUDC Registry and Research Collaborative), which provides a thorough case review by a multidisciplinary team, neuroimaging, neuropathology and genetic testing (whole exome sequencing) of both parents and the deceased child. These services are provided at no cost to the family. For our family, the lack of knowledge of what happened to Conor also impacted the care of our daughters, Tessa and Isabelle. We did not want to overmedicalize them, but we were unsure what would constitute appropriate follow-up care. Should we see a neurologist or a cardiologist, or both? Should we do genetic testing? The SUDC website has a section on providing care for SUDC families that helps to address these questions and can connect families with providers who specialize in sudden pediatric death.

There has been limited research into SUDC, but there is evidence of an increased rate in febrile seizures among the SUDC population and, similar to SIDS, an increased incidence of death during sleep. However, there are more questions than answers. One major limitation of the current research is the variability in death investigations. In an attempt to standardize the death investigation process, the National Association of Medical Examiners has been involved in a collaboration with the American Academy of Pediatrics to
establish national guidelines for the investigation of sudden unexpected pediatric deaths that will be published later this year.

How awareness will help
In order to attain more research and more multidisciplinary collaborations, there needs to be an increased awareness among the medical community, particularly pediatricians, that SUDC is an entity. You may see only one SUDC family in your entire medical career; however, if you can help them navigate this tortuous path, they will remember you forever. As the child’s pediatrician, you are the one they have a connection with, and yet, when your child dies, you are given the phone number of the medical examiner to contact if you would like to discuss your child’s death investigation.

Early communication with the medical examiners can be very useful in order to help provide families with realistic expectations of their timeline. In some states, in the case of a sudden pediatric death, the death investigation can take up to 6 months to be complete. Calls to the medical examiner to seek updates can be important for families but may also feel daunting. Even with my medical knowledge, I dreaded calling the medical examiner to discuss the results of Conor’s autopsy for the simple reason that I would have to say the words, “I’m calling to discuss my son’s death.” I had never read an autopsy before I read Conor’s. Although I had many colleagues offer to read it with me, ultimately it was something I chose to do alone. It is incredibly painful to read about your vibrant, beautiful child in the clinical terms of the autopsy. Providing families with that opportunity for

HOW TO SUPPORT FAMILIES AFTER SUDC

Here are 12 important steps that pediatricians can take to support families after the sudden death of a child:

**STEP 1** In first 48 hours: Call the family upon receiving notification of death to express condolences and assess for necessary support.

**STEP 2** Send condolence card to family.

**STEP 3** Consider attending funeral services.

**STEP 4** At 2 weeks: Call the family and offer to have a face-to-face meeting to discuss the death of the child/answer questions/meet with siblings/assess for need for referrals for support groups/mental health or medical referrals (cardiology/neurology/genetics).

**STEP 5** Contact the medical examiner to establish a timeline and determine how updates will be provided.

**STEP 6** Connect the family with the SUDC Foundation for emotional support and research opportunities.

**STEP 7** Utilize the resources on the SUDC website to familiarize yourself with recommendations for screening for siblings and bereavement resources for families.

**STEP 8** Connect the family with local bereavement support resources; for example, support groups through local churches and The Compassionate Friends and Bereaved Parents of the USA.

**STEP 9** Continue to contact the family (if desired) at least monthly to assess for ongoing needs, recognizing that needs may change over time.

**STEP 10** When the autopsy is complete, offer to read it with the family. Offer to be present at the meeting with the medical examiner to explain the results.

**STEP 11** Facilitate research opportunities for the family, if desired, for more genetic testing/further evaluation.

**STEP 12** Reach out to the family on important dates for the deceased child—birthday, anniversary of the child’s death—to express your condolences and assess for the need for support.

Abbreviation: SUDC, sudden unexplained death in childhood.
support, regardless of whether they choose it, is very significant.

When your child dies, many hospitals provide the family with a list of bereavement support groups and resources. As I stated before, our ED staff was incredible, but even in the most supportive environments, when your child has just died, any papers that are handed to you feel insignificant at the time. You can’t think. You feel like your entire body is working at 150% capacity just to help you to breathe. After some time has passed, bereavement support can be a lifeline for many families. Pediatricians should be aware of their local resources and should feel comfortable in helping connect families to provide support for both parents and siblings.

Many families feel an outpouring of support in the days and weeks that follow the death of their child, but then feel that, as the months pass, the support fades. You may provide the family with contacts initially, but it may be months before they feel ready to pursue them. Making a call to check in with the family 3 months and 6 months after their child’s death will not be a reminder of the pain of their child’s death. They deal with that pain every second of every day. When you call, it will show them that their child is remembered.

Conor’s legacy

Conor was a beautiful child in every way. He was always smiling and always laughing. You could not help but fall in love with him. He was so full of life and of love. He started blowing kisses at 9 months of age and it quickly became his trademark move. He particularly loved his sister and, despite being the younger sibling, was the first to comfort her if she was upset.

Even at his young age, my husband

CONTINUED ON PAGE 32
Two views of treating obesity in childhood

Pediatric obesity is a derangement of the energy regulatory system.

ALLEN F BROWNE, MD, FACS, FAAP

Dr. Alvin Eden’s “10 commandments of obesity prevention for children” (Contemporary Pediatrics, May 2018), while excellent for improving the health of children and their families, are not effective at prevention or treatment of the disease of obesity. They have been tried by pediatricians, parents, and children over the past 20 to 30 years and obesity prevalence statistics are quite clear. Lack of improvement in the prevalence of pediatric obesity makes sense if one looks at obesity as a disease and as a derangement of the energy regulatory system (ERS) resulting in the body defending an unhealthy set point. The evidence for the ERS is well outlined.1-3

The ERS is a homeostatic mechanism that maintains our body’s composition and weight through various episodes of energy intake and energy expenditure, similar to blood pressure control, body temperature control, red cell mass maintenance, and liver mass maintenance.

A few children have simple, well-worked-out, genetically driven defects in the ERS; eg, leptin deficiency, leptin receptor deficiency, MCAR deficiency. For the vast majority of children with obesity, the problem in the ERS is not well worked out. The ERS is highly complex and, thus, many defects in the system are possible. The study of how genetics causes some children (many related and living in the same environment) to be susceptible or not to the disease of obesity is early prevention.

CONTINUED ON PAGE 8

The only answer to the problem of childhood obesity is early prevention.

ALVIN N EDEN, MD, FAAP

I read with interest Dr. Browne’s response to my article “10 commandments of obesity prevention for children” (Contemporary Pediatrics, May 2018) and found myself agreeing with much of what he wrote, especially his statement right at the start that my program was “excellent for improving the health of children and their families.”

I also agree that genetics plays a large and poorly understood role in the development of obesity. Furthermore, I completely agree that the treatment of childhood obesity has been a dismal failure. Being a practicing pediatrician for more than 40 years, I have been trying thus far unsuccessfully to make inroads into the epidemic of childhood obesity. My first book, Growing Up Thin, which discussed the prevention and treatment of childhood obesity, was published in 1975.

Dr. Browne and I are on the same page as far as agreeing for the need for more education about obesity as well as for more research into its causes. He describes the problem as a derangement of the energy regulatory system (ERS) and again I agree, but in my latest book I call it “the X-factor.”

I also agree with Dr. Browne that instilling guilt onto the obese child at any age is not only unfair and wrong, but terribly cruel. Before discussing where Dr. Browne and I disagree, let me...
obesity is developing.\textsuperscript{4,5}

We need to take a physiologically based, evidence-based approach to prevention and treatment of the disease of obesity. We have tried an approach based on voluntary behaviors and personal responsibility. This approach has been based on correlations and cultural beliefs. Meanwhile, increases in the prevalence and severity of the disease of obesity have occurred. This approach is not correct.

As Lee Kaplan, MD. PHD, associate professor of Medicine at Harvard Medical School and director of the Obesity, Metabolism, and Nutrition Institute of Massachusetts General Hospital, Boston, stated recently at a National Academies of Sciences Roundtable on Obesity Solutions, "Overeating does not cause obesity, obesity causes overeating!"\textsuperscript{6}

It is not correct to blame the current obesity statistics on the parents, the children, or the primary care providers. This leads to shame, blame, stigma, and bias. We need education about the disease of obesity and aggressive research into what causes the malfunction of the ERS, leading to prevention strategies that work and treatment strategies that succeed.\textsuperscript{4,5}

For reference, go to ContemporaryPediatrics.com/point-counterpoint-1118

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Dr Eden CONTINUED FROM PAGE 7

address his quotation from Lee Kaplan, MD, PHD: “Overeating does not cause obesity, obesity causes overeating!” It’s catchy and clever, and it reminds me of the old question, “Which came first, the chicken or the egg?” What difference does it make? The fact of the matter is that the high prevalence of childhood obesity is a reality and it continues to be a major public health problem.

So where do we disagree? I strongly disagree with his basic premise, namely, that my “10 commandments of obesity prevention” are not effective. The key concept in my article and the main theme of my latest book, \textit{Obesity Prevention for Children: Before It’s Too Late: A Program for Toddlers and Preschoolers}, is that the treatment of childhood obesity seldom is successful. Therefore, the only answer is prevention—the earlier the better—and before it’s too late. As I have emphasized, this approach is crucial, especially when dealing with high-risk families in which one or both parents are obese. I am certain that Dr. Browne would agree that treating an already obese school-aged child or adolescent from a high-risk family is almost always doomed to failure. In my opinion, obesity prevention programs, especially for high-risk children, must start very early in life in order to be successful.

A recent large-scale retrospective analysis from Germany, published in the \textit{New England Journal of Medicine}, showed that among obese adolescents, their most rapid weight gain had occurred between ages 2 and 6 years.\textsuperscript{7} This study also showed that most of the children who were obese at ages 2 to 6 years were obese as teenagers. The majority who were obese at age 3 years also remained obese as adolescents. This further demonstrates that prevention must start early on.

Rather than waiting for the mystery of the genetic causes of obesity to be solved, the time to act is now. It makes intuitive good sense to follow my “10 commandments.” Further, the results of 3 large-scale studies of toddlers and preschoolers discussed in my recent book \textit{Obesity Prevention for Children} suggest that my prevention program is effective. As the lady in the opera house balcony shouted down after all resuscitation methods failed and the tenor lying on the stage was pronounced dead, “Give him an enema!” “Why?” she was asked. Her reply? “It can’t hurt.”

Finally, if the “10 commandments of obesity prevention in children” are excellent for improving the health of children and their families, may well be effective, and can’t hurt, how can Dr. Browne, or anybody else for that matter, object to their use?\textsuperscript{4,5}

For reference, go to ContemporaryPediatrics.com/point-counterpoint-1118
A comparative analysis of the feces of infants with and without colic indicated that intestinal inflammation is associated with colic. Further, compared with noncolicky babies, those with colic were shown to have in their gut microbiota a greater abundance of some less favorable organisms and fewer of others known to be beneficial.

Participants were 65 infants (aged 21 to 90 days): 37 had colic (crying and fussing more than 3 hours a day) and 28 were noncolicky (control group). Crying and fussing time was about 5 hours a day in the group with colic and less than 1 hour in the control group.

To test for intestinal inflammation, investigators analyzed fecal calprotectin levels, finding that calprotectin was elevated in babies with colic regardless of whether they were fed breast milk or formula. In fact, analysis that adjusted for variables such as feeding type and crying plus fussing time and age showed that colic is the only independent predictor of fecal calprotectin levels, which were an average of 95 μg/g higher in colicky infants than in their noncolicky counterparts.

Overall, fecal analysis showed microbial diversity was greatest in exclusively formula-fed babies and lowest in breastfed controls, with the microbiota of babies with colic containing many more species than the microbiota of controls. Although investigators did not find that any major differences in species diversity were attributable to colic, they did determine that the stools of colicky babies, compared with noncolicky infants, were characterized by a significant decrease in the relative abundance of Actinobacteria and a marginal increase in Proteobacteria, a proinflammatory microorganism.

The researchers also found that more than 95% of the reduction of organisms of the Actinobacteria phylum was attributable to the species Bifidobacterium, an anti-inflammatory organism. Indeed, in infants with colic, Bifidobacterium represented only 0.3% of total bacteria compared with 10% in noncolicky infants. Acinetobacter and Lactobacillus iners were species significantly associated with colic (Rhoads JM, et al. J Pediatr. August 31, 2018 [epub ahead of print]).

**Thoughts From Dr. Burke**

It may be that, after hundreds of years of caring for colicky babies and more than 60 years of investigation focusing on the gastrointestinal (GI) tract as the possible source of babies’ distress, pediatric researchers are bringing into focus the cause of infantile colic. This study provides a potential mechanism for previous observations that probiotics may moderate colic, and it reinforces our expanding understanding of the importance of the human microbiome.

Michael G Burke, MD is Chairman, Department of Pediatrics, Saint Agnes Hospital, Baltimore, Maryland.
Breastfeeding moms who smoke marijuana expose their infants to cannabinoids

Women who use marijuana while breastfeeding produce breast milk with a measurable amount of the primary psychoactive ingredient in marijuana, delta-9-tetrahydrocannabinol (delta 9-THC), for up to 6 days since they last smoked. This was the primary finding in a study of 50 breastfeeding women who reported using marijuana and provided breast milk samples to a research repository for analysis.

Two-thirds of participants were breastfeeding a child aged younger than 1 year, and 88% reported using marijuana at least once a day, most often exclusively through smoking (64%). Delta 9-THC was detectable in about two-thirds of milk samples with a median concentration of 9.47 ng/mL. Far fewer samples, only 9%, had measurable concentrations of either of 2 other cannabinoids in marijuana—11-hydroxy-delta-9-tetrahydrocannabinol (11-OH-THC) or cannabidiol—and only 1 sample had measurable levels of all 3 cannabinoids.

Both the number of hours since last marijuana use and number of uses per day were predictors of delta 9-THC concentrations in breast milk. Concentrations declined by 3% each hour after exposure, and as the number of uses per day increased so did the concentrations (Bertrand KA, et al. Pediatrics. 2018;142[3]:e20181076).

Parent education by text reduces ED visits for nonurgent care

Frequently sending texts to caregivers with messages about infant development, safety, and basic care reduces the number of visits to the emergency department (ED) in the first year of life, according to a new study conducted in a large urban pediatric care practice that serves a low-income population with limited health literacy.

The 230 participants, caregivers of newborns visiting a pediatric clinic, were divided into 2 groups. One group received anticipatory guidance at all well-child visits along with information related to their child’s growth and development using Bright Futures handouts, as well as a condensed version (ESoC; enhanced standard of care) of these handouts designed to serve as a simplified guide. Caregivers assigned to the text-messaging group received, in addition to the ESoC documents, 4 educational messages per week until their child was aged 6 months. Content addressed nutrition, safety, feeding, and common concerns associated with ED visits, including fever, voiding and stooling, and skin issues.

Participants who did not receive text messages made a total of 240 ED visits in the first year of their child’s life whereas those who received texts made 168 such visits. Also, compared with those who received texts, participants who were given solely printed material were almost 1.5 times more likely to go to the ED for nonurgent visits in their child’s first 12 months (Ladley A, et al. Acad Pediatr. 2018;18[6]:636-641).

To date, 9 states have legalized recreational use of marijuana and 30 allow dispensing marijuana for medical purposes. These researchers show that some psychoactive components of marijuana are transferred to breastfed babies, but we still don’t know what this means for the baby’s health and neurologic development. The American Academy of Pediatrics (AAP) recommends a conservative approach to screening for marijuana use and advising against it for pregnant and breastfeeding women. For all the AAP’s recent recommendations on the topic, see: Pediatrics. 2018;142(3):e20181889.
Cannabidiol affects 1 of 23 persons of the general population, making it one of the most common neurologic disorders. Patients with epilepsy suffer adverse effects on quality of life secondary to the effects of the disease and its therapies. One-third of patients with epilepsy develop treatment-refractory epilepsy (TRE), in which seizures persist despite adequate trials of 2 appropriate antiseizure drugs (ASDs). Although there are more than 25 ASDs currently available, there is still a need for additional treatments with unique mechanisms of action to help those with continued seizures.

The endocannabinoid system
Cannabis contains numerous bioactive compounds called cannabinoids; the most abundant of these are delta-9-tetrahydrocannabidiol (THC) and cannabidiol (CBD). Cannabinoids target G-protein-coupled cannabinoid receptor type 1 (CB1) and type 2 (CB2). The CB1 is widely expressed throughout the central nervous system, where it is involved in the regulation of neuronal excitation/inhibition.1 The CB2 is mainly expressed in the immune system and present in much lower concentrations in the brain.2 Cannabidiol has antiseizure activity without psychoactive effects, but the mechanism underlying CBD’s therapeutic properties is not yet understood. Preclinical data suggest potential allosteric modulation of CB1, as well as actions on targets outside this system.3

Artisanal cannabis
Cannabis use has become increasingly prevalent in patients with epilepsy. Public interest was fueled in part by anecdotal reports of individual children with TRE who had miraculous response with CBD use. The first widely publicized story in 2013 was of a 5-year-old girl named Charlotte, with SCN1A-confirmed Dravet syndrome (DS), also known as severe myoclonic epilepsy of infancy (SMEI).4 At baseline, Charlotte had up to 50 generalized tonic-clonic seizures daily, and after failing many ASDs, her family was told that they had “reached the end of the road.” Her parents obtained a high-CBD-strain cannabis extract (later marketed as “Charlotte’s Web”) and saw a greater than 90% reduction in her seizures after 3 months of treatment.5 Similar case reports, surveys, and small retrospective chart reviews suggested CBD may improve seizure...
control, alertness, mood, and sleep.3

Artisanal cannabis products with high ratios of CBD:THC soon became available across many countries and states. Users obtained products from local growers, government dispensaries, and Internet purchase (including Charlotte’s Web). Public interest in CBD products was partly based on the belief that “natural” products may be safer with fewer adverse effects than conventional ASDs. However, lack of regulatory measures resulted in insufficient quality control of artisanal preparations. Laboratory analyses showed that most products had significantly different contents of individual cannabinoids compared with their marketing label, and reports emerged of children with TRE presenting to medical attention with signs of THC toxicity.5

Despite the growing ubiquity of cannabis, quality scientific evidence was lacking and no reliable conclusion could be drawn about the safety or efficacy of cannabis products.7 The Epilepsy Foundation released a statement in 2014 affirming its support for the rights of patients and families in the use of medical marijuana.8 In response, the American Epilepsy Society recommended caution and stressed the risk-to-benefit ratio did not yet support the use of marijuana for epilepsy treatment.9

RCTs
In recent years, results from the first few randomized controlled trials (RCTs) on the safety and efficacy of CBD use for epilepsy have been published. Pharmaceutical-grade purified CBD solution (Epidiolex [CBD]; GW Pharmaceuticals, Cambridge, United Kingdom) was supplied to clinical investigators at trial sites throughout the United States and Europe. Across 3 RCTs in patients with DS10 and Lennox-Gastaut syndrome (LGS),11,12 patients taking adjunctive CBD showed significantly reduced seizure frequency compared with placebo. Moreover, some patients taking CBD achieved seizure freedom despite having failed numerous previous ASDs and taking 2 to 3 ASDs at the time of the trial.

Therapeutic and adverse effects of Epidiolex were found to be dose dependent.13 The most common adverse effects were somnolence, diarrhea, and decreased appetite. Somnolence was particularly common in patients who were concurrently taking clobazam. Epidiolex is known to modulate cytochrome P450 and glucuronosyltransferase (UGT) isoenzymes and has been associated with changes in levels of conventional ASDs.13,14 It is estimated that clobazam levels may increase approximately 60% in those receiving Epidiolex.13 Elevated transaminases also were reported in patients concurrently taking Epidiolex and valproate.14

Epidiolex approval
The US Food and Drug Administration (FDA) approved Epidiolex in June 2018 for adjuvant treatment in patients with DS and LGS aged 2 years and older. Product availability was pending reclassification of CBD by the US Drug Enforcement Administration (DEA), as it was previously classified as a Schedule 1 drug. On September 28, 2018, the DEA rescheduled Epidiolex as Schedule 5, and the product is expected to be available to consumers by the end of the year.

Epidiolex will be marketed in the United States by Greenwich Biosciences (Carlsbad, California) as a 100-mg/mL oral solution. The FDA drug information15 indicates initial dosing recommendations of 5 mg/kg/day divided twice daily, with titration to the initial maintenance dose of 10 mg/kg/day after 1 week. Further increases in dose can be made in weekly increments of 5 mg/kg/day as tolerated (max 20 mg/kg/day). Reduced dosages are recommended for patients with hepatic impairment. The cost for Epidiolex is expected to be more than $30,000 per year, raising concerns regarding insurance company approval.16 The cost also may limit future investigator-initiated trials for novel indications.

Summary
We are finally beginning to accumulate evidence through rigorous scientific investigation that supports the efficacy and safety for adjuvant CBD use in TRE. Studies are underway to evaluate cannabidiol efficacy for a broader range of epileptic syndromes,17-20 and more than 20 trials are currently listed on ClinicalTrials.gov.
Chronic cough frustrates a 4-year-old boy

JEFFREY NI, BS, MS4; BRIDGET BOYD, MD

A previously healthy 4-year-old male, born late preterm by urgent cesarean delivery with an uncomplicated postnatal course, presents to the outpatient clinic for a chief complaint of worsening cough over the past 5 months. He denies current fever, rhinorrhea, shortness of breath, diarrhea, or vomiting. His cough has been worsening in severity and frequency, and mostly occurs during the daytime. The cough does not worsen at night and does not interfere with the patient’s daily activities. The cough is nonproductive and is not exacerbated with activity or laying in the supine position. He does not have any sick contacts at home nor any history of recurrent viral upper respiratory infections.

History
The patient’s cough symptoms began 5 months ago when the patient was first seen in the emergency department (ED) for a viral upper respiratory infection (URI) and was prescribed Tylenol and ibuprofen. He was subsequently seen in the outpatient setting 2 more times for a persisting and worsening intermittent cough, where supportive care was recommended with a trial of Zyrtec, without symptomatic relief for the patient. Last week, he presented to immediate care for a 4-day history of cough, congestion, diarrhea and vomiting, and a 1-day history of fever. He was prescribed ibuprofen and supportive therapy for a presumed recurrent viral URI. The majority of his symptoms resolved except for his cough, which continued to worsen and prompted evaluation at this visit.

Physical examination
On examination, the patient is a well-hydrated afebrile child in no acute distress. His growth parameters are normal for his age. His vital signs are all within normal limits, and he is saturating 98% oxygen on room air. He has moist mucous membranes without pharyngeal erythema or tonsillar exudates. He does not have cervical lymphadenopathy, pallor or cyanosis, and he is not tachypneic, wheezing, or in evident respiratory distress.

On auscultation, his lungs are clear bilaterally with good air movement, but bowel sounds are appreciated over his lower-right sternum. His abdomen is nontender, nondistended, with normoactive bowel sounds in all 4 quadrants.

Laboratory
During the patient’s visit to immediate care the previous week, urinalysis, rapid strep test, rapid influenza diagnostic testing, and a frontal

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chest X-ray to rule out pneumonia were obtained. Urinalysis was within normal limits, and both the influenza testing and rapid strep test results returned negative.

**Imaging and consultation**
The frontal chest X-ray demonstrated evidence of clustered gas collections at the gastroesophageal junction. Lateral and frontal chest X-rays were repeated at this visit, along with a respiratory polymerase chain reaction (PCR) panel. Respiratory PCR results were positive for parainfluenza. Both lateral and frontal chest X-rays demonstrated large air-filled loops of bowel extending anteriorly from the right diaphragm to medial right lower hemithorax (Figures 1 and 2). Pediatric surgery was consulted for evaluation of the abnormal imaging findings.

**Differential diagnosis**
Chronic cough in children is typically defined as a cough lasting longer than 4 weeks’ duration in a patient aged younger than 14 years (Table). In 2 studies evaluating the etiologies behind chronic cough in children, the most common causes included upper airway cough syndrome (UACS), also known as postnasal drip; asthma and asthma-like symptoms; gastroesophageal reflux disease (GERD); and protracted bronchitis. Recommended initial evaluation in a child presenting with chronic cough is chest radiography and spirometry, although empiric therapy is usually not recommended in a child with a nonspecific chronic cough.

For this patient, his first presentation was consistent with a viral URI, which appeared to be the precipitating event for his cough. While his cough persisted, this was thought to be a self-resolving postviral symptom or a recurrent viral URI. Of note, his viral respiratory PCR was positive for parainfluenza, which indicates that he did indeed have a viral URI at the time of presentation. A Morgagni hernia was detected incidentally on his chest X-ray for a workup of pneumonia when he presented to immediate care for a fever with chronic cough.

The patient’s worsening cough may have been exacerbated by his hernia contacting the pleura and pulmonary lining, which would have been already irritated from multiple viral URIs. Additionally, Morgagni hernias have been reported to present initially as repeated chest infections and gastrointestinal (GI) complaints, both of which were present in this patient. However, it is also a possibility that the cough worsened the extent of his hernia by increasing intraabdominal pressure and placing strain on the diaphragm.

Although imaging clearly demonstrated air-filled loops of bowel herniating through the patient’s diaphragm, imaging is not always definitive because the visualized bowel may vary in consistency. Oftentimes, further evaluation with a computed tomography (CT) scan is indicated to evaluate the extent of herniation and to rule out other causes such as a pericardial fat pad, lipoma, or mediastinal cyst.

Although in many cases patients are asymptomatic, surgery is recommended on initial diagnosis of a Morgagni hernia to preserve normal lung function and prevent acute complications such as bowel incarceration.

**Discussion**
Congenital diaphragmatic hernia (CDH) occurs at a rate of fewer than 5 in 10,000 births and is relatively rare compared with other potential etiologies of chronic cough. Most reported cases of CDH are Bochdalek hernias, which present via posterolateral defects in the diaphragm, whereas Morgagni hernias, which present anteromedially, are exceedingly rare, accounting for less than
5% of diagnosed CDHs. Interestingly, although cases of CDH classically present on the left hemisphere, Morgagni hernias frequently localize to the right hemisphere.

Whereas CDH typically presents postnatally as acute respiratory distress in the neonate, a small subgroup of patients with CDH present later in life and may be asymptomatic. Compared with Bochdalek hernias, Morgagni hernias are more likely to result in a delayed presentation and diagnosis. Also unlike Bochdalek hernias, Morgagni hernias are not associated with lung hypoplasia or pulmonary hypertension, and thus do not present with acute respiratory symptoms postnatally.

For patients with a delayed presentation of Morgagni hernia, common complaints included recurrent respiratory infections, nonspecific GI complaints, and failure to thrive. However, many Morgagni hernias are found incidentally on imaging. Acute symptoms such as neonatal respiratory distress and GI obstruction also have been reported. Morgagni hernias have been shown to be related to other congenital abnormalities, such as heart defects and chromosomal abnormalities.

Morgagni hernias occur when the septum transversum fails to fuse with the costal arches during embryonic development, leading to a defect known as the foramen of Morgagni or the sternocostal triangle, which lies retrosternal, anteriorly and mediately adjacent to the sternal and costal diaphragmatic attachments. Loops of large bowel, small intestine, or omentum subsequently can herniate through this open defect. The best initial imaging modality to diagnose a Morgagni hernia is chest radiograph in the postnatal period and beyond, which will demonstrate loops of bowel in the thoracic cavity, and ultrasound in the prenatal period, which will reveal a mass in the fetal thoracic cavity accompanied by a mediastinal shift.

This case demonstrates the importance of a thorough physical exam, as not all diaphragmatic hernias present acutely or with obvious symptoms.

### Management
Surgical repair is the first-line treatment following diagnosis of a Morgagni hernia. A transthoracic approach to the repair is preferred over a transabdominal approach because the transthoracic method offers adequate visualization and better control and avoids potential adhesions that may complicate a transabdominal approach. Reduction of hernia contents with primary closure is performed, oftentimes with a synthetic patch for larger defects and tension-free repair.

A minimally invasive laparoscopic approach is also gaining favor, and is associated with a shorter operating time, shorter hospital length of stay, and a more pleasant cosmetic appearance. However, cases of hernia recurrence have been reported primarily in laparoscopic repairs without supportive prosthetic patches, and better visualization is obtained with an open approach. Open approaches are still more common than laparoscopic approaches.

Lastly, as congenital heart defects and trisomy 21 are common comorbidities associated with Morgagni hernias, echocardiography and karyotype can be considered based on clinical suspicion.

### Patient outcome
The patient was referred to pediatric surgery, where he underwent a laparoscopic repair of his Morgagni hernia with an uncomplicated operative and postoperative course. His chronic cough subsequently resolved after the hernia repair surgery.

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### For references, go to ContemporaryPediatrics.com/puzzler-1118
Pe R-REVIEWED FEATURE

Menses: A “vital sign” for teenaged girls

Ms Nierengarten, a medical writer in Minneapolis, Minnesota, has more than 25 years of medical writing experience, authoring articles for a number of online and print publications, including various Lancet supplements and Medscape. 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.

The menstrual cycle can be an important vital sign providing pediatricians with valuable information about health and disease among girls and young women.

MARY BETH NIERENGARTEN, MA

“When doing a general assessment of an adolescent girl during a health checkup, remember to ask ‘How are your periods going?’” says S. Paige Hertweck, MD, chief of Gynecology at Norton Children’s Hospital, Louisville, Kentucky.

That question, she suggests, is the basis on which pediatricians can begin the necessary conversation with their patients to both educate them and their caregivers about what a normal menses is as well as to detect any abnormalities that may need addressing.

“Pediatricians need to educate parents, caregivers, and patients about what normal menstruation entails, including normal onset, flow, and duration,” Hertweck says, adding that many pediatricians may not

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>GENERAL ASSESSMENT OF MENSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHARACTERISTICS OF NORMAL MENSES</td>
<td>INDICATORS OF ABNORMAL MENARCHE</td>
</tr>
</tbody>
</table>

**Menarche (median age)**
- 12.43 y
- Occurs within 2-3 y of breast budding.
- Occurs by age 15 y in 98% of girls.

**Menstrual cycle interval**
- 21-45 d, even in the first gynecologic year.
- Count cycle from the first day of a period to the first day of the next period.
- Cycle length is more variable for teenagers than for women.
- Missed period for 3 mo is abnormal, not irregular.

**Menstrual flow length**
- 7 d or less

**Menstrual product use**
- 3-6 pads or tampons/d

- No menarche by age 15 y.
- No menarche within 3 y of breast budding.
- No breast development by age 13 y.
- No menses by age 14 y with hirsutism.
- No menses by age 14 y with history of excessive exercise or eating disorder.
fully recognize and understand what a normal menses should be and therefore may miss indicators of abnormal cycles that require evaluation.

Hertweck provided that information in her session at the 2017 American Academy of Pediatrics (AAP) National Conference titled “Menstrual disorders in teens: evaluation and management.” At the hub of her talk was what she referred to as the clinical pearl of educating pediatricians about how to detect and manage menstrual disorders in adolescent girls—the need to use the menstrual cycle as a vital sign.

“I would like pediatricians to realize that we should use the menstrual cycle like a vital sign,” she says. “Just like we look at people’s height and weight and blood pressure, we should consider finding out about an adolescent’s periods when getting a history.”

Normal vs abnormal menses

The phrase “using the menstrual cycle as a vital sign” was coined from the title of a clinical report jointly published by the AAP and the American College of Obstetricians and Gynecologists (ACOG). The clinical report provides guidance on what normal menses is and the different types and causes of abnormal menses. Since its publication in 2006, both the AAP and ACOG continue to endorse this report.

Hertweck touched on key points of this clinical report. She first described what normal menses is and what pediatricians should look for when asking patients about their periods (Table 1). She noted that what is considered normal menarche has not changed substantially in the United States for 25 to 30 years. What has changed, she said, is that some girls are reaching puberty earlier largely because of environmental and nutrition factors that have led to higher body mass indexes (BMIs) than in the past.

Hertweck underscored the need to understand what normal is in terms of age of onset, frequency, and flow as pediatricians and patients can misinterpret what may indicate an abnormality as simply an irregularity. On average, she says, menarche begins at age 12 years and at 2 to 3 years after breast budding. “If a girl has a breast bud at age 10 and doesn’t have a period at age 14, something is wrong,” she says. “When you get 3 years out from breast budding and no period, you need to follow up on that.” Table 1 also lists what pediatricians should watch for as indicators of abnormal menarche or onset of menses. Girls with these indicators are considered to have primary amenorrhea.

In terms of frequency, Hertweck emphasizes that a normal menstrual cycle runs between 21 to 45 days. Although some periods can be irregular, they rarely fall outside this normal range. In particular,

### APPS FOR TRACKING PERIODS

Teenaged girls have their choice of many period tracking apps that can be downloaded to their smartphones from the Apple Store and Google Play. Here are reviews of several period calculators that help predict monthly cycles.

- **Magic Girl** Created specifically for teenaged girls, this app keeps a diary of past periods and predicts a user’s upcoming cycle based on previous months’ histories. It offers FAQs for newbies; educational videos; and a chat feature that promotes sharing conversations with other girls who may be experiencing similar concerns.

- **Flo** Straightforward app lets one customize personal period and cycle length and helps predict an irregular period by noting symptoms (sleep patterns, moods) indicative of the start of a cycle. Clever interface uses login frequency to reward a user with health insights, tips, and articles based on the information entered.

- **Clue** This period tracker records exercise frequency, moods, menstrual flow heaviness, and more than 30 other tracking options. It looks at past period history, premenstrual symptoms, and fertility data, and gives personalized alerts for any data that is out of normal range for age.

- **Eve** This app will predict the length of one’s cycle and period; track sexual activity and chances of pregnancy; and pinpoint trends/patterns specific to the user’s body. It offers a community option based on one’s specific interests.

Note: Period tracker apps should not be used as a form of birth control.
she points out the need to follow up on girls who have missed their period for 90 days. “I think pediatricians can get lulled into the fact that some girls just have periods that are irregular during the first 3 years,” she says. “Yes, periods that range between the 21- to 45-day cycle are acceptably irregular, but if a girl hasn’t had a period for 3 months, you have to ask what is going on,” she says.

When considering menstrual flow, she emphasizes that a normal period lasts fewer than 7 days and normal flow is one that requires changing a pad or tampon only 3 to 6 times a day. “Parents and girls need to write down and report cycles outside this norm to their providers for evaluation,” she says.

**Abnormal menses: whom to evaluate**

For girls who present with menses outside the norm, pediatricians need to consider a number of disorders. Girls with indicators of delayed menarche (Table 2) have primary amenorrhea and should undergo further evaluation to understand its cause. Hertweck emphasizes that normal
Menses require an intact central nervous system (CNS) with hormonal connection from the hypothalamus to the pituitary gland, an intact ovarian response, and also the presence of normal reproductive anatomy with intact connection between the uterus, cervix, and vagina.

Depending on anatomic findings noted on physical/genital examination or ultrasound imaging, further evaluation should include checking follicle-stimulating hormone (FSH), thyroid-stimulating hormone (TSH), prolactin levels (CNS/pituitary gland defect), and estradiol level (ovarian response). Table 2 lists these menstrual disorders associated with specific conditions.

For girls who have abnormal cycle intervals and/or abnormal cycle flow, further workup is needed to uncover the potential cause. Table 3 lists common causes of abnormal cycle intervals and flow that need further evaluation.

Girls who present with abnormal flow (ie, menorrhagia) should be screened for both a bleeding disorder as well as chlamydia. Hertweck emphasizes that up to 50% of girls with heavy periods could have von Willebrand disease. Another common bleeding disorder to consider is a platelet function disorder. “At a minimum, the pediatrician should check a complete blood count (CBC), ferritin level, and TSH level in girls presenting with heavy menstrual flow,” she says.

Hertweck also emphasizes that girls with menorrhagia should be screened for chlamydia and not just be prescribed birth control pills. “If somebody has been having normal periods and all of a sudden they are heavier than normal and there is bleeding between periods, that could be a sign of chlamydia,” she says.

Along with recognizing and evaluating these abnormalities, a major role of pediatricians is to educate parents, caregivers, and patients on what normal is so that they are aware when an abnormality exists. Hertweck underscores the need for patients and/or parents/caregivers to write down the details of their periods (cycle length and duration,

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**TABLE 4**

**DIAGNOSIS AND TREATMENT OF VON WILLEBRAND DISEASE**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct diagnosis is complex and not always straightforward.</td>
<td>Antifibrinolytics</td>
</tr>
<tr>
<td>A positive response to 4 categories is highly sensitive:</td>
<td>Prevent dissolution of previously formed clots.</td>
</tr>
<tr>
<td>1) Is duration of menses ≥7 d and flooding or impairment of daily activities with menses?</td>
<td>Tranexamic acid (Lysteda): 1300 mg orally TID x 5 d.</td>
</tr>
<tr>
<td>2) Is there a family history of treatment of anemia?</td>
<td>Aminocaproic acid (Amicar): give orally during bleeding episode.</td>
</tr>
<tr>
<td>3) Is there a family history of diagnosed bleeding disorder?</td>
<td>Humate-P: infusion for Factor VIII (15-59 IU/kg IV infusion).</td>
</tr>
<tr>
<td>4) Is there a history of excessive bleeding after tooth extraction, delivery, miscarriage, or surgery?</td>
<td></td>
</tr>
<tr>
<td>Repeated diagnostic testing often required.</td>
<td></td>
</tr>
<tr>
<td>Diagnostic assays include:</td>
<td></td>
</tr>
<tr>
<td>1) Measuring platelet concentration of vWF antigen.</td>
<td></td>
</tr>
<tr>
<td>2) An activity test of vWF-platelet binding.</td>
<td></td>
</tr>
<tr>
<td>3) Factor VIII activity.</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: IV, intravenous; vWF, von Willebrand factor. Hertweck SP.

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**TABLE 5**

**KEY ISSUES to keep in mind when assessing menses**

- Remember to use the menstrual cycle as a vital sign.
- Even in the first year of menarche, most girls have a period every 90 days. Work up those that don’t.
- Irregular periods, even those resulting in anemia, may be a sign of polycystic ovary syndrome.
- Remember to screen for chlamydia in patients with heavy or irregular menstrual bleeding.
- Teenagers with heavy bleeding should be screened for a bleeding disorder with at least a complete blood count (CBC), ferritin, and thyroid-stimulating hormone level.
- The most common bleeding disorders associated with heavy menstrual bleeding include platelet function disorders and von Willebrand disease.
- Only draw von Willebrand testing during the first 3 days of a menstrual cycle when estrogen levels are at the nadir.

Hertweck SP.
Many pediatricians may not fully recognize and understand what a normal menses should be and therefore may miss indicators of abnormal cycles that require evaluation.

—S. Pagie Hertweck, MD

Summary
Understanding normal menstrual function is essential to understanding health and disease among girls and young women. Pediatrists are in a key role to educate girls and their parents/caregivers about normal and abnormal menses.

Using the menstrual cycle as a vital sign is recommended as it provides important information about the overall health and well-being of young women. Recognition and evaluation of abnormal menses is critical to ensure that the cause is correctly identified and treated. Table 5 summarizes the key points that pediatrists should keep in mind when assessing menses in an adolescent girl.

Peer-reviewed

von Willebrand disease as a case study

Hertweck notes one example of management of a common bleeding disorder among girls who present with heavy bleeding is for von Willebrand disease (vWD). Table 4 lists the work-up for this disease. Hertweck emphasizes that testing for vWD should be done only during the first 3 days of the menstrual cycle when estrogen levels are at the nadir. If a diagnosis of vWD is made or considered, the patient should be comanaged with hormonal and hematologic medica-

tions often via consultation with Gynecology and Hematology.

Summary
Understanding normal menstrual function is essential to understanding health and disease among girls and young women. Pediatrists are in a key role to educate girls and their parents/caregivers about normal and abnormal menses.

Using the menstrual cycle as a vital sign is recommended as it provides important information about the overall health and well-being of young women. Recognition and evaluation of abnormal menses is critical to ensure that the cause is correctly identified and treated. Table 5 summarizes the key points that pediatrists should keep in mind when assessing menses in an adolescent girl.

For references, go to ContemporaryPediatrics.com/menses-as-vital-sign

You’re at your best in winning the trust of your young teenaged patients. Your innate sense of empathy—and that enduring memory of being a vulnerable adolescent yourself—makes you a born counselor and a source of caring, concern, and essential guidance!

Does your clinical IQ always keep pace with your natural EQ when it comes to menstruation issues and their broad spectrum from normal through irregular to abnormal? Do you know the caution lights of menstrual irregularities—from thyroid dysfunction to anorexia to polycystic ovary syndrome?

Oligomenorrhea tips its meaning in the Greek prefix “oligo” or “little, few,” but do you recall its clinical definition “as fewer than 8 cycles per year after 2 years of menarche”?

How about the 2 clinical findings that indicate when it’s advisable to refer to an endocrinologist? (“Recommended for those who have a history of primary amenorrhea with a lack of sexual characteristics by age 14 or 16 years despite having normal secondary sexual characteristics, or those who do not normalize their menstrual cycles 2 years after menarche and who have clinical signs of hyperandrogenism.”)

Gauge your grasp, then dive deeper

Again this month, first you’ll compete on the Contemporary Pediatrics website—in real time—with your peers in our online quiz. We’ll query you on 5 key concepts on adolescent menstrual abnormalities, provide you your score on each question in comparison with your peers, then offer some context on the correct answers. As always, we’ve included some additional reading and resources for further exploration.

So, ready to test your menstrual mettle—or at least your menstrual memory? This month’s Riddle Me This! awaits you now online now at ContemporaryPediatrics.com/menses-quiz-1118
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Influenza and RSV
How to suspect, diagnose, treat

Respiratory syncytial virus (RSV) and Influenza are responsible for significant morbidity and mortality in children. Pediatricians must step up vigilance to ensure early diagnosis and treatment.

PAT F BASS III, MD, MS, MPH

Influenza and respiratory syncytial virus (RSV) represent a significant amount of the disease burden a pediatrician sees in the winter months. Both diseases lead to considerable morbidity and mortality in the pediatric population. This article reviews the impacts of these diseases on children and what the pediatrician in the trenches needs to know about diagnosis and treatment.

Influenza

Although the symptoms of influenza (Table 1) peak between December and March, cases are seen from October through May.1

The clinician should suspect influenza regardless of immunization status during influenza season among all febrile pediatric patients, but especially among febrile infants and children with:2,3

- Rapid onset of acute respiratory illness with fever.
- An exacerbation of chronic respiratory disease with fever.
- Fever, cough, and sore throat and no other cause during flu season.
- Community-acquired pneumonia.

Typical symptoms include:4
- Sudden onset of fever.
- Headache.
- Myalgia.
- Malaise.
- Respiratory symptoms such as upper respiratory infection (URI), cough, or sore throat.

However, children aged younger than 2 months may have a sepsis-like presentation, and the immunocompromised may be afebrile and lack systemic symptoms.

Children tend to shed virus longer compared with adults before (2-3 days vs 1 day, respectively) and after (7-10 days vs 4-5 days, respectively) the onset of symptoms.5

DIAGNOSIS OF INFLUENZA

Given the common symptoms, the pediatrician might then assume that making an influenza diagnosis is relatively straightforward and easy. However, in one outbreak of influenza, other viruses leading to a “flu-like” illness (rhinovirus, parainfluenza, and human metapneumovirus) were more common and clinical presentation for each was similar.5 Appropriate diagnosis allows for opti-
mization in antiviral treatment and decreased use of inappropriate antibiotics and other testing. Rapid diagnosis also may improve satisfaction with the healthcare provider.

Depending on the testing modality used in the office or emergency department (ED), an influenza diagnosis is dependent on either identification of virus or the detection of viral protein/viral RNA in respiratory tract secretions. Negative antigen tests do not rule out an influenza infection.

Rapid influenza diagnostic tests (RIDTs) utilizing viral antigen detection are commonly performed in the outpatient setting because results are obtained quickly, usually before the end of the visit. However, these tests have a lower sensitivity (50%-70%) than other currently available tests. Reverse transcriptase polymerase chain reaction (RT-PCR) and rapid molecular assays are 2 other testing modalities with improved sensitivity (86%-100% and 66%-100%, respectively) and are available as Clinical Laboratory Improvement Amendments (CLIA)-waived tests that can be used at point of care.

**IMPACT OF INFLUENZA IN PEDIATRIC PATIENTS**
Approximately 9% of all children experience a symptomatic influenza infection yearly that is associated with increased physician visits, increased antibiotic use, and missed time from work and school. The majority of hospitalizations in influenza-confirmed pediatric patients occur in either patients with no known high-risk condition, a chronic lung condition, or a neurologic condition.

**HOW EFFECTIVE IS INFLUENZA VACCINATION?**
Effectiveness of the influenza vaccine is determined by the fit or match between the influenza strains in the vaccine and the particular viruses actually circulating during influenza season as well as their severity. When the fit is high, good rates of protection are seen, and vice versa.

Vaccine effectiveness measures how well vaccination prevents influenza infection in a routine community setting. Over the 14 flu seasons from 2004 to 2018, the estimated influenza vaccination effectiveness ranged from 10% to 60% with effectiveness greater than 40% 9 times.

Although uncommon, influenza is associated with more than 100 deaths annually among children and adolescents, ranging from 37 in the 2011-2012 flu season to 358 in the 2009 pandemic.

Examining laboratory-confirmed flu deaths over 4 flu seasons from 2010 to 2014, Flannery and colleagues found that only 26% received flu vaccination 14 days before symptom onset. The vaccination rate among children with high-risk conditions related to flu was only slightly better at 31%.

Overall vaccine effectiveness was 51% and 65%, respectively, for children with and without high-risk conditions. These results indicate

### TABLE

**SYMPTOMS, DIAGNOSIS, AND TREATMENT OF INFLUENZA AND RESPIRATORY SYNCYTIAL VIRUS (RSV)**

<table>
<thead>
<tr>
<th>SYMPTOMS OF INFLUENZA</th>
<th>SYMPTOMS OF RSV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Fever</td>
</tr>
<tr>
<td>Body aches</td>
<td>Body aches</td>
</tr>
<tr>
<td>Cough</td>
<td>Cough</td>
</tr>
<tr>
<td>Sore throat</td>
<td>Sore throat</td>
</tr>
<tr>
<td>Rhinitis</td>
<td>Rhinitis</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Fatigue</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIAGNOSING INFLUENZA</th>
<th>DIAGNOSING RSV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic tests allow for rapid diagnosis and appropriate use of antivirals and avoidance of inappropriate antibiotics.</td>
<td>Both rapid antigen assays and PCR-based testing are available.</td>
</tr>
<tr>
<td>Rapid influenza diagnostic tests (RIDTs) are quick, available, and cheap, but less effective.</td>
<td>Testing only needed if it will change management.</td>
</tr>
<tr>
<td>Reverse transcriptase polymerase chain reaction (RT-PCR) and rapid molecular assays are more effective; less available at point of care.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TREATING INFLUENZA</th>
<th>TREATING RSV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oseltamivir (Tamiflu)</td>
<td>In outpatient setting, generally supportive:</td>
</tr>
<tr>
<td>Zanamivir (Relenza)</td>
<td>Maintain hydration and nutrition.</td>
</tr>
<tr>
<td>Peramivir (Rapivab; IV)</td>
<td>Relief of nasal obstruction.</td>
</tr>
<tr>
<td>(Oseltamivir and zanamivir are available orally and are active against both influenza A and B viruses.)</td>
<td>Parent must monitor and identify hydration and respiratory status issue.</td>
</tr>
</tbody>
</table>

Abbreviations: IV, intravenous; PCR, polymerase chain reaction. Author created.
the continued need for the pediatrician to increase vaccination rates, especially for those children with high-risk conditions.18

**INFLUENZA TREATMENT**

Oseltamivir (Tamiflu), zanamivir (Relenza), and peramivir (Rapivab) are neuraminidase inhibitors that are currently available in the United States. Oseltamivir and zanamivir are available orally and are active against both influenza A and B viruses. Peramivir is an intravenous (IV) formulation and indicated in patients aged older than 2 years with symptoms for fewer than 2 days.

A neuraminidase inhibitor was recommended as the treatment of choice during the 2017-2018 flu season as more than 99% of circulating viruses were susceptible.19

Amantadine and rimantadine are adamantanes and were not recommended for the treatment or prophylaxis of influenza during the 2017-2018 season.19


Treatment with a neuraminidase inhibitor decreases symptom duration by approximately 1 day, decreases associated otitis media, and decreases prescription of unnecessary antibiotics.20,21 Additionally, earlier treatment (eg, 12-24 hours after symptoms onset) can significantly decrease symptom duration.22,23 In 1 study of children aged 1 to 3 years, treatment within 24 hours with oseltamivir decreased symptom duration by 3 days.25

Finally, among patients admitted to intensive care units, early treatment was associated with increased survival.24 Year-round vaccination of pregnant women in a study in Nepal decreased maternal febrile flu-like illnesses by 19%, infants aged younger than 6 months diagnosed with flu by 30%, and low-birth-weight by 15%.25

**Respiratory syncytial virus**

Globally, RSV is second only to malaria as a cause of death from infectious agents in children aged from 28 to 364 days.26 In the United States, the RSV-associated pneumonia mortality rate is 3.1 per 100,000 person-years in children aged 1 year.27,28 These RSV infections additionally result in significant morbidity among pediatric patients.

**SYMPTOMS OF RSV**

Symptoms (Table) depend on the age of the child and his/her underlying health status. Infants and young children are more likely to present with bronchiolitis or pneumonia whereas older children are more likely to present with upper respiratory tract symptoms.29,30 Of note, RSV infection also may present as apnea, and some authors have discussed an association with sudden infant death syndrome.31,32

**DIAGNOSING RSV**

Respiratory syncytial virus is commonly diagnosed clinically when a young child presents with lower respiratory disease in the winter months with RSV circulating in the community. A laboratory diagnosis is often pursued when it will impact the clinical management.

Both rapid antigen assays and PCR-based diagnostic technologies are available when necessary.

**TREATING RSV**

Respiratory syncytial virus that is not severe can generally be managed in the outpatient setting with supportive care.

**Supportive measures include:**

- Adequate ability to maintain hydration and nutrition.
- Relief of nasal obstruction.
- Ability of parent to monitor and identify hydration and respiratory status.

Neither oral nor inhaled bronchodilators are recommended in the routine outpatient treatment of RSV as they do not decrease any long-term outcomes.33-35 Similarly, neither treatment with steroids nor montelukast decreased respiratory or wheezing symptoms following RSV infection.36,37 Antibiotics are only indicated if there is a coexisting bacterial infection.38

Follow-up either by phone or in person should occur in 1 to 2 days depending on how severe the child is at presentation.

**WHEN TO HOSPITALIZE**

**Indications for hospital admission include:**

- Dehydration.
- Toxic appearance.
- Lethargy.
- Signs of respiratory distress such as inability to feed, nasal flaring, retractions, or a respiratory rate greater than 70 breaths per minute.
- Apnea.
- Hypoxia.
- Concern about parent’s ability to care for child.

For children requiring hospital admission, supportive care remains...
the standard treatment. Admitted children should be placed on contact precautions and monitored closely for hydration status.

Rapid respiratory rate and moderate-to-severe respiratory distress are possible indications for parenteral-only fluid administration to avoid any risk of aspiration. Urine output needs to be monitored closely.

Respiratory support is the mainstay of treatment. Oxygen should be administered if SpO2 is 90% or lower to maintain an SpO2 above 90% to 92%,38,39 Chest physiotherapy is not routinely recommended but may be beneficial in patients with some diseases such as cystic fibrosis.40

Bronchodilators are not routinely recommended.38 Similarly, neither systemic nor inhaled glucocorticoids have been found to prevent admission, decrease length of stay, decrease objective measurements of severity in patients with more severe disease, or readmission among patients with a first episode of bronchiolitis.37

Although a 2009 study did find that combining systematic glucocorticoids and bronchodilators may decrease hospitalization rates, the result was not considered statistically significant when adjusted for multiple comparisons. Additional study is necessary before this treatment approach can be recommended.41,42

The administration of hypertonic saline has had mixed results in the literature with some studies showing positive effects and others having negative results. A 2013 Cochrane Review concluded that hypertonic saline decreased length of stay and decreased symptoms, but also cautioned that more research was necessary to evaluate its effectiveness.43 More recent, well-designed, randomized controlled trials have not shown a benefit related to outcomes such as severity scores, length of stay, readiness for discharge, or subsequent readmission rates.44-46 The 2014 guidelines from the American Academy of Pediatrics (AAP) do not recommend treatment with nebulized hypertonic saline in the ED, but do find relatively weak evidence to support treatment in hospitalized patients.38

Looking ahead

On the research front, lumicitabine is a nucleoside analog that was shown to reduce RSV viral load and symptoms among healthy volunteers. Participants treated with the study drug cleared virus more than 80% faster than those treated with placebo and also had improved clinical status.45 Several different clinical trials with this study drug are currently in progress with infants and young children.

In terms of prevention, handwashing, avoiding persons with URIs, and avoiding cigarette smoke remain routine recommendations for the pediatrician. Immunoprophylaxis with the monoclonal antibody palivizumab is recommended for certain preterm infants, infants with chronic lung disease, and infants with hemodynamically significant congenital heart disease in the first year of life.46,47 Following the most recent update of the RSV guidelines in 2014, which stated that palivizumab was not of high value because of its high cost and minimal benefit, significantly fewer infants qualified for treatment. Rajah and colleagues found that in the year following the AAP recommendation, there was a significant increase in RSV hospitalizations and associated morbidity such as increased lengths of stay, hospital costs, admissions to intensive care units (ICUs), and oxygen requirements compared with the previous year.50 However, pooling data from 8 Medicaid health plans in Texas, Farber was not able to demonstrate similar outcomes.51

Although there is not currently an RSV vaccine, there are as many as 10 vaccines and 11 novel clinical therapeutic agents in development.52 These include therapies that provide anti-RSV neutralizing antibodies as well as monoclonal antibodies targeting the RSV protein structure.

Summary

Respiratory syncytial virus and Influenza are responsible for significant morbidity and mortality in the pediatric population. Continued vigilance for immunizing against influenza and early diagnosis and treatment are important for the pediatrician. Whereas current prevention and treatment options for RSV are suboptimal, a number of investigational therapies are on the horizon. ■

For references, go to ContemporaryPediatrics.com/influenza-and-RSV

80%

Of children who died from influenza—2017-2018 season—had not received a flu shot.

—CDC, June 8, 2018.

80% Of children who died from influenza—2017-2018 season—had not received a flu shot. —CDC, June 8, 2018.

PLUS How to diagnose wheezing at ContemporaryPediatrics.com/localized-wheezing

PLU
When faced with budget shortfalls, policymakers often consider reducing funding of healthcare programs. However, a new report reveals that cutting spending on children’s health programs by changing eligibility requirements could have significant consequences.

The report, published in *Pediatrics*, found that lowering eligibility requirements for public insurance (Medicaid and the Children’s Health Insurance Program (CHIP)) to 100% of the poverty level—current eligibility thresholds of the 14 states studied ranged from 152% to 405% of the federal poverty level—would leave an estimated 650,000 hospitalized children without public insurance coverage.1

Nationally, more than 30 million children are covered by public health insurance programs. Public insurance programs are funded jointly between states and the federal government, and the federal share varies between 50% and 70% by state, according to the report. Any push to limit federal spending on healthcare may result in states tightening the belt on public insurance programs. Although this might save some upfront tax dollars, the study authors estimate that these newly ineligible healthcare expenses for these children would end up costing the families, commercial insurance (if families could afford coverage), or the healthcare system more than $4 billion per year.

“Public insurance eligibility limits for children vary by state, but nearly all are higher than 200% of the federal poverty limit,” says Jessica L. Bettenhausen, MD, FAAP, pediatric hospitalist in the Department of Pediatrics, Children’s Mercy Hospital Kansas City and University of Missouri-Kansas City School of Medicine, Kansas City, Missouri, and lead author of the study. “If eligibility limits were decreased to 200% of the federal poverty limit, over 60% of all hospitalizations currently covered by public insurance would be newly ineligible, affecting 412,000 children in 14 states.”

Data reveal a bigger problem
Researchers used data from the Agency for Healthcare Research and Quality’s State Inpatient Databases (SID), examining hospitalization costs from children aged younger than 18 years across 14 states whose healthcare costs were primarily paid through Medicaid and CHIP. The children included in the study represented 30.6% of American households: 43.1% lived below 300% of the federal poverty level; 27.2% lived below 200% of the federal poverty level; and 11.2% lived below 100% of the federal poverty level, according to the report. Six of the states studied already had set public insurance eligibility requirements at 300% of the federal poverty level.

As far as demographics, 38% of the publicly insured children studied were non-Hispanic white, 20.2% were African American, and 24.5% were Hispanic. Most of the children across all ethnicities lived in urban areas.

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1 National, more than 30 million children are covered by public health insurance programs. Public insurance programs are funded jointly between states and the federal government, and the federal share varies between 50% and 70% by state, according to the report. Any push to limit federal spending on healthcare may result in states tightening the belt on public insurance programs. Although this might save some upfront tax dollars, the study authors estimate that these newly ineligible healthcare expenses for these children would end up costing the families, commercial insurance (if families could afford coverage), or the healthcare system more than $4 billion per year.
Clinical Brief

Cuts at what cost?
The impact of increases in unreimbursed care is dependent upon families being able to afford commercial coverage, but at these levels, it may mean huge losses for hospitals, particularly safety-net hospitals that serve low-income patients and that already operate with narrow margins or at a loss, the authors point out.

“Reducing public insurance eligibility limits would have resulted in numerous pediatric hospitalizations not covered by public insurance, shifting costs to families, other insurers, or hospitals,” the authors write in the report. “Without adequately subsidized commercial insurance, this reflects a potentially substantial economic hardship for families and hospitals serving them.”

Medicaid now spends about $100 billion each year on healthcare services for children, according to the study. Without aid programs, families would have to be responsible for the costs that they might not be able to afford. Hospital systems would have to absorb the costs; or children would simply go without the care they need.

“Pediatricians acting as child health advocates at the local, state, or national level influence policy for all children,” Bettenhausen says. “All pediatricians have the experience and perspective to provide expert testimony on the importance of access to adequate healthcare for children.”

Pediatricians also should make referrals as necessary to patients and their families at risk of losing public insurance, pointing them in the direction of someone who can help the family navigate subsidized insurance options, she adds. Even subsidies may not help some families, however, and Bettenhausen says she hopes the study will highlight the consequences of severe cuts to public insurance programs for children.

“If families with children who are newly ineligible for public insurance are unable to obtain commercial insurance, they would be confronted with a very difficult decision—either choosing between forgoing necessary healthcare or jeopardizing the economic well-being of the family,” she says.

Bettenhausen says the study should be a call to action for both policymakers and pediatricians.

“We hope that this article encourages policymakers to consider the individual effects of health policy, and pediatricians to consider their role as a child health advocate on a broader scale,” she says. “As pediatricians, we understand that the provision of healthcare during childhood improves health across the life course, and investment in child health returns dividends over time. Though this study focuses on hospitalized children, access to high-quality outpatient care is equally important. Ensuring that all children have equal access should not be understated.”

Reference

MEET THE AUTHORS

Donna Hallas, PhD, CPNP, PNP-BC, PMHS, FAANP
Written for practicing pediatric nurse practitioners (PNPs) and family nurse practitioners (FNPs), and PNP and FNP students, Dr. Donna Hallas’ pediatric primary care text focuses on strategic, evidence-based measures to evaluate and treat behavioral health problems during each well-child visit across the pediatric life span.

Harlan R Gephart, MD
Most pediatricians believe they lack the ability to diagnose and treat mental health issues. In his new book, Dr. Gephart walks clinicians through the learning process for assessing and identifying behavioral health problems and empowers them to handle many of these conditions within their own practice.
Teenagers are often found facing a screen—whether it’s a phone, television, computer, or video game. Although digital media has some benefits, the extent to which children and adolescents rely on media is highlighted in a new report that studies common healthy—and unhealthy—behaviors in young persons today.

Data on digital media use and other health activity trends, such as nutritional choices and physical activity, among children and teenagers were unveiled earlier this year in the newest Youth Risk Behavior Survey (YRBS) from the Centers for Disease Control and Prevention (CDC). The survey identifies health-related behaviors and trends across 6 categories every 2 years to compile a national report assessing adolescent health risks.

The report monitors 6 categories of health-related behaviors among adolescents and young adults: behaviors that contribute to unintentional injuries and violence; tobacco use; alcohol and other drug use; sexual behaviors related to unintended pregnancy and sexually transmitted infections (STIs), including human immunodeficiency virus (HIV) infection; unhealthy dietary behaviors; and physical inactivity.

The entire report summarizes a total of 121 health-related behaviors of students across 39 states. Contemporary Pediatrics previously covered the report’s findings on alcohol and drug use, sexual behaviors, and other high-risk behaviors. This report will focus on dietary behaviors and physical activity trends.

**Physical inactivity**

According to the CDC, 43% of the students studied in the report played video or computer games, or used a computer for 3 or more hours each day—above the previously estimated 2 hours per day. The report points out that this usage increased from 22.1% to the current 43% between 2003 and 2017. This computer time happens on school days, but doesn’t necessarily involve the completion of school work, according to the report, and 15.4% of the teenagers studied were sedentary for at least an hour in the prior week that they were polled. The report adds that 14.8% of the teenagers polled were obese and 15.6% were overweight.

Adolescents also reported high rates of television use, with 20.7% watching 3 or more hours of television daily—although this rate was a decline from 42.8% in 1999.

The CDC reveals in a statement about the report findings that whereas physical activity is one of the most proactive things individuals can do for their health, children and teenagers are falling short in this category.

“American youth do not get the recommended amount of physical activity nor do they eat the recommended amounts of fruits and vegetables each day,” according to the CDC. “Regular physical activity can help children and adolescents improve cardiorespiratory fitness, build strong bones and muscles, control weight, reduce symptoms of anxiety and depression, and reduce the risk of developing health conditions such as heart disease, cancer, type 2 diabetes, high blood pressure, osteoporosis, and obesity,” the researchers write.

Some trends were promising, however, with nearly half—46.5%—of students reporting that they were active for at least an hour each day on 5 or more days during the week, and 26.1% of teenagers were active for at least an hour every day of the week. Additionally, 51.1% did strength or toning exercises at least 3 days each week, according to the report.

Physical activity (PE) classes in school offer some motivation as well, with 51.7% of students attending PE classes at least 1 day a week at school, and about a third of students attend-
ing PE classes daily. Participation on sporting teams also remains popular, with 54.3% of students playing on at least 1 sports team through school or another organization.

Failing nutrition
In addition to regular physical activity, the CDC also recommends that children and adolescents eat 1 to 2 cups of fresh fruit and 1 to 3 cups of fresh vegetables daily. The report found, however, that 5.6% of teenagers had not eaten fresh fruit or drunk 100% fruit juice in the week prior to the survey. Another 60.8% had fruit or fruit juice at least once per day; 31.3% had 2 or more servings of fruit or fruit juice daily; and 18.7% had 3 or more servings of fruit or fruit juice daily in the week before the survey.

Rates of vegetable consumption were similar, with 7.2% not eating any fresh vegetables in the week before the survey. About 60% of teenagers had at least 1 serving of vegetables per day; 26.6% had 2 or more servings per day; and 13.9% had 3 or more servings per day in the week before the survey.

Aside from fresh fruits and vegetables, the survey found that milk consumption also was low, with 26.7% of teenagers not consuming any milk in the week before the survey. About 31% consumed at least 1 glass of milk daily; 17.5% had at least 2 glasses per day; and 7.9% drank at least 3 glasses of milk daily. On the positive side, roughly a third—27.8%—did not consume soda or pop in the week before the survey; 18.7% drank soda at least once a day; 12.5% drank 2 or more servings per day; and 7.1% drank 3 or more servings per day.

Most students also avoided sports drinks, according to the report, with 47.7% of students avoiding all sports drinks in the week prior to the survey.

NUTRITION
Most American youth do not eat the recommended amounts of fruits and vegetables each day, says the CDC.

- 5.6% of teenagers had not eaten fresh fruit or drunk 100% fruit juice in the week prior to the survey.
- 7.2% did not eat any fresh vegetables in the week before the survey.
- 31% consumed at least 1 glass of milk daily.
- 27.8% did not consume soda or pop in the week before the survey.
- 14.1% of adolescents skip breakfast daily.

Water appeared to be the favored drink, with 51.3% of teenagers drinking 3 or more glasses or bottles of water daily. Almost 67% drank at least 2 servings of water daily; 75.4% drank at least 1 serving; and just 3.8% of teenagers reported not drinking any plain water at all in the week prior to the survey.

In terms of eating habits, the survey found that 14.1% of adolescents skip breakfast daily, whereas 35.3% eat breakfast every day, according to the report.

Other health issues addressed in the survey were the prevalence of certain conditions, such as asthma. The report notes that 22.5% of students had been told by a clinician that they had asthma, an increase from 18.9% in 2003.

The report also reviewed dental care, revealing that 1.5% of teenagers had never seen a dentist whereas 75.7% had been to a dentist in the year prior to the survey. Tanning bed use also was reviewed, with indoor tanning decreasing from 15.6% in 2009 to just 5.6% in 2017, according to the report. Still, exposure is a concern, with 57.2% of teenagers reporting 1 or more sunburns in the prior year whether from outdoor sun exposure or indoor tanning use.

Sleep was another concern addressed in the report. The CDC found that 25.4% of students got 8 or more hours of sleep on school nights, with levels of sleep decreasing as teenagers progressed through their high school years.

Kathleen Ethier, PhD, director of the Division of Adolescent and School Health for the CDC, says that overall this year’s report shows that adolescents are generally making better decisions about their health and the risks they take, but there is also more work to be done. Pediatricians are in a unique position to offer guidance on healthy food and activity choices, she says, as well as to offer education and support for preventive care. These efforts should be in conjunction with school and community programs, as well as family support, she says.

“Connectedness is key to protecting health of adolescents—to family, to peers, and to important adults in their schools and other community organizations, including their healthcare providers,” Ethier says. “Students are more likely to thrive if they know they matter—that they have adults, teachers, and friends who care about their safety and success—and these protections last into adulthood.”

For references, go to ContemporaryPediatrics.com/CDC-teen-risk-survey
How to limit your risk of legal liability

Pediatricians deal daily with parent and patient refusals of recommended care. Here’s how to protect yourself and your practice from legal repercussions.

Lisette Hilton

Pediatrician James Scibilia, MD, FAAP, says he thinks most about the issue of professional liability when patients or their families refuse recommended vaccines.

Among the burning questions, says Scibilia, who presented “Provider, protect yourself! Limiting your risk in the face of nonadherence or refusal (F2010)” during the September 2017 American Academy of Pediatrics (AAP) National Conference, is this: Might parents say they don’t want to vaccinate their kids but later claim they weren’t fully informed? Or, when parents refuse vaccines and their children get sick, are pediatricians responsible for the potential risk to others of having unvaccinated children in the office? Finally, what does refusal say about the doctor-patient-family relationship? Should pediatricians continue to see those patients or sever the relationships?

Hot-button topic

The authors of a study called routine childhood immunization refusal among the most divisive issues in pediatrics today, and it’s an issue most pediatricians are increasingly encountering. In a 2013 survey of more than 850 pediatricians published a few years ago in Pediatrics, more than 87% of respondents experienced parental requests to delay at least 1 age-appropriate immunization. That was up from 74.5% in 2006.

Those same pediatricians estimated an average 18.7% of patients requested to delay 1 or more vaccines.

What pediatricians need to know

Many pediatricians think if they don’t immunize a patient and the patient gets sick, the family will sue the pediatrician.

That does happen, according to Scibilia. “There are cases in California where physicians did not immunize a patient because a parent refused; then a claim was made by the parents that, if they had known that this illness could have killed their child, they would have received the vaccine. The [parents] won those cases,” he says.

Documentation can help to shield a pediatric practice from liability from vaccine refusers, Scibilia says. “Pediatricians need to make sure to document that patients have been informed about the risks of not getting vaccinated,” he cautions.

The AAP offers a comprehensive and free refusal-to-vaccinate form that pediatricians can use. It lists the vaccines that patients don’t want and the associated risks, Scibilia says.

It’s important to have patients fill out and sign that form or something like it in the pediatrician’s office, he notes. That way, they acknowledge potential risks of their decision. Pediatricians should keep the signed form with the patient’s records, he says.

Another important way in which pediatricians can legally protect themselves and their practices is to have a mechanism in place for identifying patients who are not immu-
Flagging those patients allows pediatrician practices to see unimmunized children more quickly when they’re sick, as well as take steps to avoid contact among those children and immunized patients and families.

Scibilia says he knows of no litigation with the premise that an unimmunized child in a pediatric practice infected others. However, it makes sense, he points out, that there’s liability risk for the pediatrician if he or she doesn’t act quickly to treat a sick, unimmunized child.

"An unimmunized patient that calls you with a fever may need to be seen a lot more quickly than a fully immunized kid with a fever," Scibilia says. "I think the risk for the pediatrician isn’t so much on the side of being sued because he didn’t give the vaccine; it’s more not appropriately identifying people who are undervaccinated in their offices and addressing the issue appropriately with them when they’re sick.”

Pediatricians with electronic health records can add alerts that indicate if a patient is unimmunized or underimmunized. Practices using paper charts should use sticky notes or something that is highly visible for letting the staff and doctor know a child isn’t fully immunized or immunized at all.

Interestingly, not having children vaccinated can work against parents in a court of law. There have been cases in which vaccine refusal was the reason for parental neglect under child welfare laws, according to 1 study. Some states have a legal precedent for considering parental vaccine refusal as medical neglect, but [the AAP] also acknowledges in its position paper that if you really feel this is interfering with the trust that you have with your patients—if you feel you have a circumstance where you’re recommending something that’s really super important for patients’ health and they’re choosing not to participate—you can sever that relationship," Scibilia says.

Pediatricians need to go about severing relationships with patients in the correct way to avoid liability, according to Scibilia.

"You can’t just tell somebody I’m not going to see you’ and walk away," he says. "Most states have requirements where you have to see the patient for a certain period of time [for emergencies] after you ask them to leave the practice. Some insurance carriers have different time frames, when they require you to see their members [for emergencies] after you’ve severed the relationships," Scibilia says.

Pediatricians severing relationships should use the longest amount of time mandated by their states or contracts to be on the safe side. In addition, ending a doctor-patient relationship needs to be done in writing. The correspondence should document that the pediatrician has severed the relationship and will provide emergency care for the amount of time required by the state or contract. If pediatricians don’t follow through and care for the sick child, parents or others can make an abandonment claim against the doctor.

### The bigger care-refusal picture

Scibilia says he thinks the concept of patients who refuse care is “informed refusal.”

"We do informed consent all the time. Informed refusal offers the same things informed consent does. You have to identify what it is that
you’re recommending. You have to explain to the parent or the patient what the benefit and risk is of not doing that procedure. You have to make sure that you’ve documented that the patient understands that there could be a bad outcome with their refusing. Then, have them sign off on that, like you would informed consent for surgery or anything else,” he says.

Many states, Scibilia says, allow informed refusal as a legal document in a court proceeding. Still others might allow it to be presented in court as a signed document and proof that the parents understood their decisions.

Medication refusal is a different issue and is something pediatricians often encounter. “Patients who have chronic illnesses or patients with mental health problems are especially susceptible to refusing medications,” Scibilia says. Pediatricians, however, have to deal with the issue differently than physicians who see adults because of the proxy issue.

“We get permission for care through proxies. If you don’t have a proxy, you can’t really do anything with the patient unless it’s a life-threatening situation,” Scibilia says. If parents refuse a treatment that the pediatrician feels strongly is in the child’s best interest, the pediatrician can take up the case with parents in court.

“Usually, in those kinds of cases, the only time that you can really go to court for a case where a parent refuses medication or treatment is in a circumstance where [all the medical professionals involved] agree that the treatment is beneficial, and that the parent’s refusal creates a risk to the patient’s life or ability to function,” he says.

Pediatricians deal with parent and patient refusals of recommended care sometimes daily, Scibilia says. “It’s such a common scenario that I think it’s important that we recognize there are risks to that,” he says. “How to protect ourselves from that risk is by informing patients and by making sure we understand what our obligations are to our patients as opposed to the parents.”

Ms Hilton, is a medical writer who has covered health and medicine for more than 25 years. She resides in Boca Raton, Florida. 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.

For references, go to ContemporaryPediatrics.com/limit-legal-liability

Kisses for Conor

and I used to say we knew he was going to do amazing things. It is so heartbreaking that we will never see him play sports, fall in love, get married, have children, and reach many other milestones, but we know that he can still make a difference in his death.

In memory of his tremendous capacity for love and affinity for blowing kisses, we have been spreading acts of kindness—our “Kisses for Conor” campaign. I was recently named to the Board of Directors of the SUDC Foundation with a commitment to increase medical awareness of SUDC. Currently, the majority of advocacy efforts and funding for the SUDC Foundation comes from affected families. Although it is incredibly inspiring that so many families are turning their tragedies into hope with education and working toward a deeper understanding of SUDC, I believe it is time for the medical community to take a more active role in these efforts.

We cannot ignore the fact that 400 healthy children die every year without any known medical reason, and to date there has been no targeted federal funding to investigate this. My hope is that this article will raise awareness of SUDC, foster future research and collaborations across disciplines, and impel physicians to think ahead about the tools needed to provide adequate support to grieving parents.

To learn more about Conor Bowen and his life and legacy, visit www.kissesforconor.com

Dr Bowen is a pediatrician at Children’s Medical Associates, Ansonia, Connecticut, and a member of the American Academy of Pediatrics (AAP) Section on Child Death Review and Prevention. She currently serves on the Board of Directors of the Sudden Unexplained Death in Childhood (SUDC) Foundation, Cedar Grove, New Jersey.

REFERENCE

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with CU. Although CU is not considered to be a manifestation of IgE-mediated food allergy, 7% of CU patients have a confirmed food allergy.

**Spontaneous remission occurs in 39% and 50% of children with CU at ages 3 and 5 years, respectively.**

The prevalence of CU is estimated to be 1.8%. One study reports that 18% of children who present to the emergency department (ED) with urticaria are diagnosed with CU. Although CU is not life threatening, the condition is distressing for patients and frequently impairs their quality of life.

**Clinical findings**

Urticarial lesions present as erythematous plaques that may be annular, round, and serpiginous with variable size. Although CU is defined by the presence of lesions for longer than 6 weeks, individual lesions are transient and resolve within 24 hours with no residual discoloration. Angioedema may coexist with urticarial lesions. Whereas systemic symptoms such as fever, joint pain, and headache are often present in adult patients, no clinical studies have examined the prevalence of these symptoms in childhood CU.

**Diagnosis**

Clinical history and physical exam are essential for the diagnosis of CU. Laboratory tests are rarely abnormal in children with CU. However, a limited set of tests may be needed to rule out other underlying systemic diseases that may present with similar cutaneous findings. These include complete blood count with differential, erythrocyte sedimentation rate, C-reactive protein, and liver function tests. Antinuclear antibody, thyroid function tests, and complement also may be considered if an autoimmune condition is suspected.

**Management**

The cornerstone of therapy involves avoidance of exacerbating triggers, if they are identified. A symptom diary can be helpful for documenting possible factors that may precipitate urticaria. A stepwise approach is used for medical management of CU in adults involving antihistamines followed by immunomodulatory therapy in refractory cases. It appears that a similar management approach may be appropriate for children, although there are few clinical studies that focus on pediatric CU.

In both pediatric and adult patients, the mainstay of pharmacologic management involves the use of selective (nonsedating) H1 antihistamines. Desloratadine has been shown to be safe and effective for the treatment of CU in children aged older than 2 years in randomized control trials. Cetirizine and levocetirizine also have been found to effectively decrease the recurrence of urticaria in infants. Nonselective (classical) H1 antihistamines should be avoided in children because of significant anticholinergic adverse effects (such as disruption of sleep cycle). Cyclosporine has been shown to be effective in some children with CU, and the Royal College of Pediatrics and Child Health currently recommends cyclosporine as a second-line treatment for childhood CU. Although omalizumab has shown promising results for the management of refractory CU in adults and children aged older than 12 years, its use in younger pediatric patients is currently limited and requires further investigation.

Other immunomodulating therapy may be considered on a case-by-case basis. The role of dietary modification for the treatment of CU is controversial and is not currently recommended.

**Patient outcome**

The patient was treated symptomatically with cetirizine. At his 4-week follow-up visit, urticarial lesions had regressed. After 1 year, his symptoms had resolved.

Approximately 17% of children with CU have similar outcomes and can achieve remission within 1 year. Spontaneous remission occurs in 39% and 50% of children with CU at ages 3 and 5 years, respectively.

Ms Wu is a fourth-year medical student, Baylor College of Medicine, Houston, Texas. Dr Cohen, section editor for Dermcase, is professor of Pediatrics and of Dermatology, 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 an 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.
Persistent pruritic rash in an 8-year-old boy

JULIE H WU, BA, MS4; BERNARD A COHEN, MD

An 8-year-old boy is brought to the office for evaluation of a persistent itchy rash on his extremities, trunk, and face. Although the rash has been present for longer than 3 months, individual skin lesions change from hour to hour and occasionally the rash clears completely only to recur several hours later. He is otherwise healthy with no known allergies, changes in diet, medication use, or recent illness.

Background
Urticaria or hives is a common skin condition characterized by development of raised wheals or welts, with or without angioedema. Urticaria is classified based on duration and is considered to be chronic when lesions are present for longer than 6 weeks.¹ Chronic urticaria (CU) is further subclassified into spontaneous or inducible CU. The majority of CU is spontaneous, in which no specific cause can be identified (50% to 80% of cases). For inducible CU in children, the most frequent triggers include physical stimuli (eg, cold urticarial, exercise-induced urticaria, nonsteroidal anti-inflammatory drugs, and antibiotics).¹ Viral infectious also have been shown to exacerbate symptoms of CU.²

The pathogenesis of CU has not been definitively established, although multiple lines of evidence suggest that an autoimmune component is implicated. Some patients with CU are positive for an immunoglobulin (Ig) G autoantibody directed against the IgE receptor, which leads to mast cell activation and degranulation. Other autoimmune conditions, such as rheumatoid arthritis, lupus erythematosus, thyroid disease, and dermatomyositis, are also associated

For more on this case, turn to page 35.
To test or not to test

Many times, testing seems to be the easiest way to answer a clinical question, but judicious use of tests is the best approach. Here are some guidelines I have followed over the years.

1. If you want to find out if a patient has constipation, and how much, an abdominal film is rarely needed. The 3 P’s are more useful: percussion, palpation, and poking (in the rectum, with an index finger). This last is not as uncomfortable for the patient (or the doctor) as one would think.

2. If parents insist on a test because their child is short, and you do not suspect an endocrine problem, a bone age test is best. It can also help with predicting adult height.

3. Along those lines, normal linear growth usually will rule out an adrenal or thyroid problem.

4. Don’t trust an incidental reading of sinusitis on a computed tomography (CT or CAT) scan. This is almost a universal finding.

5. Finding white cells in an otherwise benign urine on a child who does not have a bladder infection based on history rarely indicates infection. You can culture, but do not start treatment.

6. Amino acid screens seem to almost always have positive findings. They are usually unimportant unless they are orders of magnitude outside the normal range.

7. The antinuclear antibody (ANA) test is not a good screening test.

8. Sometimes you have to get blood work to please parents and reduce their worries. Do the minimum in these cases. For the tired child, this means a hemoglobin rather than a complete blood count (CBC), and a thyroid stimulating hormone (TSH) test rather than a full thyroid panel. For viral sore throats, do a rapid strep test without a culture. If the parents are concerned about diabetes and you are not, a blood glucose (or better yet, urine) test, rather than a comprehensive metabolic panel, should suffice. The less you do, the less likely you are to get false positives.

9. Bayes theorem is the most important mathematical concept you need to know to interpret tests. Basically, it says that if, based on your history and examination prior to getting back results, a diagnosis is very unlikely/likely, then a positive/negative result is probably inaccurate. Unless a test is almost foolproof, do not expect it to be helpful unless you are uncertain as to what may be going on prior to ordering it.

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