Contemporary PEDIATRICS®

YOUR HAIKU ON MOC

OCTOBER 2015
VOL. 32 | NO. 10

Expert Clinical Advice for Today's Pediatrician

ContemporaryPediatrics.com

DERMATOLOGY ISSUE

IS IT CHILD ABUSE?

Skin cues and clues

+ *S. AUREUS* INFECTIONS IN AD | PEDIATRIC MELANOMA | HYPERHIDROSIS & QOL

UBM

BY MARIAN FREEDMAN | COMMENTARY BY MICHAEL G BURKE, MD | f CONTEMPORARYPEDIATRICS

4 behavior targets help prevent obesity

A 3- to 5-minute intervention delivered during routine pediatric visits and targeting 4 behaviors related to obesity—milk consumption, juice and sugar-sweetened beverage consumption, television/screen time, and physical activity—decreased the rate at which body mass index (BMI) percentile increased in young children in a recent trial. Participants, who received care at an urban medical center, were low-income Hispanic or African American mother-child pairs. The children were aged 2 to 4 years and included those who were normal weight, overweight, and obese.

Investigators compared 200 caregiver-child dyads who participated in the study with 218 age- and sex-matched historic controls, observing BMI changes in the 2 groups over 12-month periods. For the intervention group, physicians and nurses provided a 12-question survey about the 4 behaviors as well as counseling (using a "motivational interviewing" framework) about desirable changes, culminating in a contract that stated the mother's goal to change a single agreed-upon behavior at each encounter. Practitioners also provided educational materials for implementing the behavior change, a self-monitoring calendar to track progress, and a "toolkit" that included such items as a measuring cup and pedometer. In the study group, investigators followed up each clinic visit and "dose" of counseling—each participant had a total of 2 or 3 during the year long study period—with a phone call to provide support. The control group received usual care, including height and weight measurements, calculation of BMI, and any counseling the clinician deemed appropriate.

After 12 months, BMI percentile had decreased by 0.33 percentile in the intervention group, compared with a mean increase of 8.75 percentile in the control group. For participants of normal weight, the intervention had a particularly significant effect, with mean BMI percentile in normal-weight controls increasing from 47.6 to 61.3 between baseline and 12 months while remaining unchanged in similar individuals in the intervention group (Cloutier MM, et al. *J Pediatr.* 2015;167[2]:372-377).

commentary

This study's weakness is that it compares the study group with historic controls. This sequential design might attribute BMI changes to the interventions when, in fact, societal or other changes may have been at play. The strength of the study design, however, is the practical, achievable scope of the program. The 3- to 5-minute motivational interview with goal setting might realistically be incorporated into the routine of a busy office practice.

Moms often get inadequate advice

A nationally representative survey of more than 1000 mothers of infants aged 2 to 6 months showed that mothers report receiving little or inappropriate advice—even from physicians—about 5 key infant care practices: immunization, breastfeeding, sleep position, sleep location, and pacifier use. A written survey, which mothers generally completed when their infants were between 60 and 180 days old, assessed how much advice participants received about the 5 targeted infant care practices and whether that advice was consistent with recommendations of the American Academy of Pediatrics (AAP). The survey also addressed variations in the quality and quantity of advice mothers received from 4 sources: doctors, nurses at the hospital at which the infant was born, family, and the media. Doctors were the most common source of advice though roughly 20% of mothers reported receiving no advice from

doctors about breastfeeding and sleep position, and more than 50% said they got no advice from their doctors about sleep location or pacifier use. Also, mothers reported that as much as 10% to 15% of physician-provided advice was not consistent with AAP recommendations for breastfeeding and pacifier use, and more than 25% was inconsistent with recommendations for sleep position or location. Doctors were most likely (89%) to offer guidance about vaccinations and that advice almost always was accurate. Participants reported that advice from nurses was generally similar to that from doctors.

The prevalence at which advice was received from family or the media was 20% to 56% for most care practices and was often inconsistent with recommendations (Eisenberg SR, et al. *Pediatrics.* 2015;136[2]:e315-e322).

commentary

So, this could mean that we aren't giving advice or, per the paper, "perceived receipt of advice is not the same as actual advice given." New mothers deal with so much, it is a wonder that many even remember the doctor, much less advice. That's why it needs to be promulgated by more than just primary care providers. Parents and families need to know what is recommended before the baby arrives. This requires an alliance of physicians, nurses, public health officials, and media to change community beliefs on infant care. For more on this, see editorial by Drs. Krugman and Cumpsty-Fowler (*Pediatrics.* 2015;136[2]:e490-e491).

Sudden neonatal death, drugs linked

Of 32 neonates who died suddenly at a hospital in the United Kingdom and whose deaths remained unexplained after a thorough postmortem, 12 (37.5%) were born to mothers with a history of drug addiction during pregnancy. A retrospective review of postmortem examinations in 138 babies who died before the age of 28 days during an 8-year period revealed this unexpectedly large proportion of sudden deaths associated with maternal drug use. In addition, all 12 of the infants with a maternal drug history who died at a mean age of 11 days were exposed to multiple risk factors for sudden infant death syndrome. Specifically, 10 mothers smoked, some heavily; 8 of the infants were placed in an unsafe sleeping environment, such as a shared sleep surface with the mother or on a bed, sofa, or mattress on the floor; and 10 infants were born prematurely. (Cohen MC, et al. *Acta Paediatr.* 2015;104[9]:883-887).

commentary

Deaths described here are earlier than most Sudden Infant Death Syndrome (SIDS) deaths, suggesting that something different is going on in the brains, hearts, lungs, or homes of these children. Perhaps it is the direct or indirect effect of maternal drugs either *in utero* or after birth. Or perhaps drug use decreases maternal and family member recall and implementation of recommended behaviors to prevent SIDS. If mothers described in the preceding abstract often reported not hearing advice from doctors, nurses, and family members, imagine how much less likely an addicted parent would be to remember it—even if it was delivered. We may not be able to address the differences that might be causing early and frequent SIDS in these children, but we can focus on minimizing risk by vigorously addressing modifiable factors. Perhaps a series visits to check conditions and practices in the home and to reinforce parents' understanding would be a justifiable use of healthcare resources.

also of note

Where teens hang out affects how likely they are to engage in risky behavior. By using GPS-enabled smartphones to track 16- to 17-year-olds and checking their behavior via text messages, investigators confirmed that adolescents are far more likely to drink alcohol when their activities center around commercial areas where alcoholic drinks are available than when they confine their activities to residential areas. Similarly, marijuana use is related to spending time in areas of low socioeconomic status (Byrnes HF, et al. *J Adolesc Health.* 2015;57[2]:245-247).

Cutaneous clues of child abuse

LISETTE HILTON
REVIEWED BY BERNARD A COHEN, MD

Ms Hilton is a medical writer who has covered health and medicine for 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.

Normal active children have their share of bumps and bruises. However when should cutaneous injuries alert pediatricians to abuse—and when are they signs of skin disorders unrelated to mistreatment?

A skin manifestation can be a pediatrician's first clue that a patient is being abused. Up to 90% of physical abuse victims present with cutaneous findings, such as bruises, lacerations, abrasions, burns, oral trauma, bite marks, and traumatic alopecia.[1,2]

Yet, there is good evidence that minor signs of child physical abuse are missed regularly by unsuspecting physicians, according to Cindy Christian, MD, chair of Child Abuse and Neglect Prevention, The Children's Hospital of Philadelphia.

"This is especially true in young infants, who may present with minor bruising or other skin injuries. These infants are at significant risk for further, more serious injury," Dr Christian said.[3] "Most physicians are aware that patterned injuries and multiple injuries are concerning for physical abuse, but may not consider a minor injury in a young infant as an indicator of abuse."

1 IN 58
US CHILDREN EXPERIENCED MALTREATMENT DURING 2005-2006
—NIS-04 Report; DHSS

Prevalence, urgency

Child abuse is one of the leading causes of death related to injury in infants and children.[4] An estimated 1520 children died from abuse or neglect in 2013.[5]

Physical abuse should be part of the differential diagnosis for all cutaneous and other injuries in children.[6] Pediatricians are in unique position to identify and prevent child abuse.[7]

The earlier the abuse is detected and stopped, the better. An abused child has about a 50% chance of being abused again, and is at an increased

mortality risk if the abuse is not detected and stopped after the first presentation.[4,8]

One of the challenges for pediatricians and others who suspect abuse based on cutaneous findings is that several skin disorders may mimic child abuse. Among the numerous categories of findings that can mimic cutaneous signs of abuse are common dermatologic findings, according to Dr Christian. Abuse mimickers include: Mongolian spots, also known as congenital dermal melanosis; coagulopathies; skin infections such as impetigo, cellulitis, and scalded skin syndrome; and a form of vasculitis called Henoch-Schonlein purpura.[9]

"In addition, ex-lax [sennosides, Novartis] ingestion can lead to severe buttocks burns in toddlers, so there are many mimics that have been described," Dr Christian said.

Pediatricians can avoid diagnostic errors in problematic cases by consulting with forensic pediatrics, pediatric dermatology, pediatric radiology, and others.[10]

One should realize that only 8% of the 90% of skin abnormalities due to child abuse are pathognomonic, according to Arnold Oranje, MD, PhD, professor emeritus in pediatric dermatology at the Erasmus Medical Center Rotterdam, the Netherlands, who directed the focus section at this year's American Academy of Dermatology annual meeting on skin abnormalities in the differential diagnosis of child abuse. Therefore, the diagnosis of child abuse should be evaluated by a multidisciplinary team of expert specialists, he said.

Cindy Christian, MD

Arnold Oranje, MD, PhD

▲ **7-year-old girl with discoid lupus. Could be mistaken for burns or abuse.**

PHOTO COURTESY: TOR SHWAYDER, MD, FAAP

Cutaneous clues: bruising

Bruising is the most common cutaneous manifestation of abuse, but abused children also can have burns, scars, lacerations, and abrasions from inflicted injury, according to Dr Christian.

Researchers found that bruising characteristics predictive of abuse were bruising located on the torso, ear, or neck for a child up to age 4 years, and bruising in any region for an infant younger than age 4 months.[11]

Bruises occurring on the knees, elbows, and forehead tend to be normal, but bruises on other areas should prompt questioning. These include bruising on uncommon areas that are away from bone, multiple bruises in clusters, and certain patterns (like a whip mark). Abusive bruising patterns include hand prints or grab marks, and bruises that mimic such things as belt buckles, hangers, hair brushes, paddles, spoons, and forks, according to Tor Shwayder, MD, the director of pediatric dermatology at Henry Ford Hospital, Detroit, Michigan.

Careful pattern analysis is necessary, according to Dr Oranje.

"Imagine you're grabbing a young child. The thumb would be

▲ 4 -year-old girl with herpes and impetigo on the nose.

on the front of the arm, and your forefingers would be on the back of the arm," Dr Shwayder said. "Lip cuts or lip bruises, where someone is forcing the bottle into the mouth and telling the kid to shut up and stop crying, is another cause for concern."

Other bruises that should alert include bruises around the eyes or on the jaw's tip.

"You rarely [bruise the eye] when you fall because it's protected by the bone," Dr Shwayder said. "And it's pretty rare to land right on the jaw."

Pediatricians can differentiate bite marks by other children (in a daycare center, for example) from adult bite marks by looking at the distance to the canines (the third tooth to the right or left).

"The distance to the canines is more than 3 cm in an adult and less than 3 cm in a child," Dr Shwayder said. "Animal bites are different than human bites. Animal bites tend to tear and they have elongated mouth."

Cutaneous clues: burns

Burns comprise about 5% to 22% of physical abuse, and burn abuse seems more common in children aged younger than 3 years.[2]

Clues that a burn might be related to abuse include:

- if the burn is older than the history would suggest;
- burns that exist with other injuries, like bruises or fractures;
- burns that are just a little too symmetrical—like those from cigarettes; and burns located in areas that are unlikely, such as the buttocks.

50%

CHANCE ABUSED CHILDREN HAVE OF BEING ABUSED AGAIN

"If, for example, you take a kid and force him into a hot bath, the child will clench his buttocks cheeks together, sparing the inner part and burning the outer part," Dr Shwayder said.

Burns to the back of the head or the neck are unlikely, unless these are from child abuse. Additionally, burns in patterns, such as that from the bottom of an iron, can be signals of abuse.

"Burn abuse would include scalds, but you have to be careful because sometimes kids do pull things off a stove. I would say if something has been thrown at the child or the child has been immersed in hot liquid, that would look different than if a cup or pot of hot coffee falls on the child," Dr Shwayder said.

Hair symptoms and signs

It's one thing to lose hair because of ringworm, traction alopecia, telogen effluvium, or alopecia areata. It's another to have hair yanked out.

"If someone had their hair dragged and yanked out, or if they've been grabbed by the hair and dragged, you will see usually hematomas or hemorrhages develop in the area. And it might be tender and an irregular area of localized hair loss," Dr Shwayder said.

Oral clues: oral injuries

Among the most likely signs of oral abuse are injuries to the outside of the lip. That might be from a bottle being forced into a baby's mouth or from forced oral sex. Pediatricians should look for unexplained erythema in the palate, especially in the back of the palate, according to Dr Shwayder.

Genital area clues: sexual abuse

Sexual abuse manifests in many ways, beyond what's apparent on the skin. Conversely, normal skin findings—especially in the gentital area—do not exclude child abuse. Pediatricians who suspect sexual abuse should inquire about a family's

PHOTO COURTESY: TOR SHWAYDER, MD, FAAP

history of encounters with police, as well as a child's abdominal pain, bed wetting, or refusal to go to the bathroom at all. Sometimes, sexually abused children display inappropriate sexual behavior, sexual play, masturbation—things far beyond their years. They might have inappropriate sexual knowledge for their age or sexually aggressive behavior, according to Dr Shwayder.

Pediatricians who suspect sexual abuse should conduct a thorough exam of the child's genitalia, looking for bruising, lacerations, and abrasions, according to Dr Shwayder.

Some signs of potential sexual abuse are controversial. With as prevalent as it is in society, genital herpes in a child's diaper area might be innocent, Dr Shwayder said. The same goes for condylomata acuminata, according to Dr Oranje.

Dr Oranje said there are several skin manifestations that can confuse physicians. Real skin findings may result from skin disorders not related to abuse.

▲ **4-month-old with a lip hemangioma. Could be mistaken for abuse.**

▲ **21-week-old boy with "Non-Herlitz Epidermolysis Bullosa" showing his blistered foot. Could be mistaken for an immersion burn.**

"Traumatic petechiae misdiagnosed as purpura and lichen sclerosus [are] often misdiagnosed as sexual abuse. Perianal mollusca contagiosa usually have nothing to do with sexual child abuse, while condylomata acuminata sometimes does," Dr Oranje said.

Taking action

Pediatricians are among the frontline physicians in a position to identify abuse in their patients. Among their other roles in the protection of abused children, pediatricians report suspected abuse to the child protection agency for investigation; support families who are affected by child abuse; coordinate with multidisciplinary teams of other professionals and community agencies to provide immediate and long-term treatment to victimized children; provide court testimony when needed; provide preventive care and anticipatory guidance in the office; and advocate for policies and programs that support families and protect vulnerable children.[7]

It is not necessarily the actual injury alone, but the age of the patient, the history provided by the parent, and the presence of other findings that should serve to alert the physician to abuse, according to Dr Christian.

"...it is important to take a careful, complete history, and to consider the age and developmental ability of the child. Most bruises, burns, and other skin markings on children are not the result of abuse, but these findings can often be an important clue to the diagnosis of abuse—especially, in young infants, who should not have bruises, etc., before they are ambulatory," Dr Christian said.

Physicians should take a proper history, according to Kipling's principle of the 5 Ws—what, when, where, who, and why. They should try to compose a 100% certain diagnosis, sometimes also based on

PHOTOS COURTESY: TOR SHWAYDER, MD, FAAP

histopathologic findings, according to Dr Oranje.

"The nonverbal attitude of the child also gives much information. Two examples of nonverbal signs are frozen watchfulness and ostrich behavior [where the child seems to be burying his or her head in the sand]," Dr Oranje said.

In suspected child abuse cases, pediatricians should consider recommending a skeletal survey to x-ray the child from head to toe, according to Dr Shwayder.

"When the history or physical examination reveals suspicious injuries, and the pediatrician has a reasonable suspicion that a child has been abused, a report to [a Child Protective Service agency] for further investigation is mandated by law," according to a recent article in *Pediatrics*.[7]

Pediatricians should know how to get in touch and work with local child abuse and neglect teams located at children's hospitals and in some counties, according to Dr Shwayder.

Pediatricians don't always need parental consent to evaluate children for potential abuse. Many states have laws permitting physicians to evaluate children who are suspected victims of abuse, to conduct tests, and to take photographs of children's injuries without parental consent.[7]

Even when families might abandon pediatricians who report suspected child abuse, it is important that those pediatricians do not abandon these families. Pediatricians can be of great assistance to children, nonoffending parents, and family members during such times of crisis. They can

QUESTIONS & CLUES

Tor Shwayder, MD, offers these questions to ask to help determine whether a child's cutaneous signs are the result of child abuse. Dr Shwayder is triple boarded in pediatrics, dermatology, and pediatric dermatology and is the director of pediatric dermatology at Henry Ford Hospital, Detroit, Michigan. He was a speaker this year on the American Academy of Dermatology's section on child abuse.

Does the history match the skin disease? "A child runs into a pole. Sudden impact with a stationary object causes a linear bruise on his forehead. This makes sense. However if he has fingerprints imprinted on either side of the back of his arms, where someone might have grabbed and shaken the child, that doesn't make sense," Dr Shwayder said.

Do family members or caregivers give conflicting accounts of what happened?

Could the injury have occurred based on the child's developmental and activity levels?

Was there a delay in seeking care for anything other than a minor injury? "Usually, parents will be pretty prompt about bringing a child in for a burn or a laceration that causes bleeding [that isn't caused by abuse]," Dr Shwayder said.

Is the child taking a medication that could make bruising more likely? Or, for example, does the child have hemophilia, which might help explain bruising?

Has the child been to the emergency department repeatedly for cuts, burns, broken bones?

Does the pattern of the injury fit something that would be considered abusive?

Is the family intact or disorganized? Is there violence among family members? Is there substance abuse? Mental illness affecting the parents or kids? Is there poverty or unemployment? These are all stressors associated with elevated risk of abuse, explains Dr Shwayder.

Other stressors that can lead to abuse: **Are the parents or caregivers young? Does the child cry a lot? Is the child toilet training (unsuccessfully)? Does the child have a birth defect or mental or physical illness?**

Another sign that should set off an alarm about potential child abuse **Are there severe injuries to the brain, eyes, bones, organs?**

▲ 4-month-old child with "Hay Wells Syndrome" a very rare disorder of skin formation. Could be mistaken for burns.

help interpret children's injuries for Child Protective Service agencies and law enforcement investigators. Pediatricians might also be required to testify in trial proceedings.[12]

In addition to detecting child abuse affecting individual patients, pediatricians can help to prevent abuse by advocating for funding and the implementation of evidence-based prevention programs in their communities, states, and at the national level.[7] ■

▲ 26-week-old baby boy with JEB (juntional epidermolysis bullosa) who died two weeks after this photo was taken. Could be mistaken for burns.

PHOTOS: TOR SHWAYDER, MD, FAAP

Ms Hilton is a medical writer who has covered health and medicine for 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.

REFERENCES

1. Stephenson T. Bruising in children. *Curr Paediatr.* 1995;5:225-229.

2. Kos L, Shwayder T. Cutaneous manifestations of child abuse. *Pediatr Dermatol.* 2006;23(4):311-320.

3. Sheets LK, Leach ME, Koszewski IJ, et al. Sentinel injuries in infants evaluated for child physical abuse. *Pediatrics.* 2013;131(4):701-707.

4. McDonald KC. Child abuse: approach and management. *Am Fam Physician.* 2007;75(2):221-228.

5. Children's Bureau. Administration for Children and Families. Child Maltreatment 2013. January 15, 2015. http://www.acf.hhs.gov/programs/cb/resource/child-maltreatment-2013. Accessed August 5, 2015,

6. Committee on Child Abuse and Neglect, American Academy of Pediatrics. When inflicted skin injuries constitute child abuse. *Pediatrics.* 2002;110(3):644-645.

7. Christian CW; Committee on Child Abuse and Neglect, American Academy of Pediatrics. The evaluation of suspected child physical abuse. *Pediatrics.* 2015;135(5):e1337-e1354.

8. Rosenberg LA. Effects of maltreatment on the child. In: Wissow LS, ed. *Child Advocacy for the Clinician: An Approach to Child Abuse and Neglect.* Baltimore, MD: Williams & Wilkins, 1990:12.

9. Anderst JD, Carpenter SL, Abshire TC; Section on Hematology/Oncology and Committee on Child Abuse and Neglect of the American Academy of Pediatrics. Evaluation for bleeding disorders in suspected child abuse. *Pediatrics.* 2013;131(4):e1314-e1322.

LEARN MORE

Bilo RAC, Oranje AP, Shwayder T, Hobbs CJ. *Cutaneous Manifestations of Child Abuse and Their Differential Diagnosis: Blunt Force Trauma.* New York: Springer, 2013.

Brogdon BG, Shwayder T, Elifritz J. *Child Abuse and Its Mimics in Skin and Bone.* Boca Raton, FL: CRC Press, 2012.

Staphylococcus aureus infections in atopic dermatitis

EMILY OSIER, MD CATALINA MATIZ, MD FRED GHALI, MD LAWRENCE EICHENFIELD, MD

Dr Osier is a clinical research fellow at University of California, San Diego, and Rady Children's Hospital San Diego, Division of Pediatric and Adolescent Dermatology.

Dr Matiz is a clinical assistant professor at University of California, San Diego, and Rady Children's Hospital San Diego, Division of Pediatric and Adolescent Dermatology.

Dr Ghali is a clinical assistant professor at University of Texas Southwestern and Baylor Medical Center, Department of Dermatology, Dallas, TX.

Dr Eichenfield is a clinical professor at University of California, San Diego, and Rady Children's Hospital San Diego, Division of Pediatric and Adolescent Dermatology.

None of the authors have anything to disclose in regard to affiliations with or financial interests in any organizations that may have an interest in any part of this article.

In some cases of atopic dermatitis, *S aureus* contributes to the underlying inflammation so characteristic of this complex, chronic condition. Patients with AD can benefit from various containment strategies that aim to decrease *S aureus* colonization.

Staphylococcus aureus plays an important role in the pathogenesis and course of atopic dermatitis. Compared to the normal pediatric population, atopic patients are especially susceptible to colonization and recurrent infections of *S aureus*. This article summarizes the role *S aureus* plays in atopic dermatitis. Additionally, we review the approaches of decolonization in the context of "containment" strategies, given that true decolonization of this virulent bacteria remains challenging.

FAST FACT
Pediatric AD has increased 2- to 3-fold since the 1970s.
—*JAAD. 43:2000;649-655.*

S aureus causes the majority of bacterial skin infections, including some historically caused by streptococcal species. Bacterial skin infections can be classified as primary or secondary and as an initial episode or a recurrence. Primary infections manifest in normal, intact skin. Examples include impetigo, cellulitis, folliculitis, or furunculosis. Secondary infections manifest in conditions with an impaired skin barrier. Common examples include atopic dermatitis, bites, burns, and wounds. In atopic dermatitis, *S aureus* colonization is common and secondary *S aureus* infections are a major concern (Figures 1, 2 *see online*). Patients with atopic dermatitis are at risk for secondary infections due to impaired physical barrier function, colonization with pathogenic bacteria, and alterations to the skin microbiome.[1]

TABLE 1

INFECTIOUS DISEASES SOCIETY OF AMERICA RECOMMENDED APPROACH TO DECOLONIZATION

	FREQUENCY	DURATION
Intranasal mupirocin	o Twice daily	o 5-10 days
Intranasal mupirocin + **Topical chlorhexidine** or **Dilute bleach baths**	o Twice daily o Daily o Twice weekly for 15 minutes	o 5-10 days o 5-14 days o 3 months

From: Liu et al[15]

An additional risk for infection relates to deficiencies in the antimicrobial defenses of the skin. The skin serves 2 important barrier roles as a permeability barrier and an antimicrobial barrier.[2-4] The stratum corneum provides a physical barrier to microbes, and the epidermis acts as a chemical defense shield. Healthy skin constitutively produces antimicrobial peptides, including lysozyme, RNase 7, calprotectin, and dermcidin. During infection, keratinocytes produce inducible antimicrobial peptides, including human beta-defensin-2, human beta-defensin-3 (hBD-3), and cathelicidin.[5] The inducible antimicrobial peptide hBD-3 specifically defends against *S aureus* and is deficient in patients with atopic dermatitis. Atopic patients also have deficient levels of cathelicidin, implicating deficient hBD-3 and cathelicidin for the propensity for these patients to develop *S aureus* infections.[5,6]

Colonization with pathogenic bacteria

Patients with atopic dermatitis have increased rates of colonization with pathogenic bacteria. *S aureus* colonization in patients with atopic dermatitis is high, ranging from 46% to 80%, compared with approximately 10% of nonatopic patients.[7,8] Patients with more severe atopic dermatitis are more likely to be colonized as are older versus younger pediatric patients.[9] Depending on the study, colonization with methicillin-resistant *S aureus* (MRSA) ranges from 13% to 31% of patients with atopic dermatitis.[7,10] Of skin and soft tissue infections caused by *S aureus*, MRSA is responsible for 44% in nonatopic patients but only 14% in atopic dermatitis patients.[8] When looking at disease severity, however, more severely affected patients are more likely to have MRSA infections.[10]

Colonization and the skin microbiome

Bacterial colonization may be considered in the context of the skin microbiome. The term "microbiome," coined by the American microbiologist Joshua Lederberg, refers to the entire collection of microbes that reside in and on the human skin. The skin microbiome consists of bacteria, archaea (a distinct class of nonbacterial microorganisms), fungi, viruses, and mites. The human body contains over 10 times more microbial cells than human cells, and the body-microbiome interaction is of increasing interest.[11]

The skin microbiome plays a part in health and disease. A diverse milieu of microorganisms colonizes the skin, comprised of beneficial, harmless, and potentially harmful organisms. Colonization is driven by the ecology of various skin surfaces, topographic location, host factors, and environmental factors. The cutaneous immune system, both innate and adaptive, modulates the skin microbiota, and the microbiota, in turn, educates the immune system.[12]

In atopic dermatitis, the microbiome may help us understand the disease and treatment. The microbiomes of patients with and without atopic dermatitis were evaluated in an important National Institutes of Health study.[1] The skin's microbial diversity decreased in areas affected by atopic dermatitis, the antecubital, and popliteal creases. The change in the microbiome's diversity was influenced by topical atopic dermatitis treatments such as corticosteroids, calcineurin inhibitors, and antibiotics, causing the return of diversity prior to clinical improvement. Patients with disease flares who had not recently used any topical therapy had a higher proportion of *S aureus* composing their microbiome compared with the baseline, postflare, and controls. The influence of *S aureus* on the pathogenesis of atopic dermatitis is suggested as well as the positive

TABLE 2 PREPARATION OF A DILUTE BLEACH BATH SOLUTION

US MEASUREMENTS	METRIC	SMALL BATCH PREPARATION
¼ cup standard strength bleach + 13 gallons water (1/4 tub water)	60 mL standard strength bleach + 49 L water	1 teaspoon (5 mL) bleach + 1 gallon (3.8 L) water

From: Liu et al[15]

effect of atopic dermatitis therapies on the microbiome.[1]

Clinical infections and management

Staphylococcal infections can present differently in patients with atopic dermatitis. The patient may have an infection that is clinically similar to a patient with nonatopic skin, such as impetigo, cellulitis, folliculitis, and furuncles. In these instances, diagnosis and treatment are relatively straightforward. Another presentation seen in patients with atopic dermatitis is refractory atopic dermatitis related to *S aureus* infection. Infection should be considered in patients with flaring atopic disease that is resistant to normal therapy, and obtaining a bacterial culture of involved skin before starting antibiotics is helpful. In addition to containment of *S aureus*, clinically infected atopic dermatitis patients should be treated with oral antibiotics based on culture and sensitivities.[13] Practitioners should continue to treat infected atopic dermatitis with topical corticosteroids or calcineurin inhibitors to help correct the primary process of inflammation and defective skin barrier.

The focus of this article is *S aureus*, but other skin infections should be considered on the differential of eroded, crusted, resistant atopic dermatitis including herpes simplex virus, coxsackie virus, and group A streptococcus. Herpes simplex virus (eczema herpeticum) should be considered if the patient has monomorphous, round, punched-out, grouped lesions that quickly spread in areas of atopic dermatitis. These patients are typically more ill appearing. Coxsackie virus can also cause widespread vesicles and erosions, but usually involve the more classic locations of the hands, feet, mouth, and buttocks. Group A streptococcus can cause a serious secondary infection with a more ill-appearing child. Impetiginized eczema may be coinfected with both group A streptococcus and *S aureus*, which influences antibiotic choices.[14] For an ill-appearing child with atopic dermatitis and for whom there is concern for infection, a dermatologist should be consulted for assistance with management and hospital admission can be considered. Typical *S aureus* infections with or without atopic dermatitis flares can be managed on an outpatient basis.

Decolonization and containment

For recurrent primary and secondary infections with *S aureus*, especially MRSA, attempts at decolonization of the skin and improved hygiene are recommended. The approach to decolonization of a patient with recurrent *S aureus* infections includes treatment with intranasal mupirocin in isolation or in combination with either chlorhexidine or dilute bleach baths (Table 1).[15] If a dilute bleach bath solution is included in decolonization, the needed measurements for either a bathtub or a 1-gallon container can be found in Table 2.[15]

Given that true decolonization of *S aureus* is challenging to achieve, we have begun to adopt the concept of containment strategies. Patients should be instructed to cover draining lesions, bathe and wash hands regularly, and not to share personal items such as razors and towels. Disinfection of high-traffic objects (eg, door knobs, counters, bath tubs, toilet seats) in the home is another hygiene measure that can be accomplished with any number of antiseptics found in cleaning products.[15] Commonly used antiseptics are alcohol, hydrogen peroxide, chlorhexidine, triclosan,

Older pediatric patients with atopic dermatitis are more likely to be colonized versus younger patients.

TABLE 3 TOPICAL ANTISEPTICS

	CONCENTRATION	MECHANISM OF ACTION	SPECTRUM	*S AUREUS* RESISTANCE
Sodium hypochlorite (bleach)	0.006%-0.025%	Dissolves fatty acids, degrades amino acids and proteins	Bacteria, fungi, viruses	No
Chlorhexidine	2%-4%	Cytoplasmic membrane disruption	Bacteria, yeast, molds	Yes*
Triclosan	0.1%-0.45%	Lipid membrane disruption	Most gram-positive and gram-negative bacteria, fungi	Yes**
Ethyl and isopropyl alcohol	60%-95%	Denatures proteins	Bacteria, fungi, viruses	No

*Approximately 1% *S aureus* resistant to chlorhexidine, although definition of resistance not standardized.
**Small-colony variant resistant bacteria can be created with triclosan exposure. *S aureus* variants resistant to triclosan, penicillins, gentamicin.
From: Noguchi et al[16]; Seaman et al[17]

iodophors, benzoyl peroxide, and sodium hypochlorite (bleach) (Table 3).[16,17] Topical antiseptics are available in various strengths and can work against *S aureus* and other organisms. Practitioners should be aware, however, of the possibility of *S aureus* resistance to chlorhexidine and triclosan.

For patients with atopic dermatitis, *S aureus* plays an important role in disease pathogenesis and severity as well as causing secondary infections. Patients with a history of secondarily infected atopic dermatitis improve when treated with intranasal mupirocin and dilute bleach baths.[18] In a study of patients with atopic dermatitis and secondary bacterial infection, patients were randomized to either intranasal mupirocin ointment treatment with dilute bleach baths or placebo for 3 months following treatment of the acute infection. Mean Eczema Area and Severity Index (EASI) scores decreased, but only for body sites submerged in the dilute bleach bath, correlating the dilute bleach application with improved atopic dermatitis.

Even clinically noninfected atopic patients may benefit from such treatment.[19,20] Investigators studied patients with moderate-to-severe atopic dermatitis who were colonized, but not infected, with *S aureus*. Patients used a commercial sodium hypochlorite body wash with surfactants (CLn BodyWash; Top MD Skin Care Inc, Dallas, Texas), approximately the concentration of a dilute bleach bath, 3 times a week for 3 months. This resulted in improved Investigator Global Assessment (IGA) scores and reduced body surface area (BSA) affected.[20] A recent study of 40 pediatric patients with moderate-to-severe atopic dermatitis examined the role of the same dilute sodium hypochlorite wash on dermatitis severity. After 2 weeks of daily use, patients had improved atopic dermatitis on multiple measures: EASI score, IGA score, pruritus visual analog scale, BSA involvement, and quality-of-life indices. The improvement was maintained for 6 weeks of sodium hypochlorite wash use.[21] These studies further support that containment of *S aureus* improves atopic dermatitis and that the new sodium hypochlorite body wash is a simple alternative to bleach baths.[20,21]

Topical agents to contain *S aureus* were evaluated in a study comparing controls with intranasal mupirocin, intranasal mupirocin plus chlorhexidine, and intranasal mupirocin plus dilute bleach baths. Study subjects with recurrent skin and soft-tissue infections were recruited if they were colonized with *S aureus*, based on cultures from the nose and skin folds. Following treatment, *S aureus* eradication rates were 48% for controls; 56% for intranasal mupirocin alone; 54% for intranasal mupirocin plus chlorhexidine; and 71% for intranasal mupirocin plus dilute bleach baths. All groups received hygiene education. Despite this, up to 36% of participants had recurrent skin and soft-tissue infections at follow-up.[22]

For an extended version with photos and references, go to **ContemporaryPediatrics.com/saureus_infection**

Hyperhidrosis and quality of life

Special considerations for pediatric management

LOUISE GAGNON

Pediatricians should recognize that hyperhidrosis is not limited to adults, but that children can also present with this condition that can greatly impair quality of life.

Last spring, Adelaide A Hebert, MD, professor of dermatology and pediatrics, University of Texas Medical School, Houston, published a manuscript discussing special considerations in the management of hyperhidrosis in children. The paper noted that about 1.6% of adolescents and 0.6% of prepubertal children are affected by primary hyperhidrosis, and that children who experience the disease state often experience social distress.[1]

"The implications for children can be evidenced in daily activities," Dr Hebert said in an interview. "Their hands may be sweating, and they cannot participate fully in games with other children. The affected children may not be able to hold a bat to play baseball or have other children agree to hold their hands when playing ring around the rosy."

Children who have plantar hyperhidrosis may not be able to wear footwear like flip-flops because their feet slip out of them. Additionally, hyperhidrosis sufferers have a hard time finding footwear that will not be ruined by the excessive sweating, explains Dr Hebert.

Quality of life impact

"We need to bring attention to this medical condition and make physicians aware that it is a disease that can impact the quality of life of pediatric patients," says Dr Hebert.

Typically, parents bring their children to a clinician when they note excessive sweating. Even when children do not tell their parents about their condition, they may research it themselves on the Internet and find out about their disease state on their own, notes Dr Hebert.

A key resource for patients with hyperhidrosis, both adults and children, is a website called SweatHelp.org, which is sponsored by the International Hyperhidrosis Society. In addition, a website targeted specifically at teens has recently launched called sweatometer.org.

"They (children and adolescents) feel tremendous relief at finding empathy about what is happening to them," says Dr Hebert. "Many young patients are relieved to find information via the website and to learn that they are far from alone in their challenges in managing their hyperhidrosis...We can often offer strategies for them to manage this disease."

Treatment options

One of the most common therapies employed to treat pediatric patients with primary, focal hyperhidrosis is oral glycopyrrolate. Patients with hyperhidrosis must continue using their therapy such as glycopyrrolate because the excessive sweating will return on cessation of the medication, stresses Dr Hebert.

"My pediatric hyperhidrosis patients tell me that they do not want to go without their medication because they will promptly begin sweating again," says Dr Hebert. "The hyperhidrosis will come back in a day or 2 if they have not been compliant."

Very commonly used to treat axillary hyperhidrosis, botulinum toxin works on the pre-synaptic receptors.

There may be some undesirable side effects with therapies like glycopyrrolate such as constipation or dry mouth, notes Dr Hebert.

Another option for children with plantar and/or palmar hyperhidrosis is iontophoresis, a process during which patients are exposed to a low level and well-tolerated electrical current that diminishes the sweating of the palms and soles. If children have severe plantar and/or palmar hyperhidrosis, an option for management is to drop glycopyrrolate tablets in the iontophoresis trays in order to increase the robustness of therapy, explains

Dr Hebert.

If hyperhidrosis is not well-controlled in pediatric patients with therapies like oral anticholinergics or with iontophoresis, clinician may look to injections of the neuromodulating agent botulinum toxin to manage the condition, says Dr Hebert. Very commonly used to treat axillary hyperhidrosis, botulinum toxin works on the pre-synaptic receptors, she notes.

Newer treatments such as miraDry, which uses non-invasive microwave technology, was approved by the US Food and Drug Administration in 2011 to treat hyperhidrosis. However, the device has not been studied in the pediatric population, says Dr Hebert.

The disease remains idiopathic, but research into hyperhidrosis may lead to newer treatments in the future that target the cause of the condition, she notes. "[Researchers] are looking at why there is central nervous system dysfunction in hyperhidrosis patients," says Dr Hebert.

The long-term impact of untreated hyperhidrosis is the threat of a limited social life and isolation, says Dr Hebert. "Some patients may choose not even attending family outings because of their condition," she says.

All clinicians should be aware of the potential to diagnose hyperhidrosis in pediatric patients and offer therapeutic interventions to reduce the burden of the disease state and ultimately increase the patient's quality of life, stresses Dr Hebert. "Children suffering with hyperhidrosis during childhood deserve to have a happy and socially fulfilling life," she says.■

Ms Gagnon is a medical writer and editor based in Oakville, Ontario, Canada.
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 interview subject, **Dr Hebert**, also reports no relevant disclosures.

REFERENCE

1. Bohaty BR, Hebert AA. Special considerations for children with hyperhidrosis. *Dermatol Clin.* 2014 Oct;32(4):477-484.

The ABCDEs of pediatric melanoma

Researchers have found that many cases of pediatric melanoma do not present with conventional ABCDE criteria. Clinicians should be aware of these alternate presentations.

BY LISETTE HILTON

Children are not small adults, even when it comes to the way they present with melanoma.

Kelly M Cordoro, MD, and colleagues have reported on how common it is for children to present atypically with melanoma. Dr Cordoro is associate professor of dermatology and pediatrics at the University of California, San Francisco.

The study, published June 2013 in the *Journal of the American Academy of Dermatology*, looks at whether using the conventional ABCDE criteria (asymmetry, border irregularity, color variation, diameter >6 mm, and evolution) adequately detects the skin cancer in children.

Researchers conducted a retrospective study looking at 70 patients under age 20. Sixty of those were diagnosed with melanoma; the other 10 had ambiguous melanocytic tumors treated as melanoma. They divided patients into 2 groups by age at diagnosis, including an aged 0 to

PHOTO COURTESY: KELLY CORDORO, MD

▲ Melanoma on the back of an 11-year-old patient. The lesion was 4 mm by 5 mm, smaller than the "greater than 6 mm diameter" criterion for conventional melanoma. It came to the patient's attention because of the itching.

CONTINUED ON *PAGE 43*

CONTINUED FROM *PAGE 39*

10 years group, representing 19 children, and an 11 to 19 years group.

"The 19 prepubertal patients in this study represent one of the largest series reporting detailed clinical and histopathological features of melanoma in this age group," says Dr Cordoro. "Large national cancer databases and registries provide summary statistics such as age of presentation, melanoma subtype, site, treatment, and outcomes, but lack detailed information about the presenting features and recent history of the melanoma."

"This is critically important information for clinicians because we need to know what we should be looking for in order to not miss this diagnosis in children. In fact, 86% of children younger than 10 years old in this study had a greater than 6 month delay in diagnosis, most likely due to a low index of suspicion and atypical clinical presentations common to this age group," she reports.

They found 60% of the younger group and 40% of the older children did not present with conventional ABCDE criteria. Rather, their lesions tended to be characterized by amelanosis, bleeding bumps, uniform color, variable diameter, and *de novo* development, according to the study.

Not only were the clinical characteristics different, but histopathological subtypes varied between groups. The histopathologic differences from adult melanoma identified in these patients seemed to parallel the non-ABCD morphology observed clinically, according to Dr Cordoro.

Nearly half (44%) of the lesions were not classifiable by experienced dermatopathologists into conventional adult subtypes (eg, superficial spreading, nodular, acral lentiginous, lentigo maligna). Very likely, the histopathological complexity of these lesions contributed to the diagnostic delay, she says.

More than 90% of the younger patients had stage 2a disease or higher, compared to 46% of the older children.

Inadequate criteria?

The conventional ABCD criteria were largely inadequate for detecting melanoma in especially younger children. The "E," for "evolution," proved to be the more sensitive indicator, according to Dr Cordoro.

"The criterion of evolution was universally valuable, capturing nearly 100% of the entire cohort of pediatric melanomas," she reports. "We must remain mindful of this as we interview and examine our patients. Though growth is a form of evolution, nevi in children are often changing with age and (clinicians) are very good at recognizing these banal transitions. More important are new, persistent pink or red papules or nodules or pigmented nevi that have developed new symptoms such as itching, crusting, or bleeding. The latter are warning signs, and warrant biopsy."

The presentation of melanoma in children can mimic a benign pyogenic granuloma, according to Melinda Chu, MD, resident and clinical trials fellow in the department of dermatology at Saint Louis University, St Louis, Missouri.

"In adults, we generally think of melanoma as being a brown spot or coming from a mole, but in children it can be a skin-colored lesion that bleeds a lot that looks like a pyogenic granuloma," Dr Chu explains.

Still, the modified criteria are not meant to replace the conventional ABCDs because many children will still present with typical melanomas, according to Dr Cordoro. Rather, "A" for "amelanotic"; "B" for "bleeding, bump"; "C" for "color uniformity"; and "D" for "*de novo*, any diameter;" are meant to raise awareness and serve as a reminder of the alternate presentations of melanoma in children, she says.

PEDIATRIC MELANOMA
A STATISTICAL SNAPSHOT

ACCORDING TO THE SKIN CANCER FOUNDATION

- 90% of pediatric melanoma cases occur in patients aged 10 through 19;
- Melanoma in children is more likely to occur in darker skin types than in adults, with 6.5% of pediatric melanomas occurring in non-Caucasians;
- Melanoma accounts for up to 3% of all pediatric cancers (6% of cancer cases in teenagers aged 15 to 19).

Source: http://www.skincancer.org/skin-cancer-information/skin-cancer-facts#pediatrics

Ms Hilton is a medical writer who has covered health and medicine for 25 years. 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 subjects of the interviews, **Drs Cordoro, Chu,** and **Sondak,** also report no relevant disclosures.

For *Rising Rates of Melanoma,* go to **ContemporaryPediatrics.com/ped_melanoma**

Pre-adolescent acne may be red flag

BY RANDY DOTINGA

Clinicians should keep an eye out for acne in pre-adolescent children aged as young as 1 year because blemishes may be a sign of serious medical problems, a leading dermatologist counseled recently in a presentation at the 11th Annual Maui Derm for Dermatologists 2015.

"It's a red flag for underlying hormonal disturbances" in children from age 1 to 7 years, said Albert C Yan, MD, a pediatric dermatologist and section chief of the Division of Dermatology at The Children's Hospital of Philadelphia, Pennsylvania, in a recent interview.

"Look for signs of early puberty" in these cases, Dr Yan says. He advises ascertaining the bone age of these patients via x-ray, testing levels of progesterone and testosterone, and consulting with an endocrinologist if needed.

"I had one patient who developed acne when she was 5," he reports. "She had an underlying adrenal tumor. Several case reports have highlighted associations with underlying endocrine abnormalities, including tumors, that trigger this type of early acne."

Steroid inhalers that treat asthma can also cause acne in the youngest children, he reports. This can happen when parents employ facemasks to administer medication to children who are too young to manipulate traditional inhalers.

In older children, acne appears in about 5% of children aged 7 to 11 years, Dr Yan states, and the number appears to be growing as puberty begins earlier. Patients with acne in that age range "are more likely to develop severe acne during adolescence," he says.

For an extended version of this article with author and disclosure information, go to ContemporaryPediatrics.com/redflag

Treatment pearls for pediatric vascular lesions

BY LISETTE HILTON

Technologies and techniques used to treat vascular lesions in children are improving, resulting in better outcomes for young patients, according to a presentation by New York City-based dermatologist Roy G Geronemus, MD, and colleagues this spring's American Society for Laser Medicine & Surgery 2015 annual conference in Kissimmee, Florida.

The key to optimal outcomes among pediatric patients with vascular lesions?

Early intervention and short treatment intervals, he says.

Dr Geronemus, clinical professor of dermatology at New York University Medical Center and founder of the University's laser program, also offers these pearls:

- "Treatment of port wine stains should begin in early infancy for the fastest and most complete response, while minimizing the need for general anesthesia."
- "Concomitant use of the pulsed dye laser and propranolol can shorten the course of propranolol in complicated hemangiomas."
- "Hemangiomas of the eyelids can be performed safely and effectively in infants and young children."

Pulsed dye lasers are the gold standard for treatment of vascular lesions in children, according to the dermatologist. However, Dr Geronemus coauthored a study in March 2013 in Techniques in Vascular and Interventional Radiology, which suggests CO_2 lasers might play a role in treating children with infantile hemangiomas where scarring has occurred.

"[Capillary vascular malformations] darken and thicken, making them increasingly difficult to successfully treat with lasers. [Infantile hemangiomas] involute, sometimes resulting in fibrofatty, atrophic plaques. These individuals can undergo ablative fractional resurfacing with a fractional CO_2 laser to improve the texture and appearance of these lesions," according to the study.

The medical writer and subject of the interview, **Dr Geronemus**, report no relevant disclosures.

Technology fuels skin reactions

Clinicians ID emerging causes of pediatric contact dermatitis

New sources of pediatric contact dermatitis are found in many of the products used by children. Recognizing these emerging allergens could mean fast, effective relief for pediatric patients, as well as prevent misdiagnoses and long-term unnecessary treatments.

BY LISETTE HILTON

Nickel and methylisothiazolinone are among today's most important pediatric allergens, according to Jonathan Silverberg, MD, PhD, MPH, assistant professor of dermatology, preventive medicine and medical social sciences at Northwestern University, Chicago, Illinois.

Technology fuels nickel exposure

Nickel has been the most common patch test positive for children and adults for many years. However in recent times, there has been an explosion in its use, Dr Silverberg says.

"Going back about 10 years, we saw a lot of nickel positive patch tests, but they weren't always relevant," he says. "Nowadays, we're seeing a lot more relevant reactions. The metal exposures are coming from technology, including telephones, iPads, tablets, and laptop cases."

Even children who might not be old enough to use phones or computers are at risk. That's because toys have become more sophisticated, with motorized parts and electronic components which contain metals—including nickel, Dr Silverberg explains.

While nickel allergies traditionally occur more often in girls than boys (because girls are more likely to have piercings and are subject to exposure from jewelry), boys seem to be closing the gap.

"Some of the older studies found huge differences in terms of nickel reactions between girls and boys, where girls had tenfold or higher rates of nickel reaction," Dr Silverberg relates. "We're seeing a lot more nickel reaction now in boys because of their exposure from some of the other novel sources."

Allergic reactions from nickel exposure is significant from a public health standpoint because not only has nickel triggered reactions in people who are at risk, but it may be that ongoing nickel exposure in children might predispose them for nickel allergies down the road.

FAST FACT
56% of 8- to 12-year-olds have a cellphone.
—National Consumers League

It's not just nickel

Pediatric skin reactions from cell phones and other devices stem not merely from the nickel in devices, but also from the many accessories that accompany these technologies, according to Dr Silverberg.

"We're seeing (skin reactions from) rubber and dyes that are used on key pads for cells phones. The rubber and plastic cases are also sources of allergens. Headphones and ear buds—there's rubber and plastic in them. The leather casings...all of these can be sources of allergens that can cause allergic contact dermatitis," he says.

Dr Silverberg has seen reactions on children's hands from holding plastic phone casings and reactions around the ears from headphones and earbuds. The source of these can be either rubber or plastic allergens, he says.

"There is something that entered the marketplace 10 or 20 years ago and is ubiquitous," Dr Silverberg continues. "There's basically no skincare category that doesn't use it in one form or another—(methylisothiazolinone)."

In fact, the American Contact Dermatitis Society named methylisothiazolinone "Contact Allergen of the Year for 2013."[1]

Methylisothiazolinone, a preservative that increases shelf life and prevents bacterial growth, is commonly combined in products

with methylchloroisothiazolinone. The mixture, called Kathon CG, is a known to cause allergic contact dermatitis. Researchers reported increases in Kathon CG-associated allergies in the 1980s.

"In unselected eczema patients subjected to routine patch testing, the number with positive reactions to Kathon CG 100 ppm increased from none in 1983 to 0.7% in January to August 1985, and to 4.6% in September 1985 to March 1986," according to the study.[2]

In Europe, the documented frequency of allergy to Kathon CG is about 1.5 percent, according to the study by Castanedo-Tardana and Zug.

"The frequency of allergy to this preservative in the United States is unknown," Dr Silverberg says. "If you are not testing for allergy to this preservative, you may be overlooking the importance of a very relevant preservative allergen that, to date, has managed to stay under the radar in the United States."

Seeing reactions 'everywhere'

While it's useful as a preservative, methylisothiazolinone can be irritating and allergenic, he says. As a result, Dr Silverberg is seeing cases of allergic contact dermatitis where they don't usually occur.

"We're seeing a lot of perianal reactions to baby wipes," he relates. "We're seeing those reactions particularly in children known to have inflammatory bowel syndrome or any other causes of diarrhea. We're (also) seeing facial reactions and hand eczema due to a number of moisturizing creams and lotions. We're seeing generalized reactions from shampoos and conditioners.

▲ **A teenager with allergic contact dermatitis of the hands from a rubber cell phone case.**

PHOTO: JONATHAN SILVERBERG, MD, PHD, MPH

It's just everywhere."

Methylisothiazolinone is even contained in some of the prescription topical medications physicians may prescribe, Dr Silverberg reports. These include crotamiton (Eurax, Ranbaxy), halobetasol propionate 0.05% cream (Ultravate, Ranbaxy) and some triamcinolone cream preparations, which are mainstays of treating inflammatory skin disease.

Methylisothiazolinone is also found in over-the-counter products that might be recommended to pediatric patients, such as Dove Soap, Dove Body Wash, and Head & Shoulders shampoo.

These products might not be irritating, initially. However, one of the major risk factors for developing contact dermatitis is frequency of use.

"If you use the same product and it has allergenic potential, you can develop an allergy over time," Dr Silverberg says. "Or, if patients have an allergy to methylisothiazolinone, providers need to be aware that they shouldn't be using these creams and topical prescriptions or make over-the-counter recommendations where they might be directly exposing patients to these allergens."

Clinicians can check product inserts and ingredient lists for methylisothiazolinone, and should refer patients for patch testing if they suspect a skin allergy.

"If you're really suspicious, don't hesitate," says Dr Silverberg "It's better to refer for patch testing and be certain about it. Otherwise, some of these patients could go on for years or decades with a chronic disease, where it's never well controlled. It might be as simple as changing around some products and avoiding some allergens and everything gets better or goes away."

And while he admits finding products without the preservative

might be a challenge, Dr Silverberg believes it's worth it for patients.

Avoiding allergens

Clinicians should at least entertain the possibility of a methylisothiazolinone-related or another contact dermatitis every time they see a child with an eczema-like rash.

"It can show up commonly in… those localized eczema reactions," Dr Silverberg says. "Really tough hand eczema or eczema that just keeps coming back that's localized to a particular body, nummular or coin-shaped eczema—a number of studies have shown that to be highly related to contact allergies. Even just the garden variety of atopic dermatitis can be confounded by contact dermatitis."

Some still believe in the conventional view that atopic dermatitis somehow cancels out an increased risk of allergens. However recent research tells a different story.

"This year, at the American Contact Dermatitis Society meeting, there were (many) studies that presented higher rates of contact dermatitis in atopic dermatitis," he says. "So, even for those garden variety eczema cases, if you're thinking about putting (patients) on prednisone, systemic agents, or phototherapy, you're really obligated to patch test them first, to make sure that it's not some reversible thing."

In one of those studies, researchers reported evidence from the United States and Europe that suggests people with atopic dermatitis have similar if not higher rates of positive patch test results to common contact allergens, including metals and fragrance, than people without atopic dermatitis.[3]

The medical writer and interview subject, Dr Silverberg, report no relevant disclosures.

For references, go to ContemporaryPediatrics.com/tech_dermatitis

Pediatric psoriasis

Systemic therapy and beyond

Psoriasis in children can have a devastating effect—resulting in psychosocial stigma and diminished quality of life. Having a better understanding of the nuances of the disease and the potential therapeutic hurdles can assist clinicians in better treating and managing their patients.

BY ILYA PETROU, MD

Psoriasis affects approximately 1% of children in the United States and, although pediatric psoriasis may not be as common as other inflammatory diseases and conditions in this age group such as atopic dermatitis, psoriasis in children can be devastating. It is associated with far-reaching psychosocial stigma and significantly reduces patients' quality of life.

"There are many challenges in the management of pediatric psoriasis, but lack of comparative efficacy and safety data resulting in lack of US Food and Drug Administration-approved systemic and biologic therapies for severe psoriasis in the pediatric age group is a big one," states Kelly M Cordoro, MD, Associate Professor of Dermatology and Pediatrics, University of California, San Francisco. "We often rely on case series, expert consensus, and data from use in other childhood diseases to make very important decisions about care."

Individually tailored treatments

Treatment of psoriasis in pediatric patients must be individualized and specifically tailored to each patient, Dr Cordoro advises.

"The risks and benefits of potential treatments must always be weighed against the risks of undertreated disease. In the case of children, this is additionally challenging given our uncertainty about the natural history of treated or untreated pediatric-onset psoriasis. Many children will likely endure a lifetime of waxing and waning disease and the treatments required to manage it. With this in mind, optimal management calls for therapeutic choices that will maximize outcomes while minimizing

cumulative toxicities."

According to Dr Cordoro, the choice of treatment should be influenced by a number of factors, including: the primary morphology and presentation of the disease, health history, speed of progression, patient age, the presence of comorbidities such as psoriatic arthropathy or obesity, impact on quality of life, patient/family preference for treatment, and level of disability. Although there is no "one size fits all" treatment choice, Dr Cordoro notes that certain therapies work best for certain presentations.

"Importantly, severity is not limited to body surface area of involvement because even very limited disease, if in a visible or challenging location such as the face or on the genitals, can create a tremendous impact on self-esteem and therefore may warrant more aggressive treatment," Dr Cordoro says.

In her pediatric patients, Dr Cordoro tries to maximize the use of combination topical therapies and phototherapy, as these are associated with a time-tested high safety profile. Treatment decisions are individualized for each patient, Dr Cordoro says, but they are often heavily influenced by the clinician's experience and comfort with various combination therapies. For example, although off-label in children, Dr Cordoro tries conventional systemic therapies such as acitretin, methotrexate and cyclosporine, and biologics including tumor necrosis factor (TNF)-alpha and IL12/23 inhibitors in more severe and stubborn cases.

Although they are readily employed in children, none of the biologics are approved for use in pediatric psoriasis in the United States. Due to long-term safety concerns as well as insurance coverage issues, Dr Cordoro says that biologics are often relegated to second- or third-line agents for refractory cases of plaque psoriasis. However, given the accumulating long-term safety data for TNF inhibitors and their tremendous efficacy for plaque and pustular psoriasis, Dr Cordoro notes that biologics have assumed a more primary role in treating severe psoriasis in children.

"When choosing treatments for the short-term, we also need to consider the longer-term perspective and anticipate the types of therapies that may be required in the future," says Dr Cordoro. "Using the principles of rotational and combination therapy can help to reduce toxicities and maximize efficacy."

Comorbidities and complications

In addition to the challenges in treating the cutaneous symptoms of psoriasis, clinicians must also address a number of potential comorbidities that have been associated with the disease including obesity, metabolic syndrome, and psoriatic arthritis. The current literature supports an association between psoriasis and adiposity in children, and Dr Cordoro explains that this association may be bidirectional, as obese children have been shown to be at risk for incident psoriasis, and more children with psoriasis, versus non-inflammatory controls, are obese.

"There is a dose response effect between psoriasis severity and obesity," she says. "In addition, there are signals for association with components of the metabolic syndrome, and, of course, as we have known for decades, psoriatic arthritis. Cardiovascular disease is clearly associated with psoriasis in adults, and one of our challenges is to determine whether systemic treatment in the pediatric age modifies this risk in adulthood."

Even simply asking the patient how their skin appearance is affecting their life validates the appearance as being about a medical issue rather than vanity.

Dr Cordoro and colleagues recently published a paper discussing therapies for different presentations of severe psoriasis in pediatric patients, given the multitude of presentations and treatment options.[1] The disorder is also the focus of new collaborative efforts. Wynnis Tom, MD, and colleagues from the department of dermatology at the University of California San Diego recently assembled a multidisciplinary group of experts, the collective effort known as the Comorbidity Screening Initiative (CSI), to review the world's literature

For an extended version of this article with references, go to **ContemporaryPediatrics.com/ped_psoriasis**