# VIRGINIA • PEDIATRICS

American Academy of Pediatrics • Virginia Chapter


## IN THIS Issue

SUMMER | 2018



## About Us

### AAP-VIRGINIA Chapter

We welcome your opinions and ideas.

Please send comments on articles, ideas for new articles,letters to the editor, suggestions for making Virginia Pediatrics more useful and address changes to:


**Virginia Pediatrics**
Jane Chappell: Executive Director
2821 Emerywood Pkwy | Suite 200
Richmond, VA 23294

• Phone: (804) 622-8135 •
• Fax: (804) 788-9987 •
• email: jchappell@ramdocs.org •
• www.virginiapediatrics.org •


• Next Issue: Fall 2018 •
• Deadline for entries: 9/15/2018 •



## Advocacy and Medicine Go Together!

*Cameron McLean Ellis*

Amid the automaticity that prevails at the end of a four-year residency, the American Academy of Pediatrics Legislative Conference 2018 was an invigorating reminder of why I went into medicine... for the children. This conference unites everyone from medical students to seasoned veterans in health promotion to learn about important issues facing our kids and hone advocacy skills during workshops, all culminating in a visit to Capitol Hill to talk with my senators and representatives about issues affecting our community.

I learned about what my colleagues across the country are doing at the community, state, and federal level to impact policy change. I was also reminded of my own influence beyond the workplace. Although residency often lends itself to a self-image of deprecation and imperfection as we traverse a learning curve, this conference imparted a different tone: no voice is too small, no issue too insignificant, no journey too short. Although many of the skills and informational sessions were intuitive, taking the time to walk through the tenets of aligning with other organizations, sharing important studies with the public via twitter, and telling stories of the personal trauma encountered in our field of work was healing and inspiring. No longer was the word advocacy a nebulous concept, but one I could affect concrete steps to achieve.

The issues discussed at the conference included immigration, nutrition, and, the primary intent of our visit to the Hill, gun violence. I was able to recognize my own value in a debate that my mind often consigns to a world of politicians and policy analysts. I see it in the NICU baby, born 3 months early, who nurses, doctors, social workers, parents, grandparents all spent months working to save, only to be taken tragically by a stray bullet shortly after being discharged home. I feel it in the statistics--that seventy children die each day at the hands of firearms. I live it in caring for the children orphaned by the barrel of a gun.

I was especially proud to be present on behalf of Virginia, a state where leaders such as Senator Tim Kaine are trailblazing with respect to the issue of gun control. Huddled shoulder to shoulder with pediatricians from all fifty states in the Kennedy Caucus Room, we listened to Senator Kaine champion funding for further research into gun violence as a public health concern, the proposed bills for increasing the gun purchase age to 21, and banning assault rifles.

The camaraderie created by bringing together pediatricians from our state to sit down with our representatives and senators was unparalleled. United by a common cause, one known firsthand from caring for patients, we carried a message that was important for legislators to hear, regardless of their political affiliations--that we will not tolerate kids dying from gun violence.

I left with my brain buzzing with new ideas, my heart strings pulled in different directions, my workplace trauma processed and shelved, and a reborn passion for advocacy. My paradigm for my future practice has now been expanded beyond the walls of clinic or the streets of my community towards a more global ethos. No longer a vague vision of greater good, I have been empowered to make a difference now--as I email my senators and representatives to follow up on my meetings with them, as I share well-researched articles to dispel common myths about gun violence and vaccinations on my social media, as I talk about my views at the dinner table with family. I urge anyone who is presented with this opportunity...or any opportunity to speak up for children...to take it! ***You will not be disappointed!***

# President's • MESSAGE

**Sandy L. Chung, MD, FAAP, FACHE**
President Virginia Chapter, American Academy of Pediatrics

"He's had a fever for the last two days and isn't sleeping well at night," a mom explained to me worriedly. "He has had a cold for week and I thought it was getting better. I don't know what's wrong with him!"

I look at the child sitting on her lap and the three-year old boy looks like he doesn't feel well. But he is comfortably snuggled on mom's lap in their living room in his PJ's holding his stuffed bear. He doesn't seem fazed by the fact that his doctor is talking to them from mom's phone screen.

"Can you please use the device so that I can check his ears?" I ask mom, controlling her device camera remotely and turning on the feature that works as an otoscope. I examine his ears and take video of his tympanic membranes. Then I give mom instruction on how to hold the device while I listen to his heart and lungs, measure his temperature, and examine his throat. I check his skin for rashes, and observe that he is alert and does not appear to be in distress.

Indeed, when I freeze-frame the otoscope video to get a good look at his tympanic membranes, he has a right otitis media. I let her know and then I am able to electronically prescribe the antibiotics to her pharmacy using my electronic medical record. After we disconnect our telemedicine visit, I document my note, send her written instructions, and bill for the visit all through our electronic medical record.

Then I click on the next patient in the virtual waiting room and continue with the next visit.

Telemedicine is here already and while it is not used as much in children as it is in adults just yet, the utilization of telemedicine in pediatrics is on the rise. Devices such as the one I am using in with my patients make the visit more palatable to pediatricians since much of a physical exam can be done remotely. While it can be a bit time-consuming to get the technology functional (as to be expected in early generation devices of any kind), the technology will only get easier to use, cheaper to access, and convenient to obtain.

The world of right-here right-now business models in practically every industry has enabled and trained patients to want super convenient everything, including health care. Controversies over the quality of care by telemedicine exist. However, even in face-to-face care, there is no question that some patients accept what some pediatricians would consider less optimal care in exchange for the highly desirable convenience factor. Often, patients do not realize that there may be a difference in the quality of care delivered to children by non-pediatricians or non-pediatric trained providers.

So, how to survive this evolving rapid, convenient care landscape? I would urge you to consider alternate means of care delivery where we come to the patient instead of the patient coming to us. We should learn from the retail-based clinic evolution that the "just say no" approach is not going to work. It is our obligation to protect the care of children and find ways to manage the way that convenient care is delivered so that children are safe. Consider telemedicine, home visits, school based care, and so on. The possibilities are endless. No matter what modality that care is delivered by, it is our responsibility to protect our patients so that they receive the highest quality, evidence-based pediatric care. Who knows? One of them may grow up and develop the next disruption in health care that will make us disease free, live forever, and make healthcare affordable for all!

# Forgotten Patriots – Looking back at Ancel Keys Minnesota Starvation Study almost 75 years later

Evelyn Wang
Peter Farmer
Peter Farrell
*Children's Hospital of the King's Daughters*

Much of what is understood about the physiologic effects of starvation and the subsequent phenomenon now known as Refeeding Syndrome is gleaned from the groundbreaking work by Ancel Keys at the University of Minnesota. His noteworthy, albeit controversial, Minnesota Starvation Study, was conducted almost 75 years ago on 36 volunteers pulled from the ranks of the Civilian Public Service (CPS). As World War II raged on, US citizens who did not actively serve in the battle theater overseas were often times part of the domestic, stateside, war effort. Men, women, and children alike played a part of the multidimensional industry of war. American women were called into new and unaccustomed roles working in factories and performing stereotypically male jobs, perhaps best symbolized by the iconic Rosie the Riveter. Even the academic community was not immune to the nationwide war effort, and they were recruited to help answer questions that had never been considered before, such as how to approach an entire continent of civilians who have been suffering starvation for the past 5 years. As the allies made their push towards Berlin in the latter half of 1944, Ancel Keys, a professor of physiology and biochemistry who had come to the University of Minnesota by way of Harvard and Cambridge, was among such academics who decided to lend his skills to the nationwide call to duty.

At the bequest of the US Army Quartermaster Corps, Ancel Keys set out to study a heretofore minimally researched domain of science—the physiologic consequence of starvation. As one of the preeminent scholars in nutrition and physiology, Keys had previously worked with the government and played an essential role in creating K-rations (the K standing for Keys) —a small packet of nonperishable foods designed to sustain military personnel in the battlefield. However, as the war continued, the Allied military leadership became increasingly aware of reports of large populations of civilians who were living on very small amounts of calories derived primarily from simple carbohydrate sources in semi-starvation conditions. Little was known about how to refeed the civilians, POWs and survivors of the newly discovered concentration camps who had been exposed to these harsh conditions. As one author put it, "rehabilitation of starved people was recognized as a tremendous task and the best way of refeeding was unknown. Protein and vitamins were recognized as important, but what of calories, other nutrients, etc., particularly for people who had to work even harder just to sustain themselves."1

Thus, in 1944, Ancel Keys created a brochure that asked, "Will You Starve That They Be Better Fed?" The study was essentially designed to answer two simple questions: "What would be the physiological and mental effects of semi starvation, and what should be expected in the refeeding period after the war?"2 There were over 400 responses, of which 100 interviewed and examined, and 36 chosen.3 Most the volunteers were young conscientious objectors who were assigned to the Civilian Public Service (CPS), performing tasks for the country like forest maintenance, firefighting and soil conservation operated by Historic Peace Churches.3 The majority were comprised of members of pacifist religious groups including the Mennonites, Church of the Brethren, and the Society of Friends.

Using the University of Minnesota's facilities as a home base, these men spent a total of almost fifty weeks living in a large dormitory style room and eating meals together in a dining hall. They were expected to walk 22 miles a week to expend 3009 kcal per day. The goal was to lose approximately 2.5 kg a week to reach 25% weight loss by the end of the 24-week starvation period.3 The men were fed mainly bread, potatoes, cereals, turnips and cabbage twice a day and only once on Sundays in order to approximate the low calorie high carbohydrate diet of most of the refugees. Very small amounts of meat and dairy products were provided.4 Psychomotor testing was performed and measurements including circulation, metabolism, and responses to stressors were recorded. During the rehabilitation period, they were randomly assigned to four different groups with different protein and vitamin levels.3 By the end of the experiment, only four participants broke the diet. A small guide based on the efforts of the group was published in 1946 to aid relief workers who were working in post-war Europe, and the complete 2 volume nearly 1400 page manuscript was published in 1950.

In 2003-2004, almost 60 years after the Minnesota Experiment, eighteen of the original thirty-six were interviewed in an oral history project. All the men described their choice to become a conscientious objector as conviction to not kill another human being.3 They stress that being a conscientious objector did not mean they were unpatriotic. In fact, they understood the risk and sacrifice of their friends and colleagues fighting in the war, and stated they wanted to do the same. They were no less fervent in their desire to serve their country, and they viewed their participation as playing a small part in a greater good. And yet they soberly recognized that their sacrifice looked very different from their soldier counterparts, as they wanted to make clear that their hunger was not equal to those starving in war torn areas. One of the participants, Samual Legg, states, "the difference between us and the people we were trying to serve: they probably had less food than we did. We were starving under the best possible medical conditions. And most of all, we knew the exact day on which our torture was going to end. None of that was true of people in Belgium, the Netherlands, or whatever.'"3

The philosophical debate of what constitutes patriotism is ongoing and relevant to our modern times. Popular understanding deems patriotism as, "love of one's country," however extremely vague. Still others believe patriotism to be a readiness to die and kill for one's country.5 To be sure, dying for one's country—particularly in war, or military defense of that country or its citizenry—is traditionally seen as the ultimate self-sacrifice.

However, patriotism is not without its pitfalls—and certainly not without its detractors. One of the harshest critics of patriotism is Russian novelist Leo Tolstoy. He describes patriotism as immoral as he suggests every patriot holds his or her country to be the best of all. Such a conviction, he posits, promotes one country's interest at the expense of others, including war. Thus, it is at odds with the "most basic rule of morality, which tells us to do to others what we would not want them to do to us."6

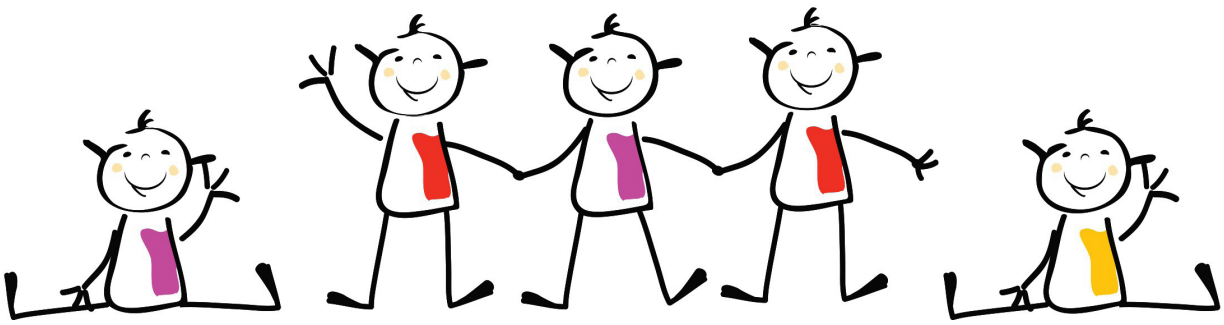
Although frequently used interchangeably, patriotism should not be confused for nationalism. George Orwell in his famous essay, "Notes on Nationalism," makes this important distinction. He defines patriotism as "devotion to a particular place and a particular way of life, which one believes to be the best in the world but has no wish to force on other people. Patriotism is of its nature defensive, both military and culturally. Nationalism, on the other hand, is inseparable from the desire for power. The abiding purpose of every nationalist is to secure more power and more prestige."7

Recently, many philosophers have adopted a middle ground in "moderate patriotism," which allows for special obligations and partiality. Marcia Baron advocates for "patriotism compatible with liberal morality."8 She argues that we are justified in considering our own attachments, yet must also reflect on attachments from a universal, impartial view. Stephen Nathanson defines "moderate patriotism" as involving special affection for one's own country, a sense of personal identification with the country, special concern for the well-being of the country, willingness to sacrifice to promote the country's good.9 This theory of patriotism acknowledges the constraints of morality. Moreover, it allows for a degree of humanitarianism, a concern for his or her country and compatriots, as well as other countries.

The men who participated in the Minnesota Starvation Study were precluded, on moral and ethical grounds, from contributing to the war effort in the prevailing way that many young men around the country were serving—military service. As a result, many accusations were leveled against those who resisted military service, including the notion that these men were unpatriotic. Despite this, the men of the Minnesota Starvation Study remained steadfast in their conviction that their participation in this study was an acceptable, alternative, form of self-sacrifice. They saw their role, as an essential (but non-violent) part of the war effort. And while their actions were hardly recognized as patriotic by their contemporaries, their commitment to both their moral principles and their country is remarkable. Generations of Americans have benefitted from the impressive self-sacrifice of the men and women who united to serve their nation in World War II, on the battlefields of Europe and the Pacific, as well as in the factories, laboratories and other academic institutions at home. Patriots, such as these, shape the fabric of our nation. It is perhaps worth taking a moment in today's climate to remind ourselves of the lessons learned from a very dark era in history, one of which is that service to the health and humanity of the global population and service to our nation need not be considered disparate goals.

Resources

1. Buskirk E.R. 1990. From Harvard to Minnesota: Keys to Our History. Historical Lecture delivered at the Annual Meeting of the American College of Sports Medicine, Salt Lake City, Utah.
2. Keys A. 1990. Recollections of Pioneers in Nutrition: From Starvation to Cholesterol. Journal of the American College of Nutrition. 9:4; 288-291
3. Kalm L, Semba R. 2005. They Starved So that Others Be Better Fed: Remembering Ancel Keys and the Minnesota Experiment. The Journal of Nutrition. 1347-1352
4. Eisan, Leslie. 1948. Pathways of peace, a history of the Civilian Public Service Program. Brethren Publishing House. 296-312
5. Primoratz, Igor, "Patriotism", The Stanford Encyclopedia of Philosophy (Summer 2017 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/sum2017/entries/patriotism/>.
6. Tolstoy, Leo, 1987, "On Patriotism" and "Patriotism, or Peace?" Writings on Civil Disobedience and Nonviolence, Philadelphia: New Society Publishers, 51–123, 137–47.
7. Orwell, George, 1968, "Notes on Nationalism," Collected Essays, Journalism and Letters, Sonia Orwell and Ian Angus (eds.), London: Secker & Warburg, vol. 3, 361–80.
8. Baron, Marcia, 1989, "Patriotism and 'Liberal' Morality," in D. Weissbord (ed.), Mind, Value, and Culture: Essays in Honor of E.M. Adams, Atascadero: Ridgeview Publishing Co., 269–300. Reprinted with a postscript in Primoratz (ed.), 2002.
9. Nathanson, Stephen, 1989, "In Defense of 'Moderate Patriotism'," Ethics, 99: 535–52. Reprinted in Primoratz (ed.), 2002.



DO YOU KNOW A PEDIATRICIAN
WHO IS NOT A MEMBER OF THE VIRGINIA CHAPTER?

YOU are the most valuable link to reaching potential members.
Please encourage your colleagues to become active members in the Virginia Chapter.
Need an application? Visit our Web site: www.virginiapediatrics.org
or call Jane Chappell, Executive Director, at (804) 622-8135.

*Your active participation is vital to the Virginia Chapter!*

## SAVE THE DATE!

The Mohsen Ziai Pediatric Conference
November 2 & 3, 2018
The Ritz-Carlton Tysons Corner
McLean, VA
For more information
inova.org/pedscme

# Ethics in Medicine

**Ashley Serrette, PGY 3 | Eastern Virginia Medical School**

Ethics in medicine is a broad topic, but within pediatrics the principles of autonomy, beneficence, non-maleficence and justice is complicated. Pediatrics is a unique field because the pediatrician must act in a way that upholds these principles for their patient—the child, and the parent or guardian. Most often, a mutual understanding can be earned between the pediatrician and the family. However, there are times that this does not happen as smoothly as we would hope. This usually occurs because there is some failure in communication, especially for those cases where the parents for whatever reason are not attentively at their child's bedside and actively advocating for their child.

Still, there are situations in which, despite the most commendable attempts at effective communication, these parents or guardians continue to be an obstacle in our efforts to provide quality medical care for their child and our patient. This hurdle is especially discouraging if you truly believe that you have only the best intentions in mind. Finding a balance between the patient-parent-physician relationships is paramount in navigating the complications that will inevitably arise when caring for pediatric patients.
As I reflect on my own experiences dealing with difficult parents and guardians, one example quickly comes to mind. I distinctly recall having a patient who had a cellulitis infection with a high white count and a developing abscess. His mother was developmentally delayed and his grandmother was making all the decisions for her grandson's care. She was firm on leaving the emergency department and not getting admitted. She refused to allow anyone to attempt to place a peripheral IV, which was essential for the treatment plan. Upon first meeting this family, it was easy to see the dynamic, the grandmother clearly had all the control. After explaining the reasons for admission, it seemed we had reached a mutual understanding. However, upon realizing that the peripheral IV still needed to be placed, the conflict was reignited. I remember arguing with the grandmother in an attempt to get my point across and then suddenly realizing that this tactic was futile, I needed a new approach. I wasn't sure how much information I should share with the family for fear that they would misconstrue it, but I did know it was crucial for me to inform them of the risks associated with leaving the hospital with the hope that they would realize the gravity of the situation. The patient's nurse and I were each other's biggest allies. We focused our efforts in one common goal, getting this patient admitted. After more disagreements and even threats, we were somehow ultimately successful. Later that evening, I was called to the patient's bedside. His grandmother saw my face and promptly told me that she wanted to see another doctor. I told her that was not possible and that I was the only doctor she could speak to at that time. I was able to answer her questions, and review the plan for her grandson again. Then, to my surprise, she broke down, started crying, and apologized to me for her behavior. This experience taught me a lot of things, but here are just a few: firstly, all I can do is my best, secondly, I can only control my own behavior, and finally, I can give a family all the information I have, but if they are not ready to listen, they will never hear what I have to say.

In conclusion, these circumstances force the physician and team to find the most effective way to work with families and in doing so, learn how to best communicate their intentions for these parents' most precious responsibility, their child. When the physician, parent, and patient can find that common goal it makes it easier to communicate, which ensures a better hospitalization and a more fruitful relationship with the medical team. In this way, we can truly move forward in striving to uphold the ethical principles of autonomy, beneficence, non-maleficence, and justice in pediatric medical care.

The authors:

Ashley Serrett, MD: graduating PL-3 resident helped to launch our Global Health Track for the residents and after graduation will be entering a fellowship in Pediatric Emergency Medicine at Cohen Children's Medical Center, Zucker SOM at Hofstra/Northwell in New Hyde Park, New York.

Ellen Libby: graduating MPH student, just helped to launch an inter-institutional coalition to prevent diabetes in Guerrero, Mexico and dreams of working in refugee camps

Ellen Dowling: Current M2 studying for boards, a valiant and articulate advocate for all—worldwide—and one of the beating hearts of the Medical Spanish program (and REMEDY, and IHI, etc…)

Meredith Roach: Current M3 planning to go into Family Medicine, the founding mother of the Medical Spanish program, a brilliant raiser of communities and defender of the human spirit in all

Tiffany Liu: Med Masters student, life of the Global Health Coalition, experience working with MSF in NYC, innovative and committed global health advocate

# Powerful New Video Persuades Parents to Keep Kids in Booster Seats

*Kelli England Will, PhD, LCP, CPST*
*Professor of Pediatrics | Eastern Virginia Medical School*

Motor vehicle crashes are the leading cause of death for children over age 5, and are a major cause of injury and medical spending for all ages.[1] Each year in Virginia, three-fifths (60%) of the 4-9 year-old children injured in crashes are unrestrained or improperly restrained in a seat belt at the time of the crash.[2] Across the US, less than half (45%) of the children who need a booster seat use one.[3] Parents need education regarding why booster seat use is so important, why the law is not the best guide for safety, and how to know when their child is ready to transition. The Boost 'em in the Back Seat program, created by my team in the Pediatrics Division of Community Health and Research at Eastern Virginia Medical School (EVMS), packs all of this information into one entertaining (and motivating) 4-minute video.

Children are 45% less likely to be injured in a crash while riding in a booster seat compared to riding in the belt alone.[4] A booster seat raises a child up so the seat belt rests on the strong parts of the body, reducing stomach, neck, and spine injuries. Children are not ready for an adult seat belt until they reach 4 feet 9 inches (145 centimeters) tall, and the safety belt fits correctly. Some small children may need a booster seat until the age of 12. Children are ready for a seat belt when: (a) their knees can bend when sitting all the way back in the vehicle seat; (b) the shoulder strap crosses the center of their chest and rests on the shoulder (not the neck); (c) the lap belt fits on their hips, touching the upper thighs (not the stomach); and (d) their feet can rest flat on the floor.

Many parents of booster-sized children do not realize their child still needs a booster seat and are misinformed about guidelines for use.[5] Virginia legislation requires children to use booster seats until they turn 8 years old, but the law is a minimum cutoff for enforcement, not the best practice recommendation. Unfortunately, many children are prematurely transitioned to a seat belt on or shortly after their 8th birthday, regardless of the fact that very few pass the safety belt fit test at that age. Virginia is not alone in this regard, as only 12% of US children who fall within the upper range of booster seat use (54-56 inches tall) are traveling in booster seats.[3]

Risks and guidelines related to front seat positioning are also not well-understood by parents and not reflected in Virginia legislation for children over age 1. Rear seat use by 4- to 8-year-olds reduces their risk of fatal injury by 45% compared to front seat use (RR = 0.55).[6] Children under age 13 are safest in the back seat, but incidence of children riding in the front seat increases with each year of age. In Virginia, many 4th-6th grade children have the prevailing attitude that the back seat is for the "little kids," and report sitting up front "as often as [the driver] will allow it," which our research indicates is over half of the time.[7]

Caregivers of children over age 5 are a difficult population to reach because they (a) do not consider their children to be of "safety seat" age, and (b) have inherently low perceptions of vulnerability to crash injury.[8,9] In order to break through these barriers, safety advocates must get parents to pay attention to something they would normally dismiss as unimportant. Specifically, we must not only educate, but also persuade, engage, and motivate. The Boost 'em in the Back Seat program was created specifically for this purpose, with a focus on invoking feelings of vulnerability.

The 4-minute Boost 'em in the Back Seat video illustrates the danger of prematurely transitioning children to an adult seat belt before they are 4'9" tall. It conveys the power of crash forces, raises perceptions of risk, dispels misinformation, clarifies the safety belt fit test, and motivates action. The video draws heavily on psychological principles of behavior change and risk communication to motivate increased safety, and is designed for easy dissemination in a variety of settings. The video's approach is empirically supported to significantly increase caregivers' booster seat knowledge, risk-reduction attitudes, sense of fear related to the hazard, efficacy related to the recommended behaviors, and most importantly, observed booster seat use (by 16%).[10] The 4-minute video is designed according to the Extended Parallel Process Model and presents a proper balance of threat and efficacy content in order to increase feelings of vulnerability and motivate protective action. The video features a 9-year-old boy who is injured in a crash when not riding in a booster seat. His mother, not realizing her 4th grader still needed a booster seat, is distraught. Viewers learn about the fit test and are directed to the companion website to learn more. To produce the video, my team and I partnered with Jpixx Films. Casting and staging was a community effort, involving CHKD, EVMS, Portsmouth Fire and Rescue, Norfolk Police, and a number of first responders, medical personnel, and safety advocates who volunteered their time to play themselves in the video.

The video was released to the public just before Thanksgiving 2017 and within weeks, it was clear that it connected with its audience, as it was shared all around the world, generating newspaper and television interviews and appearing in the feeds of national media outlets like the Today Show and Good Housekeeping, as well as popular parent blogs like Scary Mommy. The video has garnered over 10.3 million views, was shared by 221,932 people, and has received 82,508 comments. The post's total reach has surpassed 25.8 million. Our companion website housing the fit test has also received 116,866 views from every state in the US and from 125 countries since the video's release.

Following our qualitative review of the over 82,500 comments and engagement with the video, we determined that the video was not only favorably received, but was also reportedly motivating behavior change. Parents are willing to use booster seats past age 8 and back seats until age 13, and were sharing the video and tagging friends and family, with comments such as, "Chloe needs to get back in the booster seat," and "I had no idea boosters were needed until 4 feet 9 inches," and "Please watch this!" Many parents were unaware of the risks and needed clarity regarding when to transition and how the law comes into play in that decision.

The Boost 'em in the Back Seat video is a free resource for use in almost any setting, and it has empirical support for increasing child passenger safety. Watch the video at www.boosterseats4safety.org. If you would like to join the conversation and help spread


the word about booster seats, we are looking for partners across Virginia who are willing to share the video with parents. The 4-minute video and a 30 second version are available on our website (to stream or download) in English and Spanish languages, and we also have USB versions available. The website houses an interactive safety belt fit test and a variety of posters, educational handouts, and other resource information. If you would like to partner, learn more, or provide feedback, we would love to hear from you! Contact us at carsafetynow@evms.edu or 757-446-5799.

References cited:

1. *Centers for Disease Control and Prevention. Ten Leading Causes of Death and Injury. 2017; www.cdc.gov/injury/wisqars/leadingcauses.html. Accessed December 17, 2017.*
2. *Virginia Department of Motor Vehicles. 2015 Virginia Traffic Crash Facts. Richmond 2016.*
3. *Li HR, Pickrell TM, Shova KC. The 2015 National Survey of the Use of Booster Seats. Washington, D.C. 2016. DOT HS 812 309.*
4. *Arbogast K, Jermakian JS, Kallan MJ, Durbin DR. Effectiveness of belt positioning booster seats: An updated assessment. Pediatrics. 2009;124(5):1281-1286.*
5. *Durbin DR, Committee on Injury Violence and Poison Prevention. Technical Report--Child Passenger Safety. Pediatrics. 2011;127:e1050-e1066.*
6. *Durbin DR, Jermakian JS, Kallan MJ, et al. Rear seat safety: Variation in protection by occupant, crash and vehicle characteristics. Accident; analysis and prevention. 2015;80:185-192.*
7. *Will KE, Dunaway KE, Lorek EJ, Jr. Tweens at risk: Examining car safety practices in four economically disadvantaged urban elementary schools in Virginia. J Safety Res. 2013;46:77-82.*
8. *Will KE. Child passenger safety and the immunity fallacy: Why what we are doing is not working. Accident Analysis and Prevention. 2005;37:947-955.*
9. *Will KE, Dunaway KE, Kokorelis DA, Sabo CS, Lorek EJ, Jr. Challenges and opportunities for promoting booster seat use: progressive dissemination of a high-threat message. Health Promot Pract. 2012;13(6):772-778.*
10. *Will KE, Sabo CS, Porter BE. Evaluation of the Boost 'em in the Back Seat program: Using fear and efficacy to increase booster seat use. Accident Analysis and Prevention. 2009;41:57-65.*

# Intracranial TASER dart penetration and management

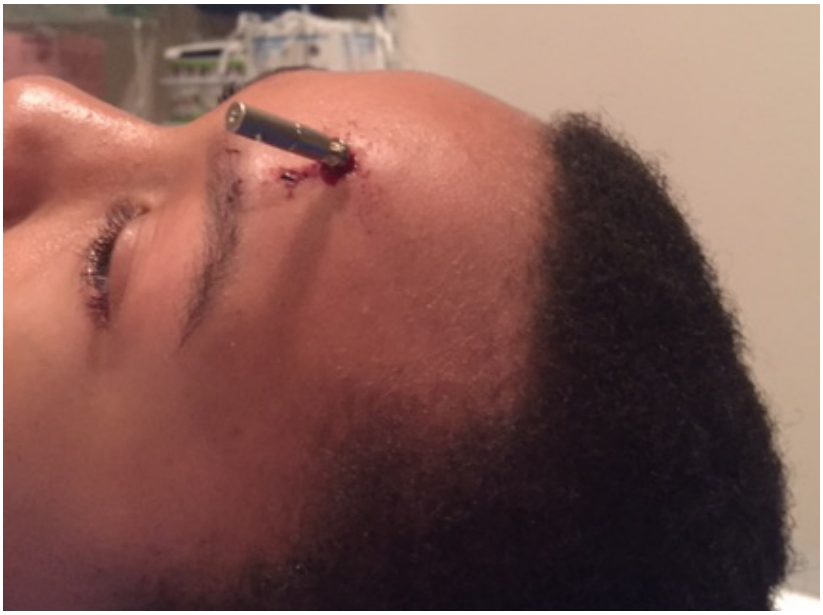


M. Ann Kuhn, MD

ABSTRACT: This is a case report of an intracranial TASER dart penetration. Removal was accomplished in the ED with sedation but review of the literature suggests operative management for adequate removal and washout. This case demonstrates the ability for successful removal without need for craniotomy.

INTRODUCTION: This case of intracranial TASER dart penetration is not a common event reported in the literature. The literature regarding 3 cases was reviewed as well as TASER specifications.

CASE REPORT: This is a case report of a 10 year old male who sustained TASER dart penetration to his left frontal region. His family had possession of a TASER and a family member was demonstrating the device when it discharged by accident striking him with a single TASER barb to his forehead specifically in the left supraorbital region (figure 1: Photo of barb injury left frontal region). No shock was delivered. He was transported by EMS and by report the force caused him to fall but he had no loss of consciousness and no hemodynamic instability. Upon presentation he was neurologically intact but was complaining of pain at the site. We obtained a skull series which seemed to demonstrate extension of the barb beyond the posterior cortical margin of the calvarium (figure 2: Plain film demonstrating penetration through skull). CT head showed the barb piercing the paramedial left frontal bone and extending through the anterior and posterior cortex entering the left frontal brain parenchyma (figure 3: Shows intracranial extension of the barb). There was a 3 mm area of hyperattenuation seen which was thought to represent artifact or a small amount of parenchymal hemorrhage. Consultation with Neurosurgery was obtained and after review the Neurosurgeon elected to remove the barb under sedation in the ED. This was successful and the child was admitted for observation, antibiotics and neurologic surveillance. He obtained a repeat CT head the next day showing a small left frontal bone fracture, complete removal of the barb and no parenchymal or extra-axial hemorrhage. He was discharged in stable condition.



DISCUSSION: Stun guns were initially introduced in the 1960s but the TASER was developed in 1974. The newer devises can deliver up to 50,000 volts at 26 watts with a range of 15-17 feet. These weapons were designed to deliver a 10 second pattern of incapacitation with each pull of the trigger and can shock up to 30 seconds which gives the law enforcement personnel time to gain control in a threatening situation.1 These devices have been developed to be sold commercially as well.

Once the trigger is pulled a blast of compressed nitrogen launches the two barbed darts at 55 meters/second less than a fifth the speed of a bullet from a typical pistol. Each barb weighs 1.6 grams and is 9 mm from the tip and is designed to penetrate clothing and the insulating outer layer of skin. Both barbs must strike the individual or one must hit the ground to deliver the shock.[2]

Removal of the TASER barb is typically undertaken by field personnel and there are multiple websites reporting correct technique of removal as well as indications for transport to a medical facility. One such website is http://www.biotel.ws/TreatmentGuidelines/TASERBarbRemoval.html .

Review of the three documented cases was undertaken. In all three cases of penetration of the skull, attempts at removing the device at bedside were unsuccessful. In two of the cases it was felt to be due to the complete penetration of both inner and outer tables of the skull. In these cases attempts to remove the barb resulted in the TASER barb breaking and required craniectomy to remove the residual foreign body.[3] The barb did not penetrate the inner table of the skull in the third case. Attempts at removal resulted in breakage of the barb but the decision was made to leave the fragment that was just superficial to the inner table of the skull.[4] Based on this review of the literature it would appear that when the barb penetrates the inner and outer tables of the skull, neurosurgical consultation for surgical removal of the barb should be considered. In this particular case of penetration through the inner and outer tables of the skull, consultation with neurosurgery resulted in an attempt to remove the barb under sedation in the Emergency Department. This was successful and avoided the need for surgical intervention. This case demonstrates that it is a reasonable option, with neurosurgical support and in a stable patient, to attempt removal of a TASER barb with intracranial penetration before proceeding with surgical intervention.

References:
1. Knoll M, Tchou P, Upsom S. How a taser works. IEEE Spectrum. 2007;Nov 30.
2. Kaloostian PE, Tran H: Intracranial taser dart penetration: Literature review and surgical management. Journal of Surgical Case Reports. 2012; 6:10
3. Rehman T, Yonas H, Marinaro J: Case report: Intracranial penetration of a TASER dart. American Journal of Emergency Medicine,. 2007;25:733
4. Mangus BE, SHen LY, Helmer SD, Maher J: Taser and taser associated injuries: A case series. American Surgeon 2008;862-865.

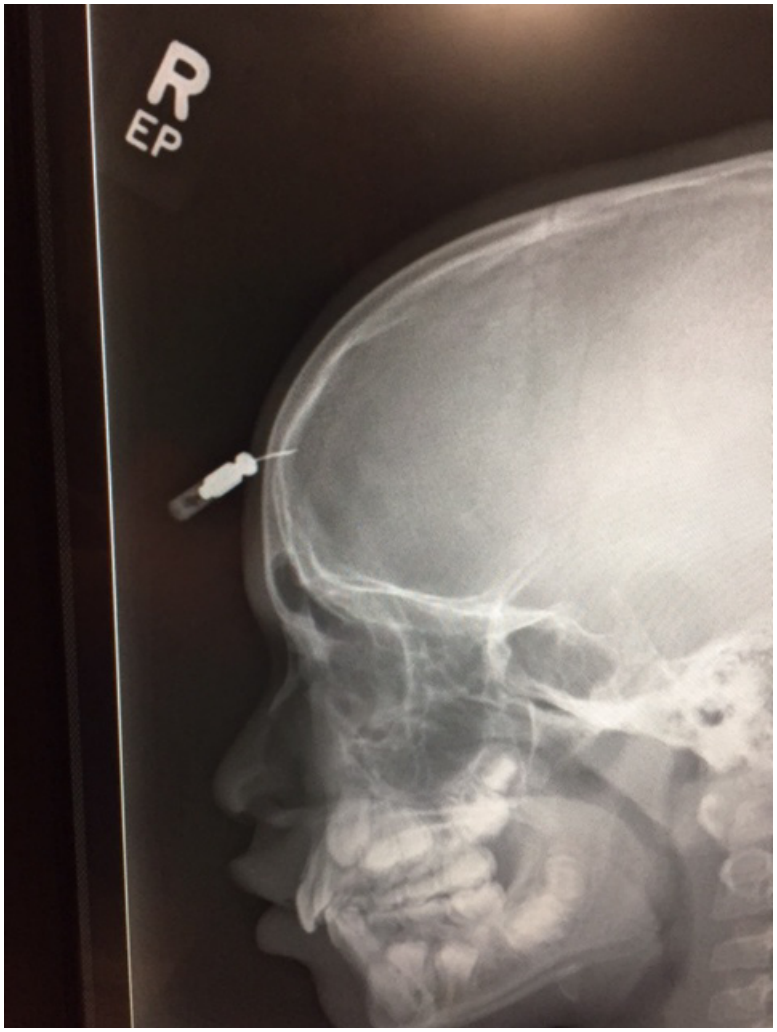



figure 1: Photo of barb injury left frontal region

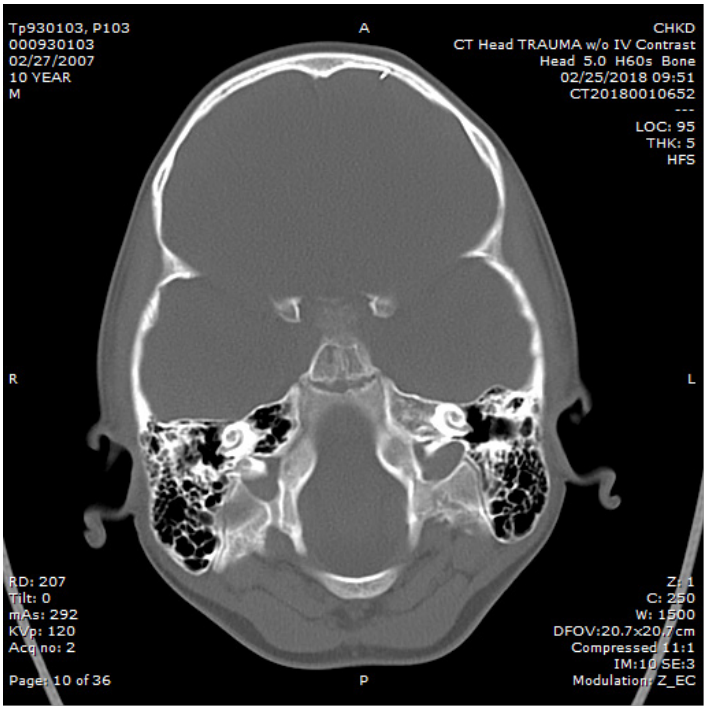



figure 2: Plain film demonstrating penetration through skull

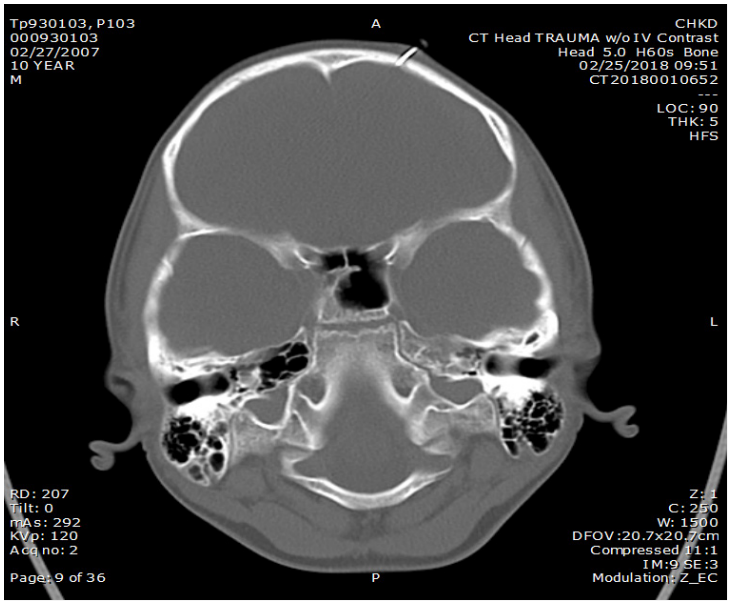



figure 3: Shows intracranial extension of the barb

# One Million Ounces Donated to the King's Daughters Milk Bank

*Michelle Brenner, MD, IBCLC*
*Pediatrician | Breastfeeding Medicine Specialist*
*Children's Hospital of the King's Daughters*

The non-profit, King's Daughters Milk Bank is approaching year 4! In March, we celebrated one million ounces of breast milk donated to the bank. We are so proud of our altruistic milk donors for "Sharing the Health" and being on the forefront of providing this life-saving medical treatment for fragile infants.

Since opening in 2014, we have screened over 2000 lactating women with Virginia mothers making up the overwhelming majority of our donor pool. We receive on average 6000 ounces of milk to the bank each week. After pooling the milk of 3-5 mothers, performing gentle pasteurization and obtaining negative cultures, the donor milk is delivered to NICU's and outpatient families stretching up and down the East Coast. We are pleased that much of this milk is being used right here in Virginia, in all levels of neonatal care units. Several newborn nurseries have started to use pasteurized donor human milk (PDHM) as a bridge to exclusive breastfeeding in infants that need supplementation.

One of the most rewarding activities in the milk bank continues to be helping families who have experienced the loss of an infant. Our bereaved moms each have their own story to tell—from a miscarriage, stillbirth, NICU stay or unexpected death at home. Some mothers donate the milk they already have stored in their freezers, and others will begin or continue expressing breastmilk to donate as a tribute to their son or daughter. We have helped over 100 bereaved families to experience and benefit from the physical, emotional and spiritual healing surrounding legacy breast milk donations. We encourage healthcare providers to develop a level of comfort discussing the imminent onset of lactation with women delivering a live or stillborn infant at any point beyond 16 weeks gestation. Women who have experienced a loss after the onset of milk production also need their lactation desires assessed and guidance regarding the cessation of milk production and/or the option to donate their breast milk in memory of their baby. The King's Daughters Milk Bank makes bereavement donations as easy as possible, accepting any volume a mother has to give, arranging for expedited screening, and shipping from home or right from the NICU so parents do not have to return to pick it up.

- Many thanks to all of the pediatric providers in Virginia who have been recommending the King's Daughters Milk Bank to families with surplus milk and for signing off on the donor infant health forms!
- Please contact us if you have an outpatient infant with a potential medical need for PDHM.
- Cheers to General Booth Pediatrics of Children's Medical Group in Virginia Beach on their upcoming first anniversary as a very successful King's Daughters Milk Bank Depot/Milk Collection Center!
- We are also very grateful to The King's Daughters for their generous ongoing support of the milk bank and look forward to our new King's Daughters Milk Bank facility opening late this summer.

For more information:
www.chkd.org/Our-Services/Specialty-Care-and-Programs/Milk-Bank
757-668-MILK

# Is the End of Peanut Allergy but a Dream?

Angela Duff Hogan, MD | Associate Professor Pediatrics
Children's Specialty Group, CHKD EVMS | Division of Allergy/Immunology

We are experiencing a food allergy epidemic. Among children, the diagnosis of food allergy increased approximately 50% between 1997 and 2011, according to a study released in 2013 by the CDC.[1] The most severe reaction to food, anaphylaxis, has risen by 377% from 2007 to 2016. This data is according to a recent report published by FAIR Health, an independent nonprofit that collects data for and manages the nation's largest database of privately billed health insurance claims. [2] Among the 15 million Americans that are allergic to foods, peanut makes up 25% of those allergies.[3] The next natural question is "why"? Some feel it is based on changes in our culture and feeding patterns.

***Through the years***

**In the 1950s**, about 45 % of infants were breastfed.[4] There were readily available manufactured formula and infant foods post-World War II and the incidence of food allergy was low. The Pediatrics Committee on nutrition in 1958 recommended, "On the basis of present knowledge, the committee is in agreement that no nutritional superiority or psychological benefit results from the introduction of solid foods into the infant diet prior to 2 to 3 months of age." [5] June Cleaver would have said, "whoever heard of food allergies, now eat your fresh, never frozen, perfectly seasoned, home-cooked dinner that I have been preparing all day, please." **In 1970**, Carol Brady and only 25% of mothers were breastfeeding with the mean duration of breastfeeding three months. As increasing emphasis was placed on many issues such as immunologic protection and maternal-infant bonding, **by 1982**, the number had risen to 61% of mothers initiating breastfeeding with 40% continuing three months or longer. The American Academy of Pediatrics stated that soy was a good alternative in potentially allergic infants (with a family history of atopy) who had not shown clinical manifestations of allergy yet.[6] There were some studies at that time that stated early exposure to a diet diverse in potential food antigens may act to predispose susceptible children to recurrent or chronic childhood eczema.

**In the early 90s**, as Peggy Bundy moved her family towards more microwavable dinners and convenience foods, the American Academy of Pediatrics also shifted its recommendations about early infant feeding. The AAP recommended appropriate solid foods should be added between the ages of 4 and 6 months and that whole cow's milk not be used during the first year of life due to the increased risk of developing type I diabetes mellitus. [7,8] **In 2000**, the American Academy of Pediatrics Committee on Nutrition published guidelines to aid in the prevention of food allergies, aimed at high-risk infants (biparental; parent, and sibling any allergies). The guidelines stated that breastfeeding was generally protective of food allergies, that mothers of high-risk infants should avoid peanut during lactation, and weaning should involve an extensively hydrolyzed hypoallergenic formula. Rachel Green and Ross Geller would have followed these guidelines for Emma delaying the introduction of solid foods until after six months, cow's milk/dairy until after 12 months, eggs until after 24 months, and peanut, tree nuts, seafood after three years. While these guidelines were for "high risk" infants, they were readily embraced by the general population and most primary care physicians. Public opinion shifted and individuals began thinking peanuts actually cause allergy and that **all children** should not eat them until after the age of three. In 1999, 0.4% of US children had been diagnosed with a peanut allergy. By 2010, 2% of US children were diagnosed with peanut allergy.[10] This spike in prevalence lead other individuals to question what were we doing wrong?

In 2008, the American Academy of Pediatrics Committee On Nutrition recanted their 2000 recommendations and stated there was insufficient evidence to recommend avoidance of any food after the age of 4-6 months in order to prevent allergies.[11] This committee, however, made no specific recommendations as to how to proceed with feeding high-risk infants so no significant changes in infant feeding practices occurred.

In 2010, new advice was published, "Guidelines for the diagnosis and management of food allergy in the United States," by an Expert Panel and a Coordinating Committee convened by the National Institute of Allergy and Infectious Diseases (NIAID).[12] The guidelines stated that, "insufficient evidence exists for delaying the introduction of solid foods, including potentially allergenic foods, beyond 4 to 6 months of age, even in infants at risk of developing allergic disease.' No mention of prevention strategies was made at that time due to lack of studies. Questions began to arise. "Was it harmful to delay foods and how important is allergen exposure during infancy?"

**Pivotal Observation: Turning the Tide**

In 2008, Du Toit and his colleagues from the United Kingdom published a paper that compared the prevalence of peanut allergy in Jewish children who were reared in Israel compared to the UK. There were 10X more children with peanut allergy in the UK than in Israel. They reported that by 7 months, 70% of Israeli infants had been introduced to peanut compared to 10% of English infants.13 could early introduction be the key to preventing peanut allergy? This observation led researchers to begin the landmark study called the LEAP trial.

**LEAP (Learning Early About Peanut allergy)**

Dr. Gideon Lack and colleagues believed that early introduction (before 11 months) of peanut-based products was essential in order to prevent peanut allergy in high-risk infants. Their study was published in New England Journal of Medicine in February 2015.14 In this first prospective randomized controlled trial, infants were selected if they were between 4 and 11 months old and had severe eczema and/or egg allergy. Over 600 infants were randomized to eat peanut products three times per week or have no peanut products (controls) until the age of 5. At age 5, there was a striking difference in the incidence of peanut allergy between the two groups. Only 3.2 % of peanut ingesting group developed peanut allergy, compared to 17.2% avoidance group ($p<0.001$, 81% relative reduction). This study demonstrated in high-risk infants, that early introduction and sustained ingestion was highly effective

... cont. on page 11

at preventing the development of peanut allergy. 92% adherence to the study protocol was also noted in the first two years.

Following the publication of the LEAP trial, "Consensus communication on early peanut introduction and the prevention of peanut allergy in high-risk infants" was published which stated there was now level one evidence to support screening of infants and encourage early introduction of peanut to high-risk infants.[15] It also stated that delayed introduction can be associated with increased risk of peanut allergy but no details on how to specifically screen and funnel to care the thousands of high-risk infants were made.

**Who needs peanut screening?**

Last year, the "Addendum guidelines for the prevention of peanut allergy in the United States: Report of the National Institute of Allergy and Infectious Diseases-sponsored expert panel" was published with much more details provided for screening infants and home/office peanut introduction.[16]

The guidelines recommended:

- Infants with severe eczema and/or egg allergy ----Test before introduction
- Infants with mild to moderate eczema--- Not studied but guidelines suggest early introduction may be helpful
- Infants with no eczema or food allergy---- Age appropriate time, no different than any other food

The guidelines suggested pediatricians could refer high-risk infants to allergists or screen with a serum specific IgE to peanut. If the blood test was positive they recommended referral for additional testing and possible in office introduction. If screening was negative, detailed instructions for family home introduction were provided. Additionally, the "Expert panel did not recommend food allergen panel testing or the addition of serum IgE testing for foods other than peanut because of their poor positive predictive value, which could lead to misinterpretation, over-diagnosis of food allergy, and unnecessary dietary restrictions."
So How Are We Doing?

In March, investigators at Emory University reported results of their quality improvement project to assess how well the new guidelines were being implemented for screening in a large academic general pediatrics practice. They completed 6 different , 1-week cycles using multiple strategies for implementation of guidelines at the 4 and 6-month well baby visits. 17% of the providers were implementing screening of 4-6 months with eczema and/or egg allergy by the end of the 6th cycle. Investigators suggested that time constraints and provider confidence in the new recommendations were possible obstacles for screening implementation.[17] Additional reports with small numbers of patients are suggesting that even when infants are screened and introduction is recommended at home, some parents do not go ahead and introduce peanut due to persistent fears.[18] Also, there are reports of families not continuing to give the peanut products for the 5 year duration as was demonstrated by the LEAP study.

There are many new questions now, "Is the Leap Study dose per week of peanut protein fixed? Is there a narrower window when peanut protein needs to be introduced? What is the minimal length of treatment necessary to induce tolerance to peanut? What are the potential risks of premature discontinuation or sporadic feeding of peanut?"[16]

Perhaps even more important questions are, "Why are we not screening more infants and why are the families not embracing this life-changing possibility?" Maybe our pop culture could lend a hand here and help us educate the masses. Maybe we all should dream a little longer.

*References*
*1. http://www.cdc.gov/nchs/products/databriefs/db121.htm*
*2. www.fairhelath.org/anaphylaxis*
*3. Pediatrics 2011 J UL; 128 (1) e9-e17*
*4. https://www.ncbi.nlm.nih.gov/books/NBK235588/*
*5. Pediatrics 1958;21;685*
*6. Pediatrics 1990; 86:4 541-546*
*7. Pediatrics 1992; 89:6 1105-1109*
*8. Pediatrics 1995; 96:3 515-517*
*9. Pediatrics. 2000 Aug;106(2 Pt 1):346-9*
*10. J Allergy Clin Immunol 2017;139:29-44*
*11. Pediatrics 2008;121:183-191.*
*12. J Allergy Clin Immunol 2010;126:S1-S58*
*13. J Allergy Clin Immunol 2008;122:984-91*
*14. New England Journal of Medicine 2015;372(9):803-813.*
*15. J Allergy Clin Immunol 2015;136:258-61*
*16. J Allergy Clin Immunol 2017;139:29-44*
*17. J Allergy Clin Immunol 2018; 141: 189; (abstract) 595*
*18. J Allergy Clin Immunol 2018; 141: 89; (abstract) 596*

# All hives are not due to allergy: Updates on Guidelines for Diagnostic Testing in Acute and Chronic Urticaria

Evelyn Wang, MD | Kelly Maples, MD | CHKD - EVMS

"Grayson's had hives for 3 months. I'm here to find out which foods he's allergic too."
"Rachel had blood testing for multiple food allergies because she had hives for two weeks. The test says she's allergic to milk and peanuts but she eats these foods regularly. Is she really allergic to these foods?"
"Jamie gets hives all the time. Urgent care gives him steroids each time we take him there. Can you provide me with a prescription for steroids to keep at home so we don't have to go back to urgent care?"

Hives are uncomfortable for our patients and cause anxiety for parents and caregivers who worry that hives may be a sign of a pending severe allergic reaction. Itching can interfere with sleep and impact school performance. The above examples are commonly encountered at our pediatric allergy clinic and general pediatricians are faced with the same challenges.

Urticaria is typically characterized by erythematous, pruritic wheals of different sizes and shapes often with central clearing. Chronic urticaria is defined as constant to intermittent urticaria lasting longer than 6 weeks[1]. While previously thought chronic urticaria was less common in children, recent investigations show prevalence and underlying causes of chronic urticaria are similar to adults[2]. Acute urticaria is more common, with 20% of children experiencing at least one episode. It is important to understand acute versus chronic urticaria and the diagnostic tests indicated.

Acute urticaria and angioedema should be distinguished from anaphylaxis. While anaphylaxis can also present with urticaria, like rash, it is usually accompanied by hypotension or at least two organ systems such as pulmonary, gastrointestinal or, nervous system symptoms. These symptoms present as wheezing, cough, vomiting, diarrhea, dizziness or loss of consciousness. If anaphylaxis is suspected or cannot be excluded, epinephrine should be prescribed. However, if no symptoms of anaphylaxis are present and the hives were not temporally related to a suspected food allergen, no epinephrine auto-injector is needed. Acute urticaria secondary to food allergy typically begins 5-30 minutes after ingestion and lasts hours not days.

Another differential diagnosis for acute urticaria is a serum sickness like reaction (SSLR) with large erythematous urticarial plaques. However, with SSLR, joint swelling and pain are usually seen[3]. SSLR in children is often associated with drugs and can last up to 6 weeks after the offending agent is discontinued.

Urticaria with central clearing is frequently mistaken for the target lesions of erythema multiforme (EM). The lesions of EM always demonstrate 3 zones while urticarial lesions with central clearing only have 2 zones. EM lesions consist of central purpura, a palpable pale ring and an outer rim of macular erythema.

Viral infection is the most common cause of acute urticaria in children and can be distinguished clinically from food allergy by the temporal characteristics discussed above. Chronic urticaria is intermittent or constant urticaria lasting over six weeks[1]. It may last years. Although histamine mediated, chronic urticaria not considered an allergic condition. Some patients with chronic urticaria have been found to produce autoantibodies against the high-affinity IgE receptor on cutaneous mast cells which leads to mast cell degranulation and urticaria.

Although most cases do not have an identifiable cause, it is still important to consider all possible causes first. Detailed history includes questions involving time of onset, shape, size, frequency of wheals, associated angioedema, associated symptoms, induction by physical agents or exercise, occurrence related to foods, drugs, infections, stress, past medical history (including previous therapies, previous diagnostic results and procedures), and social history (including travel, leisure activity)[2].
In patients with wheals and without angioedema, urticarial vasculitis and autoimmune disorders such as Schnitzler syndrome, crypopyrin-associated periodic syndromes (CAPS) should be ruled out[2]. Many other autoimmune disorders including systemic lupus erythematosus, dermatomyositis, polymyositis, Sjogren syndrome, Still disease have also been associated with chronic urticaria1.
In patients with angioedema and without wheals, bradykinin-mediated angioedema like angiotensin-converting-enzyme (ACE)-inhibitor induced angioedema or hereditary angioedema should be considered[2].
Inducible urticarias include physical urticaria and cholinergic urticaria. Physical urticaria is associated with a stimulus including cold, heat, delayed pressure (such as tight clothing or a heavy backpack) and dermatographia. Physical urticaria can affect 22% of children presenting with chronic urticaria[3]. Cholinergic urticaria can affect 2.2%-6.5% of children with chronic urticaria. Patients present with itchy pinpoint wheals induced by heat, exercise and hot showers.

Because acute urticaria and angioedema will usually resolve without treatment, laboratory evaluation is not recommended[2]. Differential blood count, ESR and/or CRP, liver enzymes and thyroid stimulating hormone measurement are no longer advised. Testing for autoimmune, infectious and endocrine abnormalities should be directed by history and physical exam and should not routinely be ordered for patients with chronic urticaria. Although an assay for autoantibodies against the high-affinity IgE receptor on cutaneous mast cells exists, it is not recommended as it does not change management of these patients.

A detailed history will identify the need for skin testing or immunoassays if a specific allergic trigger such as a food or drug (most commonly non-steroidal anti-inflammatory) is suspected. These should be eliminated if strongly suggested by a detailed history until the child is evaluated for an allergy to the specific allergen. If skin testing is warranted, it should be performed after resolution of acute urticaria and after suspension of antihistamines. It is important to order allergy testing only to the specific allergen in question and not to an indiscriminate panel of foods. Because skin testing and specific IgE immunoassays to foods have a high false positive rate of 84-96%, only test to foods that have a high pretest probability of being the cause of the child's hives by history. If a

... cont. on page 15

child is currently eating a food that she was found to have elevated IgE to on an indiscriminate food panel, that food should not be removed from her diet. In some cases of acute urticaria, an oral food challenge supervised by an allergist may be necessary.

Identifying and eliminating underlying causes of acute and chronic urticaria is important in management. Avoidance of medications thought to cause urticaria, as well as physical stimuli such as wearing looser clothing, loosening bag handles, avoiding sun and water, and eradication of infectious diseases are suggested. After elimination and avoidance, second generation antihistamines are first line agents in acute and chronic urticaria.

Management of chronic urticaria is advised in a four-step process. Monotherapy with second generation antihistamines are first line agents along with avoidance of triggers such as heat and tight clothing. Second step therapy for patients with unsatisfactory responses to step one is either a dose increase of second generation antihistamine, adding another second-generation antihistamine, adding a H 2 antagonist (about 20% of cutaneous histamine receptors are H2), leukotriene receptor antagonist or a first-generation antihistamine to be taken at bedtime. Step three is dose advancement of potent antihistamine (hydroxyzine or doxepin as tolerated). Step four is adding another alternative agent like omalizumab or cyclosporine 1. Omalizumab has become the preferred treatment over cyclosporine and sedating antihistamine regimens with hydroxyzine or doxepin as it is better tolerated and has a more favorable side effect profile.

A careful history and physical exam is of the utmost importance when presented with a case of acute or chronic urticaria. Patient education will inform families of what to expect, how to treat hives and that hives do not mean their child has a food allergy nor does it mean the child is at risk for a severe allergic reaction. Although managed by allergists, chronic urticaria patients should not undergo food allergy testing. Environmental allergy testing is also unnecessary. Antihistamines are the mainstay of treatment, often at higher than usual dosages; topical therapies will not benefit children with hives and oral steroids should be avoided if possible. Omalizumab can improve the quality of life of patients with difficult to treat chronic urticaria. Because the differential diagnosis in acute and chronic urticaria is vast, it is important for practitioners to perform a thorough history and physical examination to target testing. In many cases, however, the identification of a cause is difficult and families should be aware that often no laboratory testing is indicated.

*References*

1. *Bernstein J, Lang D, Khan D. "The diagnosis and management of acute and chronic urticaria: 2014 update" J Allergy Clin Immunol. 2014; 133(5): 1270-1277*
2. *Zuberbier T, Aberer W, Asero R, et al. "The EAACI/GA2LEN/EDF/WAO Guideline for the Definition, Classification, Diagnosis and Management of Urticaria. The 2017 Revision and Update" doi:10.1111/all.13397*
3. *Ben-Shoshan M, Grattan C. "Management of Pediatric Urticaria with Review of the Literature on Chronic Spontaneous Urticaria in Children" JAllergy Clin Immunol Pract. 2018. Article in Press*
4. *Goldstein S, Gabriel S, Kianifard F et al. "Clinical features of adolescents with chronic idiopathic or spontaneous urticaria" Ann Allergy Asthma Immunol. 2017; 118(2017): 500-504*
5. *Williams P, Kavati A, Pilon D. "Treatment Patterns, Healthcare Resource Utilization, and Spending Among Medicaid-Enrolled Children with Chronic Idiopathic/Spontaneous Urticaria in the United States" Dermatol Ther (Heidelb). 2018; 8: 69-83*

# Reach Out and Read Update

Dionne Palmer, MD | Attending Pediatrician, General Academic Pediatrics ROR CHKD

Reach Out and Read Virginia
Doctors Prescribing Books

For most pediatricians, it seems intuitive that books and child rearing go hand in hand. This explains why many of us appreciate the opportunity that Reach Out and Read offers our families. The premise of Reach Out and Read is simple, to make literacy promotion a standard part of pediatric care. Reach Out and Read gives children a foundation for success by incorporating books into pediatric care and encouraging families to read together.

The components of the program are simple. First, we do our best to create a literacy rich environment in our waiting and examination rooms. This can be as simple as having gently used books and magazines available for our families to read and explore. Second, we provide a new, developmentally and culturally appropriate book at each well visit starting at 0-6 months old to 5 years of age. Third, we give anticipatory guidance to our families on the importance of reading aloud and engaging children with books. We may even take a few moments to model how to use the books with children in the examination room while assessing their developmental milestones. With these three components, we impart the importance of book sharing at the earliest visit possible. The goal is to establish behaviors that will become a part of the daily routine in the home. The cost of the program is minimal, about $20.00 per year to cover one child.

We all know the difficulties that some of our patients experience with school readiness. Greater than one-third of children lack the basic literacy skills needed to excel in kindergarten. We also know that these children who enter kindergarten unprepared will have a greater risk of sustained school difficulties throughout their academic careers. This is even more relevant for children that are living in poverty. About one-third of young children and one half of children living in poverty lack the pertinent skills needed to achieve kindergarten success.
Not only does Reach Out and Read help with school readiness, but it also promotes positive parenting early in life that creates a strong parent-child relationship. Furthermore, this environment helps to engender healthy brain development.

There is undeniable evidence that this program is effective. ROR is one of the most researched early litracy models available. The research shows that our patients have improved language and comprehension skills, are read to more by their caregivers and have a greater love of reading overall.

We here at CHKD, are extremely proud of our program. All 29 of our pediatric practices participate in the program. All 70 of our pediatrics residents are trained annually to ensure we provide the highest quality program. Last year, we distributed almost 40,000 books at the specified well child visits. We also provided 13,000 sibling books to those children who are not here for checkups or outside of the specified age range.

I am most proud of our residents and how they have embraced the importance of literacy, especially, the critical value of an early introduction to literacy. Through their efforts, we have established a summer reading program. Patients of all ages sign up to read over the summer and log their time and books. They are also encouraged to visit the library and are given extra incentives to obtain library cards. At the end of the summer, we have a reception where they receive certificates and a new book. In addition to books, we also provide donated school supplies. This is our third year for the summer reading program and the numbers continue to increase each year.

The residents have also recorded themselves reading their favorite children's books in English, Spanish, and other languages. This recording will be played in the waiting room of our continuity clinics, which will model the importance of reading aloud. Furthermore, this helps enhance our literacy rich environment.

We are also in the process of assessing the impact of our literacy promotion on kindergarten readiness for our patients. This is a three-year summer scholar project and we are in the second year.

We are excited and fully committed to the ROR program here at CHKD. I encourage all of us to stay committed to the principles of the program. Know that we are making a huge impact in the lives of the patients we serve by promoting book sharing and encouraging reading aloud every day.

# Stepping Out to Step In: Leveraging the Strength of Social Determinants of Health

**Ellen Dowling, MD | Tiffany Liu, MD | Ashley Serrette, MD | Ellen Libby, MD | Meredith Roach, MD**

Effective and sustainable efforts to address global health disparities require an appreciation of how social factors dictate health, compelling us to first step out in order to step in. By doing so, we experience, listen, and learn about the individuals and the communities we seek to serve, allowing us to develop cultural competence and to gain an understanding of the interplay between social determinants and patient outcomes. To date, health disparities remain pervasive with race, gender, age, and education at the forefront of factors impacting health outcome. As the sliding scale of poverty continues to discriminate against the most vulnerable, the health gap widens between those who have and those who lack access to quality health services. A deeper understanding of these social determinants of health will enable us as healthcare professionals to approach global health from an ethical, socially responsible, and culturally sensitive lens.

To start, we must be guided by a high ethical standard in our efforts to address global health discrepancies. An understanding of the social determinants of health will allow us to be cognizant of potential ethical issues we may encounter, and ensure we are appropriately trained and prepared to provide care within a framework that is respectful of the culture. It is equally important to appreciate community dynamic in our efforts to work collaboratively with local leaders and caregivers. By coupling a deeper understanding of social determinants with ethics, we may be able to act as agents-of-change to address the structural violence that impedes health and human dignity.

Furthermore, social responsibility necessitates an understanding of the broader forces that impact health in the communities we seek to serve. Problems related to access to quality healthcare and improvement of a population's health outcomes are best identified at the community level, but methods to amend the disparities may not be easily discerned. Solutions that have demonstrated success in communities within the United States may not be appropriate in a global setting, but could potentially offer a creative start. For any solution to take root, it must demonstrate a respect for the community we serve. Thus a deeper understanding of the social determinants of health will best equip us to establish solutions that not only act to benefit the community, but also take into consideration the systemic problems that perpetuate health inequalities.

Similarly, efforts to be culturally sensitive require us to first learn how to work respectfully within the framework of the community we seek to serve. From this critical step, we can build trusting relationships to promote efforts to improve health practices and sustainable healthcare systems. As healthcare practitioners, our vision of those we are trying to serve needs to be contextualized in reality and deepened with background knowledge. We must step outside our communities and into unfamiliar territories to gain varied perspectives to more deeply serve as global health providers.

**Thus by leveraging the strengths gained from understanding the social determinants of health, we as aspiring global health professionals are able to learn and grow.**

# Pediatricians Performing Pre-Operative History and Physicals for Dental Sedations

Brian Schmitz, DMD | John Unkel, MD, DDS | Judy Reinhartz, PhD | Dennis Reinhartz, PhD | Benjamin Djeukeng, PhD

Abstract

**Purpose:** This study evaluated if Virginia pediatricians were willing to perform pre-sedation History and Physicals (H&P) for in-office dental sedations and evaluated their responses. **Methods:** A questionnaire containing 13 items was developed and disseminated to members of the American Academy of Pediatrics-Virginia Chapter (VA-AAP) (n=1150) who had a registered email account with the VA-AAP. **Results:** Forty-three of the pediatricians who responded, over 78% of these pediatricians did not believe a dentist should perform the pre-sedation health evaluation without a medical H&P, and over 87% did not know the current guidelines from the American Academy of Pediatrics and the American Academy of Pediatric Dentistry allow an appropriately licensed dentist to complete the pre-sedation health evaluation without a medical H&P. The most common reason reported by pediatricians denying a pre-sedation H&P was that the dental office does not have skilled personnel for sedation emergencies. **Conclusions:** Most responding pediatricians believe a medical H&P completed by the patient's pediatrician is a helpful adjuvant for in-office dental sedations. Although most pediatricians elect to complete pre-operative H&P for in-office dental sedations, a large majority were unaware that the guidelines permit an appropriately licensed dentist to perform a pre-sedation health evaluation without first acquiring a medical H&P.

**Introduction**

With the number of moderate sedation procedures on the rise[1] and national news covering cases of patient morbidity/mortality in dental offices, scrutiny of sedation in the dental office has increased. Due to a child's anatomy and physiology, sedation in pediatric patients include more risk compared to a sedation in adults.[2, 3, 4] One of the best practices to limit complications is to have a thorough history and physical (H&P) to identify any patient or family health condition that may complicate a moderate sedation procedure.[2] The American Academy of Pediatrics (AAP) and the American Academy of Pediatric Dentistry (AAPD) collaborated on sedation guidelines updated in 2016. According to these 2016 guidelines, "an appropriately licensed practitioner" will perform the health evaluation pre-operatively.[2] The guidelines do not specify what constitutes an "appropriately licensed practitioner," so often a pediatric dentist will perform the pre-operative sedation evaluation and rely on parental recall of the patients' medical history. An issue arises when the patient's medical history, from birth to procedural date that is provided to the dentist may not be as complete as the medical history on record by the patient's physician. Dentists also may not be trained to perform physical evaluations to the same degree as physicians. Without a thorough medical H&P, medical conditions that cause sedation adverse events can go undetected.[5]

According to AAP, best practices recommend getting a health evaluation with a focused physical evaluation of the airway prior to any sedation procedure to reduce the chances for complications.[2, 6] Age, weight, and vital signs need to be assessed preoperatively.[2] Data have shown that sedating patients with ASA classification of III or IV or younger than 25 months, have an increased risk of adverse effects when compared to patients older than 25 months or ASA I or II.[7, 8]

In addition to a thorough physical, taking a complete history of the pediatric patient can reveal many risk factors that might outweigh the potential benefits of performing the dental procedure under sedation.[2] It is critical that the practitioner understands what to look for and articulate what complications may arise. The AAP/AAPD guidelines,[2] state the pre-sedation work-up includes the completion of a history and physical focusing on the airway, cardiovascular, respiratory, gastrointestinal, hepatic, and renal systems.[2, 7, 9]
In situations where the patient's guardian does not accurately know the health history for their child from birth or when the pediatric dentist needs to know the severity of a patient's condition, having the ability to consult the pediatrician is an important aspect to providing safe care to the patient. For example, children with severe OSA will likely have opioid sensitivity, specifically the mu receptor,[10] and can reach an analgesic level at one-third to one-half of an opioid dose compared to a child without OSA.[10, 11] Patients with Down Syndrome can have an increased risk of having OSA12 and must also be evaluated for AtlantoAxial instability.[13] Patients with Marfan syndrome can also have OSA[14] and dilatation of the ascending aortic arch.[15] Patients with skeletal dysplasia can have restricted pulmonary function from the thoracic cage, airway and craniofacial abnormalities[16] as well as limited neck movement due to cervical spine stenosis or atlanto-axial instability.[17, 18] All of these conditions potentially can have more compromising pathologies that warrant the dentist to contact the patient's pediatrician to better understand all the risks and benefits involved and develop a proper treatment plan.
Even if a patient has not been diagnosed with any risk factors, undiagnosed risk factors can still be present.[5, 19] Undiagnosed risk factors can lead to life threatening complications, so it is critical that the clinician be competent in Pediatric Advance Life Support.[2, 20, 21, 22] A qualified practitioner needs

to be properly trained to identify and rescue a patient who falls one level of sedation deeper than intended,[23, 24, 25, 26] which is critical because a pediatric patient often needs to be placed into deeper sedation than an adult to avoid paradoxical reactions.[3, 4, 27, 28] By placing a patient in deeper sedation, the risk of cardiopulmonary adverse events is increased. A child has less ventilatory reserve in addition to an airway that is more susceptible to laryngospasm and impaired airway patency, which increases the risk of life threatening hypoxia.[27, 28, 29, 30, 31] Additionally, the pediatric heart can experience acute bradycardia due to the increased parasympathetic innervation that is less opposed by the sympathetic pathway during sedation.[27, 28, 29, 30]

**Design of the Study**

A search of Google Scholar, PubMed, and Cochrane library with key terms: "pediatric," "physician," "pre-operative," "before surgery," "dental", "sedation," and "history and physical" was conducted. With this search, no information was found on physician's opinion of pediatric dental sedations, showing the importance of this study.

Information from the current AAP/AAPD guidelines was used to develop a 13-item questionnaire. The questionnaire was designed to elicit opinions from pediatricians practicing in Virginia regarding the H&P requests from dentists and to the degree to which those requests were fulfilled. Information on the physician's position regarding in-office pediatric dental sedations was requested as well as information to assess for trends on social demographics and practice characteristics. An informal pilot study was conducted with physicians at a Virginia-American Academy of Pediatrics (VA-AAP) meeting to assess the clarity and validity of the items on the questionnaire, and appropriate changes were made based on their input. The items were finalized, edited, formatted, and uploaded onto SurveyMonkey. The questionnaire, as presented in the appendix, was sent to physicians via email along with a consent form. A link to the questionnaire was also attached in an official AAP newsletter. Requested completion of the questionnaire was made by email space two weeks apart on four separate occasions.

**Methodology**

A cross-sectional electronic questionnaire containing 13 questions was sent to Virginia members of the AAP (n=1150) via SurveyMonkey. A total of forty-three responses were received, which were reported as percentages. Chi square analysis was used to evaluate the significance of physicians performing H&P for in-office dental sedations. Chi square was used because the variables being analyzed were categorical; their measurements were nominal and were one dimensional. Inferential statistics then were used to derive the generalized perception of physicians in the state of Virginia on in-office moderate sedation performed by pediatric dentists. Three follow-up reminders were sent to those who had not responded. The questionnaire response rate was limited to one per computer, which was regulated by IP address through SurveyMonkey to prevent a single physician from making multiple responses.

**Results of the study**

After four messages with a link to the questionnaire were sent to 1150 members of the VA-AAP to participate in the study, 43 responded, yielding a response rate of 3.7%. Of those who did respond, 57% were female and 43% were male. Most of the physicians who responded have worked for over 21 years (55%), followed by 16-20 years (29%), 0-5 years (12%), 11-15 years (2%), and 6-10 years (2%).

These physicians overwhelmingly reported that an H&P from the patient's primary medical provider would be helpful (90%), but 14% reported they do not complete H&P for in-office pediatric dental sedations. When asked who should be able to perform the pre-sedation H&P, 93% reported an MD/DO, 71% reported a nurse practitioner, 57% reported a physician's assistant, 21% reported the dentist performing the procedure, and 5% reported the dentist not performing the procedure. When asked if they are familiar with the 2016 AAP/AAPD guidelines for pediatric sedation, 62% responded no and 38% responded yes. The physicians were also less likely to know that an appropriately licensed dentist is able to perform the pre-sedation H&P, with 88% reporting they were unaware and 69% reporting a dentist evaluation is not adequate for in-office sedations.

Most of the physicians (86%) reported performing H&P for in-office dental sedations, which was statistically significant (95% confidence level, alpha = 0.05) having a Chi square value of 19.558, one degree of freedom, and an asymptotic significance of 0.000. A similar number of physicians (88%) reported performing H&P for surgical center dental sedations. The respondents reported that a well-check done within the last six months is not a sufficient substitute for a pre-operative H&P with 74% of the responses saying no. Most of the physicians reported receiving 0-5 requests for pre-operative H&P a month (58%) followed by 6-10 requests (23%), 11-15 requests (10%), 16-20 requests (5%), and more than 20 requests (5%). All of the physicians reported completing the same number of H&P as were requested of them per month. When asked for reasons why some H&P requests were not fulfilled for in-office dental sedations, 24% reported that the dental office does not have skilled personnel for sedation emergencies, while 21% reported that an anesthesiologist is not available in the dental office. Fourteen percent of physicians reported that a seda-

tion should be performed in an ambulatory surgical environment by medical anesthesiologists, 11% reported that the dental office does not have an RN monitoring and recovering sedation patients while a dentist is performing or completing the procedure, and 10% report that the dental office does not follow the 2016 AAP/AAPD guidelines.

**Discussion**

Even though a large majority of the respondents felt that a pre-operative is helpful for an in-office dental sedation, with over half willing to extend that responsibility to nurse practitioners and physician's assistants, there were physicians who were not willing to perform an H&P for a dental sedation. This issue is compounded when over 78% of physicians did not feel a dentist evaluation is adequate for an in-office dental sedation. This may be because the pediatricians are unfamiliar with the qualifications of a pediatric dental specialist versus a general dentist and their beliefs are based on their personal experiences. There also is a lack of familiarity with the 2016 AAP guidelines and a lack of understanding of whom the guidelines permit to perform pre-operative H&P.

Physicians were equally likely to deny performing pediatric H&P for in-office dental sedations as for ambulatory surgical centers. The major reason for physicians not fulfilling H&P requests for a dental office were a lack of trained personnel, primarily an anesthesiologist, being present. With over half of the respondents having over twenty-one years of experience and three-quarters of them having at least sixteen years of experience or more, this could have skewed the data towards that age group and be less representative of the overall trend. Six of the seven physicians who reported they do not complete H&P for in-office dental sedations have been working for sixteen or more years. Of the physicians who are in the first 5 years of their career, 80% said they would complete all H&P for dental sedations, and only one reported not completing H&P, which could be representative of where the field might be going in the future. All respondents chose the same range bracket in the questionnaire when asked how many H&P requests were received compared to how many were fulfilled. The responses show a direct relationship and could be explained by those physicians who refused to perform H&P have stopped receiving requests, which could place the patient in an undesirable position if an H&P is needed.

In a study by Lee et al, it was noted that a majority of child deaths for 2-5 year olds during moderate sedation or general anesthesia occurred in an office setting and with a general and pediatric dentist as the anesthesia provider.32 A problem with this study design is it did not separate general dentists from pediatric dentists even though pediatric dentists have two additional years of specialized training in the anatomy, physiology and emergency treatment for the pediatric population. Due to physicians being concerned regarding the patient's safety for in-office dental sedations, the pediatric dentist should communicate with the patient's physician to inform them of the safety measures in place and how guidelines will be followed. If the physicians' concerns are alleviated, they could be more likely to complete an H&P for the in-office sedation. It is also critical that the pediatric dentist to be aware of the current AAP/AAPD sedation guidelines and have operatory and staff that meet the criteria.

**Conclusions**

Based on this study's results, the following conclusions can be made:

1. Most physicians believe a medical H&P done by the patient's physician is a helpful adjuvant for in-office dental sedations
2. Most physicians are willing to perform medical H&P for in-office dental sedations
3. A lack of familiarity with the updated AAP/AAPD sedation guidelines have made a majority of physicians unaware that appropriately trained dentists can complete the pre-operative health evaluation for pediatric dental sedations

**Limitations of the study and Recommendations**

Limitations of this study included limiting the sample population to pediatricians from the state of Virginia. The reason for selecting this population for this study was because contact information was readily accessible, making a population sample of convenience. In addition, the study population was limited to pediatricians due to the associated risk factors that are specific to their patient population, especially ages 0-6, when compared to adults. Other barriers included contacting physicians during the summer months, who may have had limited free time to complete the questionnaire, as well as not reaching those without active email accounts on record with the VA-AAP.

The questionnaire was not release before the summer due to waiting for approval from the IRB following changes made after the pilot study. Pediatric specialists were unable to be removed from the mailing list and were included in the number of recipients of the questionnaire. It is unknown how many of the members of VA-AAP are specialists and are not be performing H&P for dental sedations regularly, which decreased the relative response rate. The low response rate from pediatricians limited the power of the statistical analysis of this study and further research with larger response rate is needed. Studies including a questionnaire sent to pediatricians in other states would expand the number of respondents and assess the physician's stance in other states to start and establish a national trend.

**References-**

*1. Lee HH, Milgrom P, Starks H, Burke W. Trends in death associated with pediatric dental sedation and general anesthesia. Paediatr Anaesth. 2013;23(8):741-6*
*2. Coté CJ, Wilson S. Guidelines for Monitoring and Management of Pediatric Patients Before, During, and After Sedation for Diagnostic and Therapeutic Procedures: Update 2016. Pediatrics. 2016;138(1)*
*3. Cravero J, Blike G, Beach M, Gallagher S, Hertzog J, Havidich J, Gelman B. Incidence and Nature of Adverse Events During Pediatric Sedation/Anesthesia for Procedures Outside the Operating Room: Report From the Pediatric Sedation Research Consortium. Pediatrics 2006;118(3)*
*4. Cravero J, Beach M, Blike G, Gallagher S, Hertzog J; Pediatric Sedation Research Consortium. The incidence and nature of adverse events during pediatric sedation/anesthesia with propofol for procedures outside the operating room: a report from the Pediatric Sedation Research Consortium. Anesth Analg. 2009;108(3):795–804*
*5. Yeatts K, Shy C, Sotir M, Music S, Herget C. Health Consequences for Children With Undiagnosed Asthma-like Symptoms. Arch Pediatr Adolesc Med. 2003;157(6):540–544.*
*6. Hoffman G, Nowakowski R, Troshynski T, Berens R, Weisman S. Risk reduction in pediatric procedural sedation by application of an American Academy of Pediatrics/American Society of Anesthesiologists process model. Pediatrics. 2002;109(2):236–243*
*7. Malviya S, Voepel-Lewis T, Tait A. Adverse Events and Risk Factors Associated with the Sedation of Children by Nonanesthesiologists. Anesthesia & Analgesia 1997;85(6)*
*8. Caperell K, Pitetti R. "Is higher ASA class associated with an increased incidence of adverse events during procedural sedation in a pediatric emergency department?" Pediatric Emergency Care. 2009;25(10):661–664*
*9.Frush D, Bissett G. III, Hall S. Pediatric sedation in Radiology: the practice of safe sleep. American Journal of Roentgenology 1996,167(6):1381-1387*
*10. Doufas A. "Obstructive Sleep Apnea, Pain, and Opiod Analgesia in the Postoperative Patient" Current Anesthesiology Reports. 2014;4(1):1-9*
*11. Brown K, Laferriere A, et al. "Recurrent Hypoxemia in Children is Associated with Increased Analgesi sensitivity to opiods" Anesthesiology. 2006;105:665-669*
*12. Lane F. Donnelly, Sally R. Shott, Connor R. LaRose, Barbara A. Chini, and Raouf S. Amin. "Causes of Persistent Obstructive Sleep Apnea Despite Previous Tonsillectomy and Adenoidectomy in Children with Down Syndrome as Depicted on Static and Dynamic Cine MRI" American Journal of Roentgenology, 2004 183:1, 175-181*
*13. Bull, Marilyn J. "Health Supervision for Children With Down Syndrome." Pediatrics, American Academy of Pediatrics, 1 Aug. 2011, pediatrics.aappublications.org/content/128/2/393.full*
*14. Cistulli P, Sullivan C. "Sleep-disordered Breathing in Marfan's Syndrome." American Review of Respiratory Diseases. 1993;147(3):645-648*
*15. Wagenvoort C, Neufeld H, Edwards J. "Cardiovascular system in Marfan's syndrome and in idiopathic dilatation of the ascending aorta. The American Journal of Cardiology. 1962;9(4):496-507*
*16. Rodriguez M, Mackenzie W, et al. "Skeletal dysplasias: Evaluation with Impulse Oscillometry and Thoracoabdominal Motion Analysis" Pediatric Pulmonology. 2010;45(7):679-686*
*17. Ransford A, Crockard H, et al. "Occipito-Atlanto-Axial Fusion in Morquio-Brailsford Syndrome." The Bone and Joint Journal. 1996;78-B:307-713*
*18. Svennson O, Aaro S. ""Cervical Instability in Skeletal Dysplasia, Report of 6 surgically fused cases." Acta Orthopaedica Scandinavica. 1988;59(1):66-70*
*19. Joseph, Christine L.M., et al. "Prevalence of Possible Undiagnosed Asthma and Associated Morbidity among Urban Schoolchildren." The Journal of Pediatrics, 1996;129(5), 735-742*
*20.Priestley S, Babl FE, Krieser D, et al. Evaluation of the impact of a paediatric procedural sedation credentialing programme on quality of care. Emerg Med Australas. 2006;18(5–6):498–504*
*21. Babl F, Priestley S, Krieser D, et al. Development and implementation of an education and credentialing programme to provide safe paediatric procedural sedation in emergency departments. Emerg Med Australas. 2006;18(5–6):489–497*
*22. Maher EN, Hansen SF, Heine M, Meers H, Yaster M, Hunt EA. Knowledge of procedural sedation and analgesia of emergency medicine physicians. Pediatr Emerg Care. 2007;23(12):869–876*
*23. Krauss B., Green S. Procedural Sedation and Analgesia in Children. The Lancet 2006;367(9512).*
*24. Dial S, Silver P, Bock K, Sagy M. Pediatric sedation for procedures titrated to a desired degree of immobility results in unpredictable depth of sedation. Pediatr Merg Care 2001,17(6)*
*25. Motas D, McDermott NB, VanSickle T, Friesen RH. Depth of conscious and deep sedation attained in children as administered by nonanaesthesiologists in a children's hospital. Paediatr Anaesth 2004;14(3)*
*26. Gamble C, Gamble J, Seal R, Wright RB, Ali S. Bispectral analysis during procedural sedation in the pediatric emergency department. Pediatr Emerg Care. 2012;28(10):1003–1008*
*27. Miloro, M., G. Ghali, P. Larson, and P. Waite. Peterson's Principles of Oral and Maxillofacial Surgery. 3rd ed. Shelton, Ct: People's Medical Publishing House, 2011. Print*
*28. Coté CJ, Karl HW, Notterman DA, Weinberg JA, McCloskey C. Adverse sedation events in pediatrics: analysis of medications used for sedation. Pediatrics. 2000;106(4):633–644*
*29. Chiaretti A, Benini F, Pierri F, et al. Safety and efficacy of propofol administered by paediatricians during procedural sedation in children. Acta Paediatr. 2014;103(2):182–187*
*30. Monroe KK, Beach M, Reindel R, et al. Analysis of procedural sedation provided by pediatricians. Pediatr Int. 2013;55(1):17–23*
*31. Kannikeswaran N, Chen X, Sethuraman U. Utility of endtidal carbon dioxide monitoring in detection of hypoxia during sedation for brain magnetic resonance imaging in children with developmental disabilities. Paediatr Anaesth. 2011;21(12):1241–1246*
*32. Lee H, Milgram P, Starks H, Burke W. Trends in death associated with pediatric dental sedation and general anesthesia. Pediatric Anesthesia. 2013:23(8):741-746*

# Infantile Hemangioma: Treatments Outpacing Clinical Trials

A Brief Case Report and Review

Priya Tiwari1, M.D, MHSA
John W. Harrington1,2 M.D
1Department of Pediatrics Eastern Virginia Medical School, Norfolk, VA
2Division of General Academic Pediatrics, Children's Hospital of The King's Daughters, Norfolk, VA

Corresponding Authors:
Priya Tiwari,
e-mail: mdpriyatiwari@gmail.com
tel: 7574783132

Dr. John W. Harrington
e-mail: John.Harrington@chkd.org

The total number of words of the manuscript, including entire text from title page: 1296
The number of figures: 0
The number of tables: 0

Introduction:

During a well-child visit the mother of a four-month old male with Infantile Hemangioma (IH) asks about the infant's vascular lesion on his arm and chest and wishes to confirm the appropriate use of topical timolol maleate received from her dermatologist. She mentions that she is placing the drops daily into the infant's eyes twice a day as directed by the instructions printed on the bottle, since the prescription sticker came off after receiving it from the pharmacy. Timolol maleate 0.25%-05% eye drops have been approved by the Food and Drug Administration (FDA) for 30 years for use in pediatric glaucoma.[1] Recent studies have identified the efficacy of using this drug topically on the skin for treating IH.1 This increased adoption by sub-specialists for treating pediatric disorders with medications in an unapproved FDA way, highlights a common problem in pediatric medication research and stresses the safety concerns when discussing medication usage with your pediatric patients.

Off-Label Drug Use in Pediatrics:

A medication error is defined as "an error in drug ordering, transcribing, dispensing, administrating or monitoring".2 From the time the medication is prescribed, it goes through various stages/users, and every stage exposes it to the risk of error. Pediatric drugs are especially vulnerable since physicians must perform weight-based calculations and select from various strengths and preparations of medications.2 Pediatric medication errors are quite common because young children cannot vocalize concerns or side effects and the appropriate administration depends on the parent's health literacy. We all have had a parent place an antibiotic like amoxicillin into a child's ear canal for an otitis media. Another area of concern, as highlighted in this example, is the prevalence of unrecognized medication errors due to off-label drug use within the pediatric population. Off-label drug use does not imply that the drug is being misused or clinically unproven, but instead, it means that the evidence required by law to allow inclusion on the label has not been submitted to or approved by the FDA.[3]

Drug testing and development of new drugs in children has several barriers. Best Pharmaceutical for Children's Act (BPCA) of 2002 and Pediatric Research Equity Act (PREA) of 2003 has encouraged labeling changes for about 400 drugs as of March 2011.4 Despite these changes, drug use and labeling changes are especially challenging in the pediatric population for many reasons; rarity of the diseases encountered, restricted patient population,

especially neonates, and lack of monetary incentive for pharmaceutical companies.

**Back to our case:**

Infantile Hemangioma (IH) is characterized by abnormal proliferation of endothelial cells and aberrant blood vessel architecture. IH is the most common vascular neoplasm and various studies show the incidence as 4-5% of all infants. Clinical onset of IH usually starts before four weeks of age, with 80% of growth occurring by three months of age.1 The involution phase starts between 6 and 12 months and continues over the years. The involution phase led many physicians to believe that weekly re-examination is the best approach (1). However, a study from dermatology outpatient practice revealed that one-third of IH will require intervention.1 Earlier approaches focused on systemic therapy with high-dose steroids until 2008, when Leaute- Labrezeet al. reported substantial benefit in the management of IH with the use of oral Propranolol.5 Propranolol was used off-label for approximately 6 years until Hemangeol, an oral formulation free of alcohol, sugar, and paraben was approved by the FDA in 2014 for IH.1 Systemic propranolol treatment requires a complete cardiac evaluation by a cardiologist to assess the candidacy of the child. Consensus statements have suggested that inpatient hospitalization is required for infants eight weeks or younger, pre-term infants or those with poor social support and with cardiac or pulmonary risks.4 This proved to be clinically onerous and the thought of using other preparations off-label were tried.

Several investigators have reported success using topical B-blocker such as timolol maleate for the treatment of IH. Topical B-blockers offer a promising alternative for treating IH as they have therapeutic efficacy and reduced systemic adverse effects compared to systemic treatment.6 The use of topical timolol maleate is safe for both complicated and un-complicated hemangiomas during the proliferative stage.7 Multiple case series and studies have shown successful treatment of superficial IH with topical timolol maleate with local pruritus as the only adverse event reported among these patients.8 Since topical timolol maleate use has not been FDA approved for IH, its use for this purpose is considered off-label.

**What can Pediatricians do:**

The lack of gold standard clinical trials in the pediatric population requires the practitioner to rely on gathering information from resources such as peer-reviewed journals, American Academy of Pediatrics practice guidelines and policy statements, consensus statement handbooks and databases such as Lexicomp.3 The PREA and BPCA laws have been considered successful in compelling labeling changes; also these laws have encouraged prospective drug studies via industry sponsors, investigator-initiated studies and by consortia with National Child Health and Human Development.3 In 2012, Congress further strengthened the PREA and BPCA law generating accountability and improving the quality of the development process to enhance drug studies in the pediatric population.

With these changes and emerging evidence, a physician will need to use their knowledge and clinical judgment when prescribing or discussing the use of an off-label drug. One will need to ensure that the parent understands how to use the drug efficiently and correctly to achieve maximum benefit. In addition, since pediatric medications errors are common and different from adult errors, there is a clear need to acknowledge the dangers of off-label medication use in children and advocate for a safer child health system with equivalent drug testing for safety and therapeutics that are used for adults.

References

1. David H. Darrow, Arin K. Greene, Anthony J. Mancini, Amy J. Nopper. Diagnosis and Management of Infantile Hemangioma, the SECTION ON DERMATOLOGY, SECTION ON OTOLARYNGOLOGY–HEAD AND NECK SURGERY, and SECTION ON PLASTIC SURGERY Pediatrics Oct 2015, 136 (4) e1060-e1104; DOI: 10.1542/peds.2015-2485
2. Walsh KE, Kaushal R, Chessare JB How to avoid paediatric medication errors: a user's guide to the literature Archives of Disease in Childhood 2005;90:698-702.
3. Frattarelli DA, Galinkin JL, Green TP, Johnson TD, Neville KA, Paul IM, Van Den Anker JN; (2014), Off-label use of drugs in children. American Academy of Pediatrics Committee on Drugs
4. Clarke, Patrick. E (2016, August, 1) FDA encourages Pediatric Information on Drug Labelling Retrieved from https://www.fda.gov/Drugs/ResourcesForYou/SpecialFeatures/ucm254072.htm
5. Léauté-Labrèze C, Dumas de la Roque E, Hubiche T, Boralevi F, Thambo JB, Taïeb A. Propranolol for severe hemangiomas of infancy. N Engl J Med. 2008;358(24):2649–2651pmid:18550886
6. Danarti R, Ariwibowo L, Radiono S, Budiyanto A, Topical Timolol Maleate 0.5% for Infantile Hemangioma: Its Effectiveness Compared to Ultrapotent Topical Corticosteroids - A Single-Center Experience of 278 Cases. Dermatology 2016;232:566-571
7. Ambika, H., Sujatha, C., & Kumar, Y. H. (2013). Topical Timolol: A Safer Alternative for Complicated and Un-Complicated Infantile Hemangiomas. Indian Journal of Dermatology, 58(4), 330. http://doi.org/10.4103/0019-5154.113997
8. Ying, H., Zou, Y., Yu, W., Qiu, Y., Ma, G., Chang, L., Gu, Y., Lyu, D. and Lin, X. (2017), Prospective, open-label, rater-blinded and self-controlled pilot study of the treatment of proliferating superficial infantile hemangiomas with 0.5% topical timolol cream versus 595-nm pulsed dye laser. J Dermatol, 44: 660–665. doi:10.1111/1346-8138.13747