

# The Florida Pediatrician



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FALL 2021

## OBESITY: THE INTERDISCIPLINARY APPROACH



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1400 Village Square Blvd #3-87786, Tallahassee, FL 32312 | 850-224-3939 | [info@fcaap.org](mailto:info@fcaap.org)



# Editor's Note

Dear Colleagues,

It has been an interesting few months. The news regarding the pandemic is mixed since I last wrote a note. We have weathered a COVID19 surge in Florida and nationwide. This was a different surge since it seemed to affect children disproportionately. I am not going to lay down too many statistics since you can easily review them on CDC, AAP of Florida, and DOH websites. I will give you just two local statistics. In the first 18 months of the pandemic in Jacksonville, one child died due to COVID every 6 months. During the most recent surge, two children died each month. In August and September, we had double the number of children hospitalized when compared to January 2021, the previous record for worst month.



However, there was also good news. The FDA received the application for approval of the COVID vaccine for 5 to 11 year olds. By the time you will be reading this note, the FDA would have met on October 26th and (hopefully) approved the vaccine for 5 to 11 year olds, Advisory Committee on Immunization Practices (ACIP) of the CDC would have recommended the vaccine for 5 to 11 year olds, and we will be on our way to protecting all school-aged children. We hope to have the vaccine approved for all children older than 6 months by first quarter of 2022.

It was the worst of news that mask mandates in schools were made illegal by law in the state. It was the best of news that courageous educators, parents, and physicians stood up to protect our children, and the courts stopped the ill-conceived state law to go into effect. The AAP and the Florida Chapter took a stand for children in this case. Many pediatricians also spoke against this law at some peril to themselves.

In Duval County, mask mandates went into effect almost one month after the start of school. Once the mask mandate went into effect, the number of cases in the school district plummeted (<https://c19sitdash.azurewebsites.net/>). There is plenty of evidence that masks work, and the recent Arizona study reported by the CDC (<https://www.cdc.gov/mmwr/volumes/70/wr/mm7039e1.htm>) confirms our experience in Duval County.

It was the worst of news because the FDA approved a vaping product, which will get into the hands of children. We must continue our efforts to advocate against vaping and protecting our children against this dangerous product. It was the best of news because it seems more and more parents want to protect their children against COVID and want to get them vaccinated. We still have work to do in this regard.

Yes, we are getting many questions about the COVID vaccine. Most of the questions that I am getting from parents are when they can get the vaccine in their children's arms. These are the committed "protectors". These Protectors have done their research using credible sources and understand the importance of the vaccine. The Protectors are excited and cannot wait for the vaccine to be available, which I predict will be in November before Thanksgiving.

Some parents are asking if the vaccine was studied carefully and well enough. These are the "seekers". A few asked if there were enough participants in the 5 to 11 year olds study to determine safety. These Seekers are largely interested in the vaccine but want to know more. Seekers are not vaccine hesitant parents but those who want more information, which is very reasonable. We need to present Seekers with science and evidence. A conversation with their trusted pediatrician would be important.

Many of them are hesitant these are the "fencers". Fencers have not made up their mind, and they need to be convinced with science and evidence. They also need support from their pediatricians. In my experience, Fencers, after a conversation with their pediatrician, will change their mind.

As you would expect, some parents do not want the vaccine for their children. These are the "anti-vaxxers". I am not sure they will ever be convinced. That is why we need a vaccine mandate for school participation. We cannot let a small group of parents place our children at risk. I hope that both the worst of news and the worst of days of the pandemic are behind us. I hope that the best of days and the best of news are ahead of us.

A handwritten signature in black ink, appearing to read "M. Rathore, MD".

Mobeen H. Rathore, MD, CPE, FAAP, FPIDS, FSHEA, FIDSA, FACPE  
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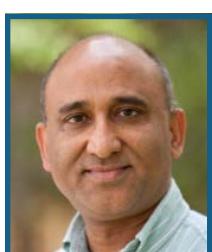
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## REVIEW ARTICLE

# Neurocysticercosis: Discussion Over Two Presumed Cases of Brain Lesion

Gabriela M. Moraru MD<sup>1</sup>, Gaurav Saigal MD<sup>2</sup>, Ivan A. Gonzalez MD<sup>1</sup>

<sup>1</sup>University of Miami Miller School of Medicine, Division of Pediatric Infectious Diseases Miami FL

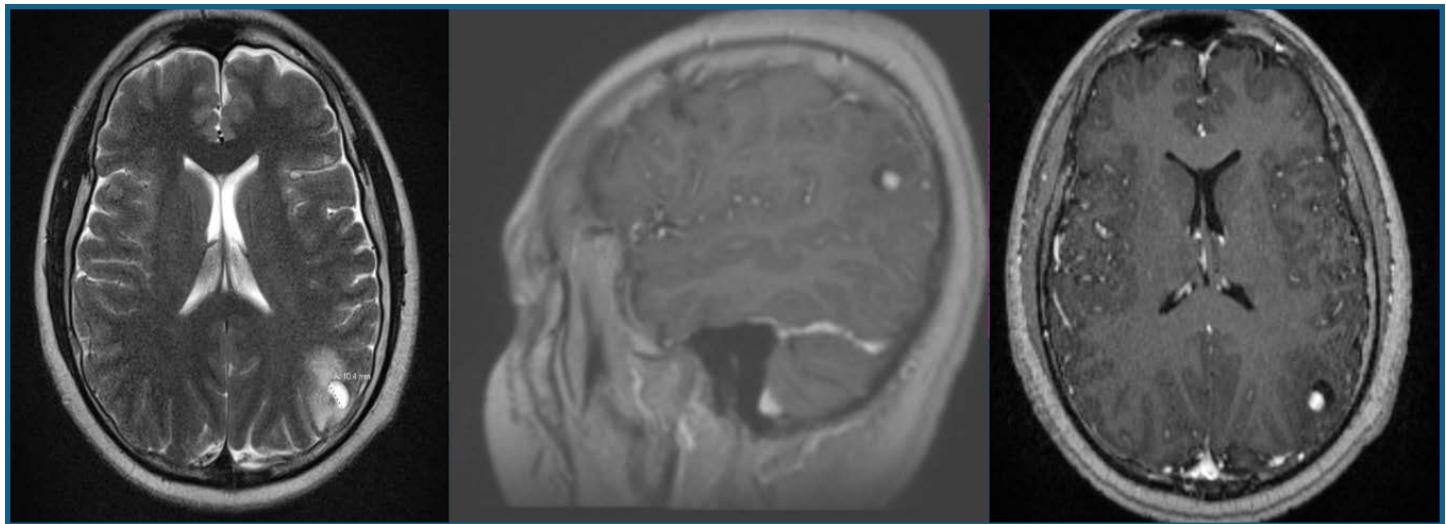
<sup>2</sup>University of Miami Miller School of Medicine Department of Neuroradiology

## INTRODUCTION

Neurocysticercosis (NCC), one of the Neglected Parasitic Infections (NPI), is a preventable disease caused by the *Taenia solium*'s cysts. The disease represents the leading cause of new onset epilepsy worldwide and should be considered in immigrant populations coming from endemic areas such as Latin America, Sub-Saharan Africa, and parts of Asia.<sup>1,2</sup> Cysticercosis is a different condition than taeniasis, a tapeworm infection of the gastro-intestinal tract, although both are caused by the same pathogen. Cysticercosis is a larval cyst infection of the tissue that can affect the central nervous system (CNS). It develops, manifests, and is managed in different ways depending on the cerebral or extra-cerebral location of the lesions.<sup>3</sup> In this report, we describe two patients admitted to the hospital for new-onset seizures.

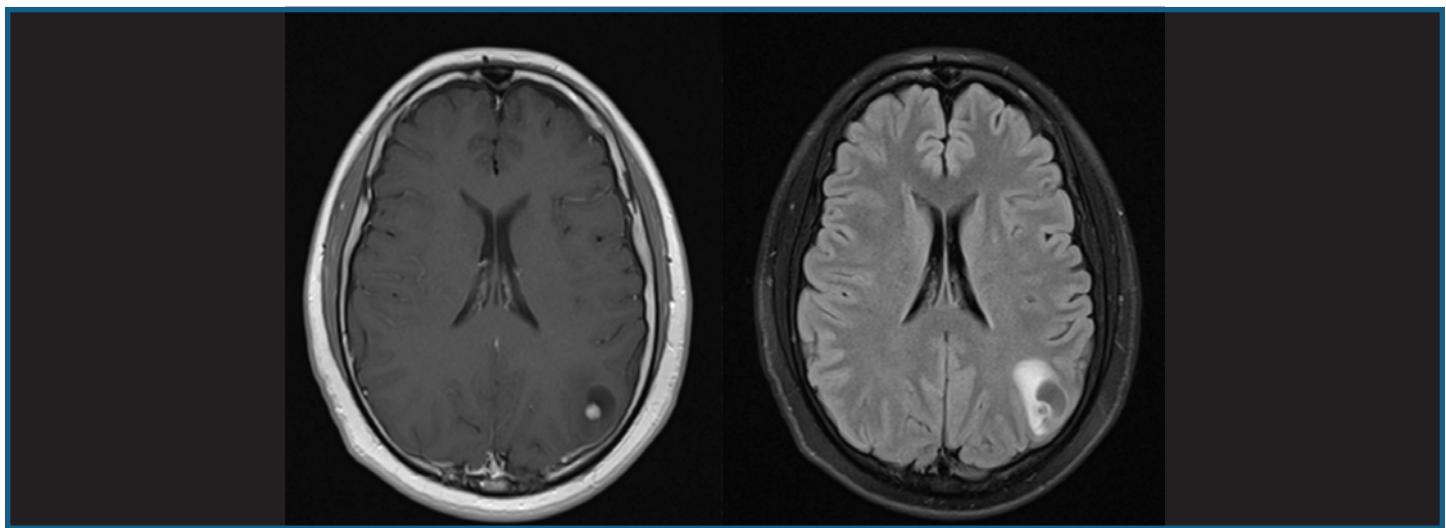
Patient A is a 19-year-old Hispanic male admitted with a new onset generalized tonic-clonic seizure. The episode lasted less than a minute and occurred while the patient was sitting at his desk at school. His past medical history is unremarkable. His social history is remarkable for the fact that he came to the United States from Latin America at 5 years of age.

On arrival to the emergency department, the physical examination and vital signs were normal. Results of the first set of tests including a complete blood cell counts (CBC), comprehensive metabolic panel (CMP), and urinalysis (UA) were unremarkable. The brain magnetic resonance imaging (MRI) revealed a 7x6 mm enhancing focus in the left parietal subcortical white matter with surrounding vasogenic edema. Based on the epidemiological context and the MRI description, he was diagnosed with NCC (Figure 1). *T. solium* antibodies in plasma and a 4<sup>th</sup> generation HIV test were negative. The ophthalmologic examination ruled out cystic lesions in the eye. The patient was treated with 14 days of Albendazole and Prednisone and receives seizure prophylaxis with leviracetam. A repeat brain MRI six months later failed to reveal any improvement of the cerebral lesion or of the surrounding edema. In addition, the seizure episodes were not fully controlled. A second set of tests including serologic screening for *Trichinella spiralis*, *Entamoeba histolytica*, and *Strongyloides stercoralis* were done, and the results were negative.



**Figure 1**

**Patient A, Brain MRI with contrast at the time of diagnosis:** Focus of abnormal enhancement is visualized in the left parietal lobe in the cortical white matter measuring approximately  $0.7 \times 0.6$  cm with peripheral high T2 and FLAIR signal representing vasogenic edema.

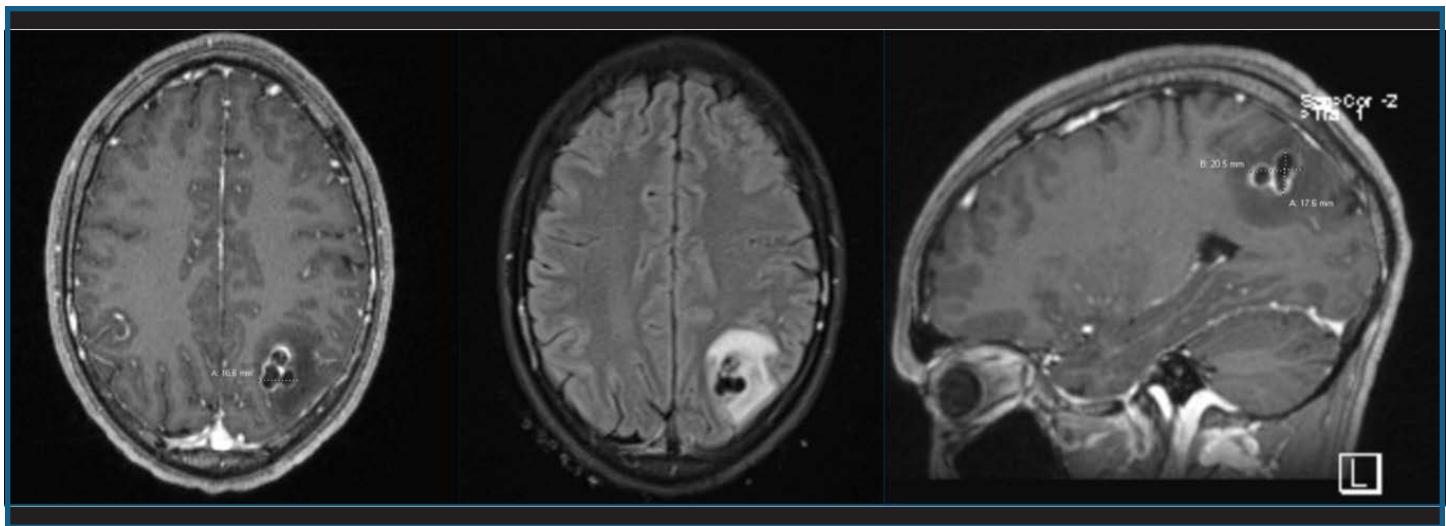


**Figure 2**

**Patient A, Brain MRI before surgery:** Left parietal lobe evolving lesion with a cystic component which measures  $1.0 \times 0.6$  cm, with perilesional FLAIR signal hyperintensity suggestive of edema.

Failed therapy with albendazole due to non-compliance was invoked and the patient was started on combined antiparasitic therapy (albendazole plus praziquantel) for 14 days. A month later, the repeated brain MRI showed worsening perilesional edema and cystic degeneration (Figure 2). Given our concern about a possible neoplastic process, the patient underwent neurosurgical resection of the lesion. The histopathology examination confirmed the diagnosis of grade I pilocytic astrocytoma.

Patient B is a 17-year-old Hispanic male with unremarkable past medical history admitted for loss of consciousness while at work. Details about the duration and the characteristics of the episode were missing. The patient was 9-year-old when he migrated to the United States from Latin America. Physical examination and vital signs on admission were within the normal limits. Results of CBC, CMP, and UA were unremarkable. The brain MRI revealed a left parietal lobe multilobulated cystic enhancing lesion with surrounding vasogenic edema (Figure 3). Results of the initial work-up including *T.solium* antibodies, interferon gamma-release assay for *Mycobacterium tuberculosis* (MTB), a 4<sup>th</sup> generation antigen-antibody HIV test, and an ophthalmologic examination were negative. We suspected a neoplastic process; thus, patient B underwent neurosurgical resection of the lesion and the histopathology showed a non-viable cysticercal lesion. The patient subsequently completed 14 days of antiparasitic therapy and prednisone, and an uncomplicated course and resolution of the seizure episodes followed.



**Figure 3**

**Patient B, Brain MRI at the time of diagnosis, before surgical excision: There is a 1.8 x 2.1 x 1.7 cm multilobulated cystic peripherally enhancing lesion with surrounding edema in the left parietal lobe.**

## DISCUSSION

Even though it is considered to be one of the NPI, NCC is not forgotten by the clinician and should be included in the differential diagnosis of patients presenting with new onset seizures and cerebral lesions. This differential diagnosis includes infectious versus neoplastic processes. MTB infection, brain abscesses, and different parasitic infections such as *Toxoplasma gondii*, *Echinococcus granulosus*, *Paragonimus* sp, *Schistosoma* sp, visceral larva migrans, malaria, and neurocysticercosis are among the infectious etiologies that could be considered and based on the history and epidemiological context.<sup>4,5</sup>

The two most common presentations of NCC are new onset seizures and increased intracranial pressure associated with cysticercal encephalitis and dying cysts.<sup>2,3</sup> However, the spectrum of manifestations can range from headache (frequently reported) to cognitive anomalies, cerebro-vascular accidents, spinal radiculopathy, hydrocephalus, focal deficits, and coma.<sup>3,5-7</sup> The seizure disorder associated with NCC is often secondary to the degenerating cysts, but it is also reported in patients with non-enhancing calcified lesions. Today, it is well known that even the non-viable calcified cysticerci can cause surrounding edema and predispose to seizure activity.<sup>2,8</sup>

The most recent guidelines published by the Infectious Disease Society of America, encourage a thorough history and physical examination along with neuroimaging when we consider NCC in our differential.<sup>3</sup> The computer tomography scan has a higher sensitivity in detecting calcified lesions while the MRI's sensitivity is significant for detection of the scolex, edema, and lesions in different locations throughout the parenchymal and the extra-parenchymal regions of the CNS.<sup>3</sup> The commercially available enzyme-linked immunosorbent assay (ELISA) uses the crude antigen to detect antibodies while the enzyme-linked immunotransfer blot (EITB) available via the Center for Disease Control and Prevention (CDC) uses the parasite glycoprotein for antibody detection. The ELISA should be avoided, given the high rate of false-negative results and low sensitivity. In addition, the ELISA result is influenced by the type of sample used (CSF vs plasma results in 71% vs 41% sensitivity, respectively) or by the number and characteristics of cerebral lesions (low sensitivity in patients with a single parenchymal or calcified lesion as compared to multiple cysts). EITB's sensitivity is close to 85% for both plasma and CSF<sup>7,9</sup>. Before initiation of therapy for NCC, additional screening should be considered. Ruling-out infections with MTB and *Strongyloides stercoralis* before initiating steroid therapy is of paramount importance. The fundoscopic examination helps in visualizing the intraocular cysticerci or the cerebral edema. For the other possible viral or parasitic infections, screening should be conducted based on the clinical presentation, history, epidemiological context, and risk factors.<sup>3</sup>

The therapy for NCC has three major components. Albendazole is the first choice among antiparasitic drugs. It can be used alone for single or two viable parenchymal lesions or in combination with Praziquantel. Combined therapy should be considered under the following circumstances: when more than 2 parenchymal lesions are present; when surgical removal of intraventricular lesions cannot be performed; when lesions are situated in the subarachnoidal space; and when there is a lack of response after albendazole alone. The duration of the therapy is 14 days. Calcified cysts do not require antiparasitic management.<sup>3,7</sup> The second component of the therapy involves anti-inflammatory drugs. A short course of Prednisone

(2 weeks), initiated the day before anti-parasitic drugs, is well-tolerated and decreases the side effects associated with the inflammatory cytokine-release response associated with parasitic death. Lastly, anti-epileptic therapy is universally indicated and should be conducted in conjunction with a neurology consultation. Surgical intervention is necessary for cases presenting with intraventricular, subarachnoidal, or intraocular lesions for management of hydrocephalus and removal of the cysts.<sup>3</sup> Clinical and neuroimaging follow-up are necessary to ensure regression of the lesions, suggesting a good response to the therapy, and once again, confirming the diagnosis. Most of the single, uncomplicated lesions resolve six months after the initial presentation and patients become asymptomatic.

## CONCLUSIONS

When including NCC in the differential diagnosis of a cerebral lesion, one should give special considerations to the following:

1. New onset seizures in patients coming from endemic areas should include NCC in the differential diagnosis.
2. History of the present illness, epidemiological context, and neuroimaging studies are the most important initial diagnostic steps.
3. Serology is not reliable for ruling-in or ruling-out the diagnosis of NCC. If indicated for confirming the diagnosis, both the plasma and the CSF samples could be sent to the CDC for EITB assay.
4. Before initiating therapy, rule out MTB and *Strongyloides stercoralis* infection as corticosteroids could cause reactivation of a latent MTB infection or lead to catastrophic hyperinfection with *Strongyloides stercoralis*.
5. Perform a fundoscopic examination looking for intraocular cysticercosis, since the initiation of antiparasitic therapy could lead to a massive local inflammatory response and even blindness.

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## REVIEW ARTICLE

# An Interdisciplinary Approach to Adolescent Weight Management

Amy L. Weiss<sup>1</sup>, MD, MPH, Rebecca Chermak, PSYD<sup>2</sup>, Amanda Musin, RDN, LD<sup>3</sup>

<sup>1</sup>USF Health, Morsani College of Medicine

<sup>2</sup>TGH + USF Bariatric Center, Tampa General Hospital

## INTRODUCTION

Rates of obesity have more than doubled in children and quadrupled in adolescents over the past 30 years.<sup>1</sup> Obesity is now the most prevalent chronic health problem among adolescents in many developed countries.<sup>2</sup> Although the prevalence of childhood obesity seems to be stabilizing to some extent<sup>3</sup>, rates of severe obesity in children are still increasing.<sup>2</sup> Severe obesity is defined as a body mass index (BMI) greater than or equal to 120% of the 95th percentile BMI for age and gender, or a BMI of 35 kg/m<sup>2</sup> or higher.<sup>4</sup>

There are significant racial, ethnic, and socioeconomic disparities in the prevalence of childhood obesity, with non-hispanic black and hispanic children having higher rates of obesity compared to non-hispanic Asian and white children.<sup>3</sup> Children and adolescents with Medicaid insurance have rates of obesity 6 times higher than those with private insurance.<sup>2</sup> Limited finances and transportation along with other barriers to healthy food choices and safe, affordable physical activity options are all factors which contribute to the disparities.<sup>2</sup>

Without intervention, obese children and adolescents are at higher risk of a multitude of medical conditions, once thought of as adult-onset illnesses, in addition to social and emotional issues. Adolescents with obesity are at increased risk for cardiovascular disease, due to hypertension or dyslipidemia, insulin resistance or type 2 diabetes mellitus, menstrual irregularities including polycystic ovarian syndrome, obstructive sleep apnea, non-alcoholic fatty liver disease, orthopedic problems such as slipped capital femoral epiphysis or Blount's disease, and pseudotumor cerebri.<sup>5</sup> Obesity is the most stigmatizing and least socially acceptable condition of childhood, leading to poor self-esteem, distorted body image, depression, anxiety, and difficulty

engaging with peers.<sup>5</sup> Obese children are frequently the victims of bullying or ridicule, and are 4 times more likely to report academic difficulties compared to their normal-weight peers.<sup>5</sup> Eighty percent of overweight and obese youth in the United States go on to become obese adults, and current rates of obesity with their long-term effects raise concerns not only for the overall health of our nation but also the economic burden on our healthcare system.<sup>2</sup>

## RATIONALE FOR THE INTERDISCIPLINARY APPROACH

The connection between the human mind and body has been shown repeatedly in scientific literature and everyday practice. It is no different when looking at obesity. However, obesity is often treated simply looking at energy expenditure—energy in and energy out. If it were truly that simple for adolescents to be mindful of calories they intake versus calories they expend, then treatment of obesity would be easy. Unfortunately, as we have seen time and time again, it is not just those basic variables that need to be considered for successful weight management in patients with obesity. A myriad of variables has been identified as playing an impactful role in adolescents who struggle with their weight. Looking at how each of these variables impact obesity as a disease helps us to better understand the complex etiology of obesity in each patient and how to help. The variables that have been seen as contributors to obesity can be categorized into: individual psychology, social psychology, individual activity, activity environment, food consumption, food production, individual physiology, and general physiology (Figure 1)<sup>24</sup>. Thus, treating obesity as a multifactorial disease requires an interdisciplinary approach to help address as many factors as possible.

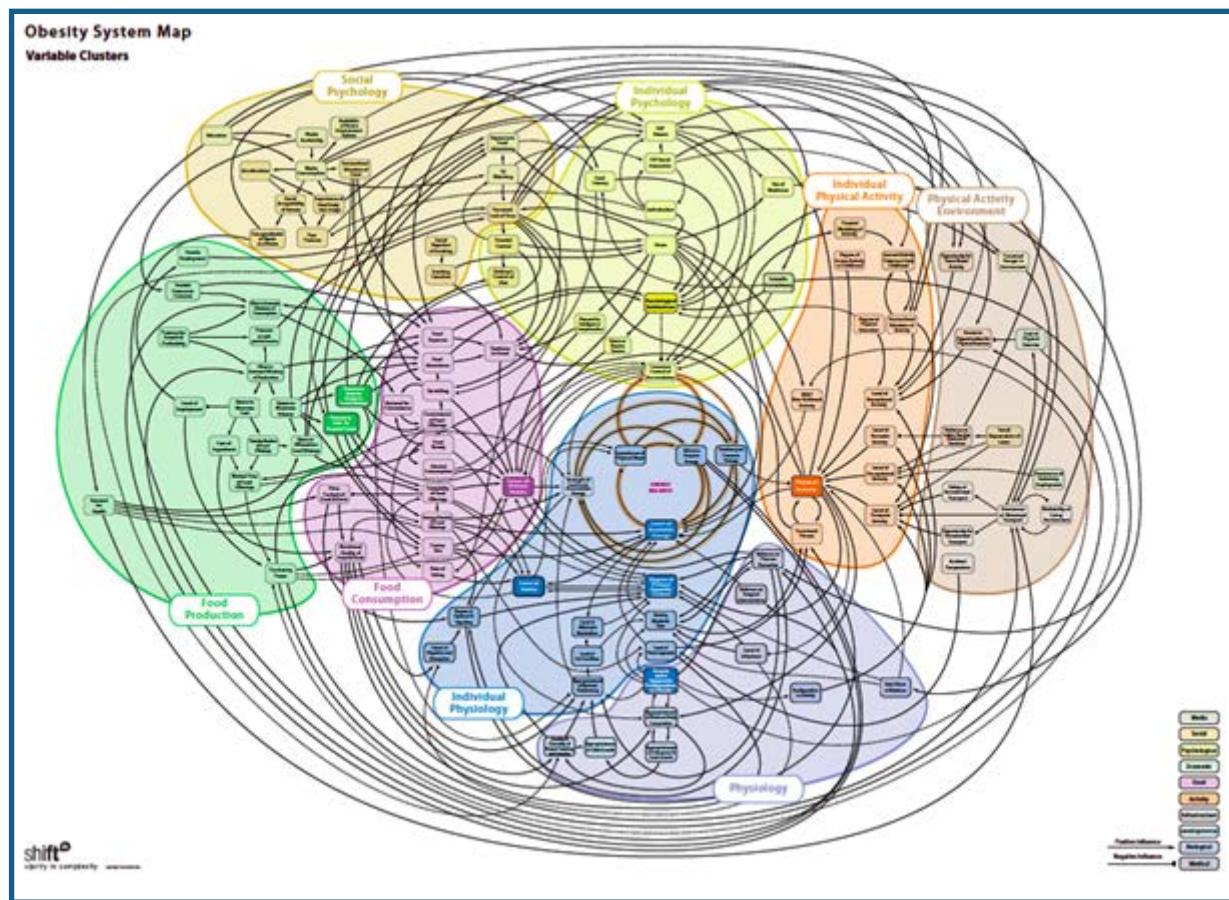


Figure 1: Obesity System Map, Variable Clusters

## MEDICAL PROVIDER'S ROLE:

The medical provider on the team can be a general pediatrician or a specialist such as an adolescent medicine physician, gastroenterologist, or endocrinologist. The role of the medical provider in the interdisciplinary team is to assess medical and psychiatric comorbidities that may contribute to obesity. Some patients may have already been evaluated at length and bring outside records for review, while other patients may have received little prior weight-related medical care. In addition to basic labs including CBC, CMP, lipids, HbA1C, thyroid function, other nutritional labs such as vitamin D, B12, and folate levels as well as iron studies are obtained. Sleep hygiene must be addressed for all adolescent patients.<sup>6</sup> A sleep study is routinely used

to assess for obstructive sleep apnea, and positive airway pressure (PAP) therapy is initiated for those with obstructive sleep apnea. Many teenagers do not get adequate sleep each night, and many spend time on screens or electronic devices late at night, which is highly disruptive to both quality and quantity of sleep.

Other medical conditions that are present or discovered during the work-up, such as hypertension or diabetes, need to be addressed. For patients who are on medications that may contribute to weight gain, such as steroids for asthma or antipsychotics for mental health issues, discussion of ways to minimize these medications or find alternatives is essential.<sup>6</sup>

Many overweight and obese adolescents struggle with depression or anxiety. For those who are not already actively in treatment for mental health conditions, it may be appropriate to start a selective serotonin reuptake inhibitor (SSRI) to help with mood and anxiety. As part of the diet history, each patient should be assessed for eating disorders, particularly binge eating disorder and bulimia nervosa as well as other disordered eating behavior. If binge eating disorder is present, initiation of treatment with Vyvanse is often helpful.<sup>6</sup>

A comprehensive assessment of menstruation is an integral part of each evaluation for adolescent girls and young adult women. Many obese young women have irregular menstrual cycles which is often the result of polycystic ovarian syndrome (PCOS). Short-term oral contraceptive pills are an option for the initial regulation of menses. Long-term contraceptive options, such as intrauterine devices (IUDs) and implants, should be discussed and encouraged for adolescent young women pursuing weight loss surgery. Hormonal IUDs in particular seem to be the most helpful in minimization of menstrual blood loss after surgery.

Other aspects of the medical provider's role include assessing for contraindications to weight loss surgery, if surgery is desired, and ensuring that the patient has the ability to be successful following surgery. Contraindications to surgery include a medically correctable cause of obesity, untreated psychosis, active substance abuse, or an inability to understand or adhere to the long-term treatment recommendations. Since these patients are adolescents or young adults who frequently still live at home, an assessment of family support is essential.

## **PSYCHOLOGIST'S ROLE:**

Mental health providers such as Licensed Clinical Psychologists or Licensed Mental Health Counselors with specific health psychology training play an integral role on the adolescent obesity treatment team, addressing the psycho-socio-cultural factors that may impact an adolescent's struggle with obesity. Starting with a semi-structured interview with both the adolescent and their caretaker(s), it is important to assess the impact of the adolescent's eating behavior and relationship with food/weight, potential food insecurity or access, physical activity, family dynamics, role of peers and social media, mood disorders, trauma or abuse, sleep hygiene, substance use, cognitive functioning, and cultural influence.<sup>7,8,9,10</sup> Identifying these variables in conjunction with evaluating motivation and insight from the patient and their family can help to determine a starting point and readiness for change. Furthermore, working collaboratively with the adolescent to identify their motivators and health values allows the patient to provide meaning to their health goals. Mental health providers can utilize a variety of evidence-based interventions such as motivational interviewing, cognitive behavioral therapy, and acceptance and commitment therapy to address related disordered eating behaviors, sleep hygiene, mood symptoms, and self-esteem.<sup>10</sup> One example of interdisciplinary treatment involves addressing maladaptive eating patterns and food relationships as a core component of psychological intervention, alongside nutrition education from the dietitian and medical intervention for impulsive or binge eating. It is also useful to collaboratively problem solve any roadblocks the adolescent encounters that may be impacting their weight management success, such as working on stress and time management strategies.

When considering bariatric surgery, psychologists have a unique role in determining if each variable listed above can be appropriately addressed within a reasonable time frame or if, in fact, the variables deem the adolescent to be a poor candidate for bariatric surgery. Psychologists need to determine the adolescent's capacity for understanding the life-long requirements of surgery maintenance, risks, potential complications associated with bariatric surgery, and post-operative guidelines and expectations.<sup>8</sup> Having the adolescent understand that bariatric surgery is not a "quick fix," but rather a tool in aiding in long-term significant weight loss is important, while medical and dietary regimen compliance and adequate support at home can be key contributors in determining success after surgery.

## **DIETITIAN'S ROLE:**

Registered dietitian nutritionists (RDNs) are a critical members of the adolescent weight management interdisciplinary team. RDNs, unlike nutritionists or unlicensed nutrition coaches, must possess a 4-year bachelors of science degree, complete a 1200-hour supervised internship, pass a national accreditation examination, and complete 75 hours of continuing education credits every 5 years.<sup>11</sup> Training covers a wide variety of nutrition settings including clinical, school food programs, and WIC

counseling. As part of the adolescent interdisciplinary team, the RDN will have experience in all relevant areas of the patient's nutrition-related barriers to health.

Nutrition plays a key role in the weight management treatment plan. Diets containing calorically dense foods that lack nutrient density are associated with increased risk of obesity/overweight, hypertension, type 2 diabetes mellitus, depression, fatty liver disease, and cardiovascular disease. Over the past 10 years, there has been a significant increase in average caloric intake amongst Americans. This increased calorie intake can be connected to a similar increase in fast-food establishments per square capita, "food deserts," and increased cost or unavailability of fresh produce, milk, eggs, and lean proteins.<sup>12,13,14</sup>

A trained nutrition professional must first complete a formal nutrition assessment before prescribing a nutrition intervention. This involves identifying the patient's relevant medical history, family influence on health behaviors, access to food, food allergies/intolerances, and personal preferences. Other areas of assessment should include food/nutrition knowledge, meal timing, social eating behaviors, and participation in sports.<sup>15</sup> One must not assume that the patient knows how to read a nutrition label or understands macronutrients and food groups. These topics are not a required part of the school curriculum, may not be taught in school or even understood by the parent or guardian at home.

Adolescent patients often engage in social activities at fast food/fast casual food locations.<sup>16</sup> Examples may include local corner stores, shopping center food courts, and fast food establishments. Verbiage that demonizes these environments must be avoided, since they may be one of the few safe locations for socialization, especially for those with limited access to transportation. Instead, one should help patient understand the more health-promoting options available at those locations. If the patient currently participates, or desires to participate, in sports, then the patient's understanding of pre- and post-activity nutrition considerations should also be evaluated. Key considerations include hydration status, carbohydrate intake, and antioxidant load. Interventions for this population should be introduced in small, incremental steps. The conversation should not center around the patient's weight, instead focusing on health-behaviors (poor eating habits, limited physical activity, etc.) leading to poor health outcomes. Adolescents tend to respond best when presented with motivators such as athletic or academic performance, energy levels, and other short-term goals.

If patients desire surgical intervention, the RDN will need to educate the patient on the pre- and postoperative dietary guidelines. Prior to undergoing a bariatric procedure, patients will need to demonstrate understanding of the lifelong nutritional implications of the procedure, demonstrate commitment to more health-promoting behaviors, and implement protein and vitamin supplements. As determined by the clinic performing the procedure, the patient may also be required to complete a minimum number of consecutive nutrition counseling visits and receive nutrition clearance within 1 year or 6 months of surgery.

## **EXERCISE PHYSIOLOGIST'S ROLE:**

The role of the exercise physiologist on the team is to minimize non-academic sedentary time, such as time spent playing video games, watching videos, or on screens for other reasons. The exercise physiologist must consider what the patient is willing and able to do, and help to set realistic movement goals. The exercise physiologist encourages structured movement, such as going to the gym to work out, as well as promoting active living and hobbies, such as walking or biking to and from school, playing sports, or swimming.

## **THE FAMILY'S ROLE:**

Adolescents' family and caretakers hold a crucial role in the success and sustainable management of obesity. Obesity is often carried down from generations due to epigenetics, genetics, environment, nutrition education, access to nutritious food, value of physical activity, cultural impact, intergenerational trauma, and dynamics within the home.<sup>7,17,18</sup> The first goal is to obtain caretaker support and 'buy-in' to weight management intervention and acknowledgement of the need to be involved in the treatment. Oftentimes, caretakers of adolescents parentify or falsely believe that the adolescent makes all their own choices and should take sole responsibility for their health and weight-related behaviors. Teaching caretakers about how their own behaviors, eating habits, and thoughts about weight can influence their child is helpful.<sup>9</sup> It has been shown that boundaries and rules are effective for parenting children, while modeling and support are more effective for adolescents.<sup>7,19</sup> Ways that families can get involved in the adolescent's care are setting boundaries in the home regarding sedentary activity or screen time, sitting together for meals, teaching the adolescent to be more actively involved in the grocery shopping and cooking, encouraging more active hobbies, utilizing effective communication strategies within the home, and being actively involved with the adolescent's treatment and doctor appointments. Specifically when thinking about surgical intervention, the caretakers must understand their role in pre and post-operative care.

## BARIATRIC SURGERY AMONG ADOLESCENTS:

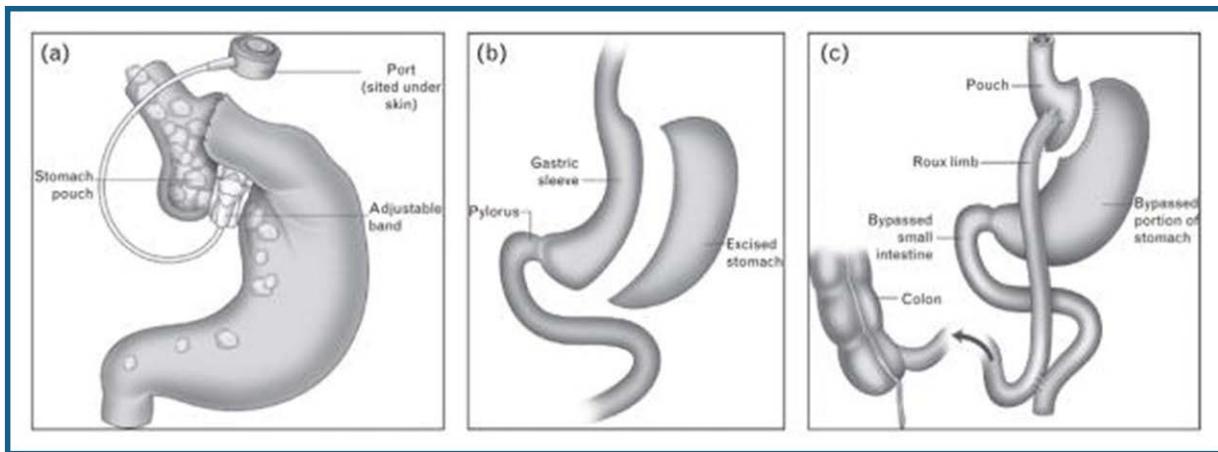
Rates of bariatric or weight loss surgery among adolescents have been increasing rapidly. One estimate showed that rates increased 5-fold from 1997 to 2003<sup>19</sup>, and another showed a tripling in adolescent bariatric surgeries from 2000 to 2009.<sup>20</sup> Long term data show that bariatric surgery produces significant and sustained weight loss among morbidly obese adults along with resolution or significant improvement in weight-related comorbid diseases.<sup>19,20</sup> There are increasing data on the safety and efficacy of bariatric surgery in adolescents.<sup>21,22</sup> Yet it still remains underutilized. Potential reasons include reluctance on the part of pediatric providers to suggest or recommend bariatric surgery. Pediatric providers may have concerns about the risks or long-term effects of surgery or may think that non-surgical management remains superior. There are also relatively few comprehensive, interdisciplinary, adolescent-focused bariatric programs compared to adult resources. Bariatric surgery should be considered for obese adolescents with significant medical or psychosocial impairment.

Bariatric surgery, regardless of procedure type, is indicated for adolescents with a BMI>35 kg/m<sup>2</sup> with a severe comorbidity, such as type 2 diabetes mellitus, moderate to severe obstructive sleep apnea, hypertension, pseudotumor cerebri, severe steatohepatitis, or for adolescents with a BMI>40 kg/m<sup>2</sup> with mild comorbid illness, including mild obstructive sleep apnea, glucose intolerance or prediabetes, dyslipidemia, or impaired quality of life (Table 1). Additional requirements include skeletal maturity (>95% estimated growth), advanced pubertal development (Tanner stage IV or V), and psychosocial maturity. There is no firm recommendation for a younger age limit as long as the other surgical indications are met. At our center, the youngest adolescents undergoing bariatric surgery have been 14-years-old. The adolescent must be prepared to make the necessary lifelong changes and must have failed 6 months of medical weight management. Contraindications to surgery include, 1) a medically correctable causes of obesity; 2) active substance abuse; 3) current pregnancy; 4) a medical, psychiatric, or cognitive disability that impairs ability for adherence; 5) an inability or unwillingness of the patient or family to understand the procedure or consequences and the need for long term follow-up and vitamin and mineral supplementation.

BMI≥35 kg/m <sup>2</sup>	BMI≥40 kg/m <sup>2</sup>
PLUS at least one major comorbidity:	PLUS other comorbidities:
1. Type 2 diabetes mellitus	1. Insulin resistance or glucose intolerance
2. Moderate to severe obstructive sleep apnea	2. Mild obstructive sleep apnea
3. Pseudotumor cerebri	3. Hypertension
4. Severe steatohepatitis	4. Hyperlipidemia
	5. Impaired weight-related quality of life
Recommended for all adolescent surgical candidates:	
1. Sexual maturity rating Tanner IV or V OR Bone age ≥13 years in girls and ≥15 years in boys	
2. Ability to understand and adhere to lifestyle changes required postoperatively (dietary needs, physical activity, vitamin supplementation, medical follow up)	
3. Ability to provide informed assent	

**Table 1. Indications for Adolescent Bariatric Surgery**

Currently the two most commonly performed bariatric surgeries are the Roux-en-Y gastric bypass (RYGB) and vertical sleeve gastrectomy (VSG) (Figure 2), both of which result in 70-85% excess weight loss at 12 months post-operatively.<sup>23</sup>. The RYGB and VSG are both considered to be safe operations with low rates of complications in the perioperative and postoperative period for both adolescents and adults.<sup>21</sup> Major complications, such as the need for reoperation or bleeding requiring transfusion, occur very rarely.<sup>21</sup> The trend over the past 10-15 years has been a decrease in RYGB and an increase in VSG among adolescents.<sup>22</sup> VSG is now performed most commonly in adolescents due to it being a simpler surgery allowing for a faster recovery time with lower long-term risk of malnutrition and vitamin deficiencies. VSG in our center has been



**Figure 2: Three commonly performed bariatric procedures**

performed for nearly all our adolescent patients. Our adolescent patients typically plan 2 weeks off from school and/or work for recovery following surgery. The laparoscopic adjustable gastric band (LAGB), which used to be performed commonly, is now rarely utilized in either adults or adolescents due to failure to lose weight or weight regain, dysmotility and worsened reflux, and band erosion or slippage, resulting in subsequent need for band removal.<sup>22</sup>

All patients should receive extensive education on the postoperative diet, which starts with clear fluids and gradually advances to protein shakes and sugar-free liquids, eventually progressing to include other foods. Education on proper fluid and protein intake to prevent dehydration and malnutrition as well as the need for lifelong vitamin supplementation to prevent vitamin deficiencies is essential. Patients are followed closely in the first year after surgery by the interdisciplinary team and surgeon in order to ensure proper protein and vitamin intake as well as appropriate weight loss. Lab screening for vitamin deficiencies should be performed regularly in the first 2 years following surgery, then annually thereafter.

Weight loss surgery seems to be very safe in adolescents with low rates of perioperative and postoperative complications.<sup>21</sup> These surgeries are all performed laparoscopically, and adolescents at our institution typically require only a 1 to 2 nights hospital stay following surgery. Large databases of adolescents show on average a 30% decrease in weight and BMI in the 12 months following surgery.<sup>22</sup> The majority of the weight loss is sustained out to 3 years post-operatively.<sup>22</sup> Medical comorbidities, such as type 2 diabetes mellitus or prediabetes, dyslipidemia, and elevated blood pressure show high rates of remission or improvement at the 3-year postoperative mark.<sup>23</sup> Additionally, adolescents report improvement in a variety of questionnaires in areas of quality of life, depression, self-esteem, physical functioning, and overall health anywhere from 6 months to 3 years post-operatively.<sup>23</sup>

## CONCLUSION:

Obesity is a common problem in children and adolescents which can continue into adulthood with substantial morbidity. Medical treatment of obesity requires significant time and persistence, and results can be disappointing. It is important to consider various individual and environmental factors when helping adolescents with weight management, and utilization of an interdisciplinary team has proven to be most effective. Medical intervention alone is often not enough to achieve sustainable results when tackling obesity in adolescents. Incorporating other disciplines such as dietitians and mental health providers can be helpful. Bariatric surgery should be considered in adolescents with a long-standing history of excess weight, medical or psychological comorbidities, limited success with previous weight management efforts, and/or a significant family history of weight-related health problems. Whether the adolescent pursues medical weight management or bariatric surgery, they can significantly reduce risk of developing the complications of obesity and attain improvements in co-morbid diseases, mood, sleep, relationships, and overall quality of life.

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RESIDENT ARTICLE

## Evaluating Knowledge and Implementation of Early Peanut Introduction Guidelines: A Cross-sectional Survey

*Shannon Sullivan, MD<sup>1</sup>, Molly Kidder, MD<sup>1</sup>, Natalia Pineros, MD<sup>1</sup>, Yvette Gonzalez, DO<sup>1</sup>, Rahul Mhaskar, MPH, PhD<sup>2</sup>, Sharon Dabrow, MD<sup>1</sup>, Panida Sriaroon, MD<sup>3</sup>*

<sup>1</sup>*University of South Florida Morsani College of Medicine, Department of Pediatrics*

<sup>2</sup>*University of South Florida Morsani College of Medicine, Department of Internal Medicine*

<sup>3</sup>*University of South Florida Morsani College of Medicine, Department of Pediatrics,  
Division of Allergy and Immunology*

### BACKGROUND

Peanut allergy is a growing public health concern. Not only is peanut the leading food-related cause of fatal anaphylaxis, but the prevalence of peanut allergy appears to have tripled in the past ten years.<sup>1,2,3</sup> Various studies have shown a significant impact on patients' and families' quality of life due to fear of life-threatening allergic reactions.<sup>4,5</sup> In an effort to reduce peanut allergy and decrease the burden on the healthcare system, clinical trials by allergists over the past two decades have revealed novel evidence, leading to drastic changes in the approach to peanut allergy prevention. In 2000, the American Academy of Pediatrics (AAP) guidelines recommended the delay of peanut introduction until three years of age.<sup>6</sup> By 2010, these guidelines were rescinded, and both the AAP and the National Institute of Allergy and Infectious Disease (NIAID) suggested that there was insufficient evidence to support either early or delayed introduction.<sup>7,8</sup> The landmark Learning Early About Peanut Allergy (LEAP) trial published in 2015 showed an 86.1% relative reduction in the prevalence of peanut allergy in a high-risk (severe eczema and/or egg allergy), early consumption group, providing strong evidence suggesting that early and regular consumption of peanut could reduce peanut allergy.<sup>9</sup> This robust finding prompted NIAID guidelines to officially shift in 2017 from late to early introduction of peanut.<sup>10</sup> As of 2019, the AAP recommends the introduction of peanut as early as 4 to 6 months of age in infants with severe eczema and/or egg allergy.<sup>11</sup>

Due to the profound changes that these guidelines have undergone over the past decade, implementation of infant screening and early peanut introduction remains inconsistent among pediatricians.<sup>11,12</sup> Basic understanding and clinical application of updated guidelines is paramount for pediatricians, who play a key role in preventive medicine, including identifying at-risk infants and preventing them from developing peanut allergy.

## OBJECTIVE

This pediatric resident quality improvement project aimed to assess knowledge, implementation, and barriers to implementation of early peanut introduction guidelines among physicians in the outpatient pediatric clinic setting.

## METHODS

Assessment of baseline knowledge and practice habits among University of South Florida (USF) pediatric attending physicians (AP), community pediatricians (CP), and USF pediatric resident physicians (RP) was conducted using an anonymous survey in January 2020. The survey had 6 questions (Qs) which consisted of demographic information, implementation, assessment of knowledge, and barriers to implementation (Table 1).

CATEGORY	QUESTION
1.	Post-graduate year of training/practice
2.	Frequency of self-reported use of anticipatory guidance for early peanut introduction at the six-month well-child checks
3.	Risk factor for peanut allergy: Severe eczema and egg allergy;
4.	Peanut IgE level of >0.35 kU/L as an indication for allergist referral
5.	Recommended dosing/frequency of peanut protein introduction of approximately two grams, three times weekly
6.	Lack of time, parent refusal, lack of parental understanding, forgetting to discuss, and/or lack of awareness of guidelines

*Table 1: Anonymous survey design*

The RP group received knowledge enhancement interventions following the initial survey, which included a lecture given on the NIAID Addendum Guidelines for early peanut introduction, electronic medical record (EMR) template phrases for the 6-month well child check (WCC) created by and shared with the residents, and reminders posted in resident clinic workrooms. Eight weeks following the interventions, residents completed a post-intervention survey.

We conducted descriptive analyses of relevant variables including median, range (for continuous variables) and frequencies (for categorical variables). We created a composite knowledge score (maximum value of three and a minimum of zero points) by including responses from the three specific knowledge questions (Figure 1, Q 3-5). The distribution of knowledge score was investigated across participant characteristics (e.g., level of training, the use of anticipatory guidance, etc.) with Kruskal-Wallis test at the 0.05 level of significance. All statistical analyses were conducted using SPSS version 26.0 software.

## RESULTS

Pre-intervention surveys were completed by 12 AP, 8 CP, and 27 RP. Percentages of correct answers in three survey categories were: risk factors for peanut allergy (42% vs. 13% vs. 48%); peanut IgE level as an indication for allergist referral (83% vs. 25% vs. 48%); and recommended dosing/frequency of peanut protein per week (25% vs. 25% vs. 11%), in the AP, CP, and RP groups, respectively. The pre-intervention median composite knowledge score was 1 (range 0-3). Knowledge was similar across the AP, CP and RP groups regardless of the physician's duration of experience since graduating medical school ( $p = 0.08$ ). The implementation of anticipatory guidance regarding early peanut introduction at the six-month WCC was 33%, 13%, and 11% in the AP, CP, and RP groups, respectively. There was no difference observed in knowledge of subjects who used anticipatory guidance versus who did not ( $p = 0.26$ ).

Following knowledge enhancement interventions, RP showed improved knowledge in all three areas assessed: risk factors for peanut allergy (percentage of correct answers increased from 48% to 64%); peanut IgE cutoff level for allergist referral (48% to 50%); and suggested dosing/frequency of peanut protein introduction (11% to 64%) in the pre- and post-intervention surveys, respectively. The post-intervention median composite knowledge score was 2 (range 0-3). Resident self-reported implementation of anticipatory guidance regarding early peanut introduction at the 6-month WCC also improved from 11% to 36%.

Collectively among all three groups, the most commonly reported barriers to implementation were forgetting (62%), not having enough time in the WCC (56%), and being used to the old guidelines of late peanut introduction (21%).

## DISCUSSION

Our study findings suggest that insufficient knowledge of published guidelines for early peanut introduction exists across both resident and attending physicians in academic and community settings, reiterating findings of prior research.<sup>12</sup> Knowledge enhancement interventions including resident education and various reminder methods led to improved proficiency in identifying risk factors for peanut allergy, indication for specialist referral, and the weekly recommended dose of peanut protein, as well as self-reported implementation of the guidelines.

As medical practice guidelines are continually evolving, physicians are often left with gaps in their knowledge. Pediatricians are actively involved in patients' lives from an early age, and thus play a pivotal role in promoting preventive healthcare. Despite strong evidence that early introduction of peanut leads to the prevention of peanut allergy in high-risk infants, many pediatricians and resident physicians reported under-implementation of the most recent guidelines. Furthermore, the self-reported practice of the guidelines did not correlate with greater knowledge, as one would expect, reinforcing the need for additional interventions to spread awareness among the pediatrician community.

The limitations of this study include a small sample size; limited knowledge enhancement intervention methods; unpaired resident participants in the before and after-intervention groups; and potential demand characteristic bias during survey completion. EMR chart review could be used to directly measure the rate of documented implementation versus self-reported data in order to eliminate any selective memory bias from participants.

Future directions should aim for improving physician awareness of updated medical guidelines, such as the early peanut introduction guidelines in this study. Case-based learning has been shown to be effective in other areas of health education<sup>13</sup> and should be encouraged when new knowledge is crucial for a physician to provide services for patients. Other useful learning methods include quiz, mock WCC sessions, roundtable Q&A discussions, and mandatory learning modules by local or national organizations. Efforts should be made to expand learning styles to accommodate a diverse group of practicing physicians.

## CONCLUSIONS

Significant gaps exist in both knowledge and implementation of the early peanut introduction guidelines for prevention of peanut allergy in high-risk infants. Educational interventions are effective at improving physician knowledge and practice habits.

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## RESIDENT ARTICLE

# The Firearm Epidemic: How Can Pediatric Trainees Improve Firearm Safety?

**Alexandra Byrne, MD<sup>1</sup>; Melanie Gross Hagen, MD<sup>2</sup>; Lindsay Thompson, MD, MS<sup>3</sup>**

<sup>1</sup>Department of Pediatrics, University of Florida College of Medicine, Gainesville, Florida

<sup>2</sup>Department of Medicine, University of Florida College of Medicine, Gainesville, Florida

<sup>3</sup>Department of Health Outcomes and Biomedical Informatics, University of Florida College of Medicine, Gainesville, Florida

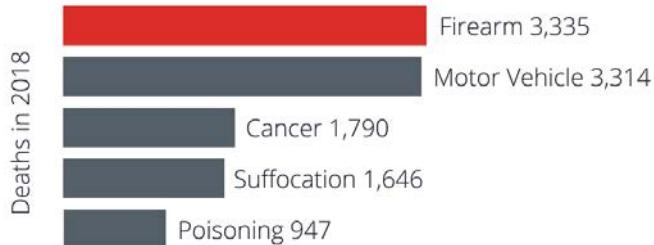
It was a routine Wednesday afternoon at my resident continuity clinic. I was wrapping up a five- year-old well-child visit with my standard “Safety Check,” which by seven months into intern year had become well engrained. The father patiently listened as I provided anticipatory guidance on key safety topics, including smoke detectors, bike helmets, medication storage, and firearm safety. I concluded with a quick “Do you have any questions?” as I scooted out the door late to my next patient. “Silly question,” he asked, “How do gun locks work?” Great question. Embarrassed, I confessed I had never used a firearm lock, but would look up resources for him, including the cost and where to find one. I left the room flustered and disappointed in my lack of knowledge on a topic so important for my patients’ safety. How could I effectively counsel on firearms if I knew nothing about them myself?

## THE FIREARM EPIDEMIC

According to recent data from the Centers for Disease Control and Prevention, firearms are now the leading cause of death for American children and teenagers (Figure 1).<sup>1,2</sup> Roughly every 40 minutes, a child or teenager is wounded with a firearm.<sup>2</sup> Of firearm-related deaths, approximately 59% are homicide, 35% are suicide, and 4% are unintentional deaths.<sup>3</sup> The rate of firearm-related deaths among children and adolescents in the United States is almost 37 times higher than the overall rate in other high-income countries (Figure 2).<sup>3</sup> In 2018, more children in the US died from a firearm than from motor vehicle accidents (3,314 deaths) or cancer (1,790 deaths).<sup>1</sup>

In the United States, one in three children live in a home with a firearm. Of these homes, 43% store firearms unlocked and 7% store them unlocked and loaded.<sup>4</sup> People with a firearm in the home are at two times the risk of homicide and three times the risk of suicide.<sup>5</sup> Although firearm-related injury rates have declined over the past three decades, there was a 28% relative increase between 2013-2018. Racial disparities in firearm-related deaths have not only persisted, but, sadly, increased. Firearm-related deaths are 3.7 times higher in African American youth compared to white youth. Geographic disparities also exist, with higher rates in urban compared to rural areas.<sup>3</sup>

## FIREARMS ARE THE LEADING CAUSE OF DEATH FOR AMERICAN CHILDREN AND TEENS.

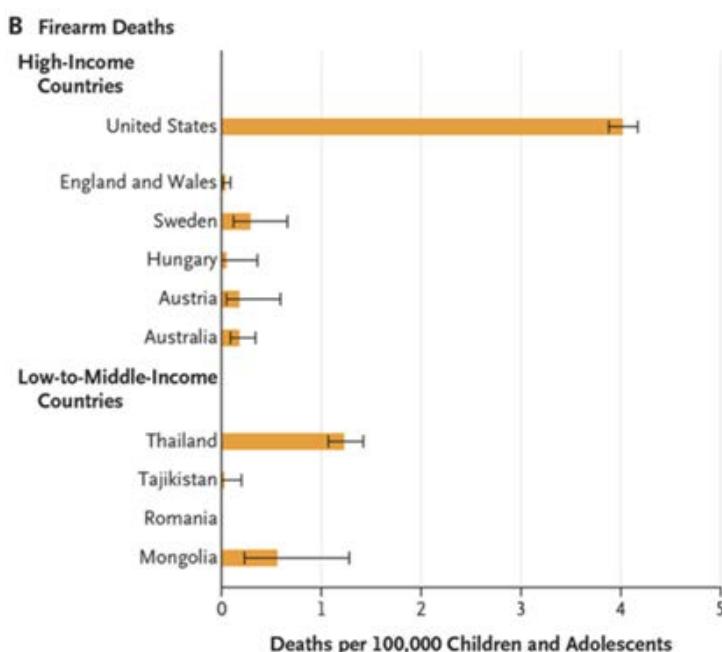


EVERYTOWNRESEARCH.ORG

CDC, Fatal Injury Reports, 2018.

**Figure 1**

*Leading Causes of Death in American Children and Teens in 2018. Reprinted with permission from ©Everytown for Gun Safety Support Fund 2020.<sup>2</sup> Data from the National Center for Injury Prevention and Control, Web-based Injury Statistics Query and Reporting System (WISQARS) Fatal Injury Reports, Center for Disease Control and Prevention.*



**Figure 2**

*Global Comparison of Firearm Mortality in Children and Adolescents in 2016. Reprinted with permission from the New England Journal of Medicine. Cunningham RM, Walton MA, Carter PM. The Major Causes of Death in Children and Adolescents in the United States. N Engl J Med. 2018;379(25):2468-2475.<sup>3</sup>*

The current shelter-in-place orders and rise in firearm sales<sup>6</sup> during the Coronavirus 2019 pandemic may lead to a sharp increase in firearm-related injuries. Social distancing can lead to isolation, which is strongly associated with an increased risk of suicide.<sup>7</sup> Increased familial stress can lead to higher rates of domestic violence and child abuse. Lastly, children are spending more time at home, which may increase the likelihood of access to unsafely stored firearms.

## SAFE FIREARM STORAGE - IS COUNSELING ENOUGH?

The American Academy of Pediatrics (AAP) recommends discussing firearm safety at every well-child check, starting at prenatal and newborn visits.<sup>8</sup> Specifically, the AAP advises that the absence of firearms in the home is the most reliable and effective measure to prevent firearm-related injuries in children and adolescents. If a family decides to keep a firearm in the home, it should be unloaded, locked in a safe or with a locking device, and stored separately from locked ammunition. Additionally, pediatricians should counsel parents to ask about firearms in the homes in which their children play, since greater than one third of unintentional shootings occur in the homes of friends, neighbors, or relatives.<sup>9</sup>

Despite the recommendations above, the efficacy of physician counseling on firearm safety is unknown. Previous studies have found that firearm safety counseling during well-child visits, including recommendations on firearm removal or safe storage and written storage instructions, has no significant reduction in firearm removal or storage practices.<sup>10,11</sup> Providing discount coupons for firearm locks has been shown to have large though nonsignificant increase in the purchase of firearm locks.<sup>10,11</sup> Conversely, providing families with free firearm locks during visits significantly increases safe storage practices.<sup>12,11</sup> Innovative models of delivery, such as waiting room tablet modules, may also be an effective way to increase safe storage practices.<sup>13</sup>

## PEDIATRIC TRAINEES, WHY ARE WE NOT ASKING ABOUT FIREARMS?

As pediatricians, we have the unique opportunity to prevent firearm-related injuries by counseling families on safe storage during routine well-child visits. Although the AAP recommends counseling on firearm safety at every well-child visit, only 65% of pediatric residents strongly agree they ask families about the presence of guns in the home and only 21% ask parents who have firearms to remove them from the home.<sup>14</sup> Though firearms are the leading cause of death in American children and teens, only 10% of pediatric residents strongly agree that firearm counseling is a high priority.<sup>15</sup> There are various self-reported reasons why residents do not counsel on firearm safety, including discomfort on the topic, perceived ineffectiveness in their counseling ability, uncertainty of how to use storage devices, fear of offending parents, and lack of time.<sup>15,16</sup> In short, pediatric trainees are not adequately educated on firearm safety.

## 10 WAYS PEDIATRIC TRAINEES CAN IMPROVE FIREARM SAFETY

### Individual Trainee Level

1. Familiarize yourself with firearm safety resources.
2. Conduct a firearm safety check, including screening, counseling, and provision of a free firearm lock, at every well-child visit.
3. Identify high risk patients.

### Residency Level

4. Help develop an evidence-based firearm safety curriculum for your residency program, including interactive simulations, motivational interviewing, and hands-on practice using firearm locks.
5. Educate medical students about firearm safety by speaking at a Pediatric Interest Group meeting, Pediatric Clerkship lecture, or one-on-one with students at your clinic.
6. Conduct quality improvement projects to improve efficacy of firearm safety checks, such as EMR template changes, innovative modes of delivery, work-flow changes, etc.
7. Develop research questions and design projects to help expand the limited research on firearm safety.

### Community Level

8. Partner with your local police department and community organizations, such as Moms Demand Action for Gun Sense in America, to collect free firearm locks and other resources for your clinic.
9. Talk with community members, in particular firearm owners, about how pediatricians can effectively frame our message.
10. Advocate at the local, state, and national level for legislation that will protect children from firearm-related injuries.

## **Firearm Safety Resources for Pediatricians and Families:**

- Healthychildren.org
- EverytownResearch.org
- BE SMART Campaign: besmartforkids.org
- The Eddie Eagle GunSafe Program: eddieeagle.nra.org
- Project ChildSafe: projectchildsafe.org

## **CONCLUSION**

Firearms are the leading cause of death in American children and teenagers. Pediatric trainees must rise to the occasion and join pediatricians, public health experts, and leaders across the country in efforts to end our firearm epidemic. Our medical training is the time to learn best practices and develop skills we will implement throughout the rest of our careers. Through formal education, community partnership, advocacy, quality improvement, and research, we can improve firearm safety in our communities. If we do not learn about firearm safety now, when will we?

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## STUDENT ARTICLE

# Human Trafficking of Children and Adolescents: A Literature Review and Call to Action for Florida Pediatricians

Ali E. Wells, MD<sup>1</sup>; Chelsea R. Schmitt, MD, MPH<sup>2</sup>; Antoinette C. Spoto-Cannons, MD<sup>3</sup>

<sup>1</sup>University of South Florida Morsani College of Medicine, Department of Obstetrics and Gynecology

<sup>2</sup>University of South Florida Morsani College of Medicine, Department of Internal Medicine

<sup>3</sup>University of South Florida Morsani College of Medicine, Department of Pediatrics

## HUMAN TRAFFICKING AND OUR COMMUNITIES

Every year between 100,000 and 300,000 children in United States fall victim to sex trafficking.<sup>1</sup> Fewer estimates exist regarding labor trafficking children, but the National Human Trafficking Resource Center recorded nearly 150 reports of child forced labor in the United States in 2014.<sup>2</sup> Reports of both forms of human trafficking are greatest in heavily populated states, in cities with multiple modes of travel access, and tourist destinations. Florida ranks third in the nation among states with the greatest prevalence of human trafficking.<sup>3</sup> These rankings probably shifted last winter when Tampa hosted Super Bowl LV in February 2021, although the effect of the global pandemic remains to be seen. Event attendance will be limited, but COVID-19 has amplified trafficking risk factors with economic stress and loss of contact with mandatory reporters in schools. As the largest yearly sporting event in the country, the Super Bowl has been dubbed “the single largest magnet for sex trafficking and child sex work in the U.S. and possibly the world”<sup>4</sup>. There was a 136% increase in the number of “adult” classified advertisements on the internet advertising site, Backpage, at the time of the Dallas, TX, Super Bowl in 2010.<sup>5</sup> This could serve as a proportional approximation of the increase in sex trafficking associated with the event. The human trafficking industry has grown in the last decade since this Texas Super Bowl, with estimated net profit of \$32 billion in 2011 to \$150.2 billion in 2018, making it the fastest-growing form of international crime and third-most profitable illegal trade.<sup>6</sup> Although there are only approximate measures of increase in human trafficking around the Super Bowl, this singular event represents an opportunity to raise awareness about a crime covertly thriving in our community year-round. Since its seizure by the United States Department of Justice in April 2018 for facilitation of sex trafficking, Backpage has been taken down but supplanted by many smaller sites less familiar to law enforcement. Despite the victory over Backpage, the demand for victims remains. It is vital that pediatricians and other healthcare providers become aware of this issue and learn to recognize red flags in every patient’s history and physical exam.

## DEFINITION

Human trafficking is defined by the United Nations Office on Drugs & Crime as:

...the recruitment, transportation, transfer, harbouring or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation. Exploitation shall include, at a minimum, the exploitation of the prostitution of others or other forms of sexual exploitation, forced labour or services, slavery or practices similar to slavery, servitude or the removal of organs.<sup>7</sup>

Note that this definition does not require that a victim be transported from one place to another in order to be trafficked.<sup>8</sup> A child may be trafficked domestically, even within their own home. The two most common types of human trafficking are sale of a person for sex and sale for labor. Sex trafficking can include escort services, pornography, illicit massage businesses, brothels, and outdoor solicitation. The most common age of recruitment for girls falls between 12 and 14 years, and the most common age for boys between 11 and 13 years.<sup>9</sup> Industries in which labor trafficking may commonly occur include agriculture, domestic work, restaurants, and cleaning services.<sup>10</sup> Reports of forced child labor in each of these industries have been filed, and children are frequently used in traveling sales crews and in peddling or begging rings.<sup>10</sup>

## HEALTHCARE PROVIDER ROLE

Over 50% of labor and sex trafficking survivors reported that they had accessed health care at least once during the course of being trafficked.<sup>11</sup> Given this important statistic, it can be reasoned that nearly every provider in the hotbed trafficking state of Florida has encountered a victim, however nearly 97% of those survivors stated that during their encounters with healthcare providers, they had never been provided with information or resources about human trafficking.<sup>11</sup> Despite the widespread nature of this problem and the fact that healthcare professionals are in a unique position to provide assistance to victims of trafficking, less than 10% of 1,000 physicians surveyed in 2014 reported that they were trained to identify the signs of human trafficking, and more than 70% said they would not know what to do if they encountered a victim of sex trafficking.<sup>12</sup> This represents an unacceptably low rate of training amongst healthcare professionals in recognizing and engaging with victims of human trafficking. Acknowledging this lack of awareness and education, Human Trafficking Bill, Chapter 2019-152 was passed by the Florida legislature in June of 2019. Among other stipulations, the law requires all healthcare professionals to complete one hour of continuing medical education on human trafficking by January 1, 2021, as part of licensure requirements. Any medical professionals who may come into contact with a victim of trafficking are advised to participate in this training, especially as office staff members may be able to observe suspicious behaviors before the clinical encounter begins and can offer valuable insight to the physician.

## RISK FACTORS

Many risk factors may contribute to domestic youth becoming involved in trafficking. Some of the most commonly cited are listed in Table 1.<sup>13</sup> COVID-19 quarantine conditions have likely exacerbated several of these.

RISK FACTORS FOR DOMESTIC TRAFFICKING OF YOUTH	
Poverty	Housing insecurity/homelessness
Lack of education	History of running away
Difficulty in school/Bullying	History of foster care
English language limitations	Juvenile delinquency
LGBTQ status	Behavioral health concerns
Female gender	Missing or absent parent
Substance abuse	Adverse childhood experiences (ACEs)
Family members/friends already involved in commercial sex	Early childhood trauma/abuse
Lack of supervision (including on the Internet)	History of dating violence, sexual abuse, physical abuse

Table 1. Risk Factors for Domestic Trafficking of Youth

## RECRUITMENT

Although some child victims are physically held by their trafficker, it is a public misconception that this represents the predominant form of control. Psychological manipulation, frequently capitalizing on one or more of the risk factors in Table 1, is a much more common method of control used by traffickers. This is termed recruitment. Traffickers may assume the role of “boyfriend” and use seduction and emotional attachment to influence their victims and isolate them from friends and family. They may pretend to serve as “helper” and provide shelter, money, even an illicit substance to which the victim may become addicted.<sup>14</sup> Finally, a trafficker may pose as a “talent scout,” offering opportunities for children to make money singing or modeling with the intent to slowly normalize sexually explicit behaviors. Traffickers use these tactics to lure in victims and then groom the children to behave in a way that is pleasing to the perpetrators and may even force the children to become complicit in a crime, such as grand theft, or in gang involvement. Children may also serve as recruiters of their peers, either because they seek reward from their trafficker or because they truly believe their trafficker cares for them. Not uncommonly, a child may be trafficked by their own family member.

## RED FLAGS

Common ailments of trafficked pediatric victims presenting to their healthcare provider include sexually transmitted infections (STIs), malnourishment, and mutilations.<sup>15</sup> It is especially telling if this is not the first encounter in which the patient presented with such complaints. Other common primary problems include undesired pregnancy, work injury, substance abuse, and psychiatric needs including acute suicidality. The latter two and STI represent the most common problems seen in trafficked pediatric patients prior to their identification as victims.<sup>16</sup> Red flags can be identified during the visit in the history, physical exam (including appearance), and behavior (Table 2).

RED FLAGS FOR HUMAN TRAFFICKING				
History	Appearance	Behavior	Force & Abuse	Coercion & Control
Scripted or inconsistent history	Tattoos or branding	Resistant to assistance	Hematoma	Inability to keep appointments/follow care instructions
Discrepancy between history & presentation	Not appropriately dressed for weather	Demonstrates hostile behavior	Laceration or scarring	Unable to present ID, false/multiple IDs
Unwilling/resistant to answer questions	Appears younger than stated age	Appears to be in a hurry	Burns	Not in possession of own ID
Unable to provide address	Appears sleep-deprived		Missing or broken teeth	Inaccurate or changing demographic info
Not aware location, date, time	Bald spots	Fear/Submissiveness	Injuries to the head/neck	Addictive behaviors
Unusually high # of sexual partners, STIs or miscarriages	Burns	Traumatic stress response	Black eyes	Accompanied by person who does not let the patient speak
Tried many inappropriate OTC remedies	Malnourished	Avoids eye contact	Limbs dislocation/fracture	Large age discrepancy between patient and partner
Trading sex for valuable item, food, shelter, drugs, money	Poor dentition/Oral trauma	Hyper-vigilance	Pelvic pain	Is not being paid or wages are withheld
Sexual vocabulary/knowledge not age appropriate	Delayed/inadequate medical care	Subordinate demeanor, especially to accompanying person	Rectal trauma	Is being isolated from family/friends
				Hypervigilance, fear, paranoia, anxiety, depression

Table 2: Red Flags for Human Trafficking

## HISTORY

A patient presenting with one of the above chief complaints may present with a history interspersed with or plagued with inconsistencies.<sup>17</sup> The account of their problem's cause and timeline may even seem scripted.<sup>18</sup> Their demographic information may be inconsistent with what is previously listed in their charts or on their forms of identification, or may change throughout or between encounters.<sup>17</sup> Key factors to consider are discrepancies between the history and the patient's presentation, such as a wound in a later stage of healing or infection.<sup>17</sup> Sexual histories may be more challenging to compare to the patient's physical exam, but if the pediatric patient offers a history of several sexually transmitted infections, pregnancies, or sexual partners, this should be considered a red flag.<sup>19</sup> In such cases, asking if the patient has traded sex for money, food, shelter, drugs, or other valuable items is warranted.<sup>20</sup> The patient may say that they are not in control over their finances or receive only a small proportion of the cost for services rendered in which they participated.<sup>21</sup>

Trafficked patients may be kept deliberately ignorant of their situation and surroundings, such that the patient does not seem oriented to location, date, and time and is unable to provide a home address.<sup>17</sup> It is worth asking the patient whether they have had recent contact with close friends and family members, since isolation from loved ones reinforces the trafficker's control over the victim.<sup>17</sup> Pay heed to what actions the patient has already tried to remedy the chief complaint; trafficked patients may try inappropriate over-the-counter remedies in order not to ask their trafficker to facilitate medical attention.

An advanced sexual vocabulary or sexual knowledge inappropriate for the patient's age is an additional cause for concern in a pediatric patient. Also, an adolescent patient's lack of responses should not be written off as normal, sullen behavior. They may well be deliberately hiding information to protect their trafficker.<sup>19</sup>

## PHYSICAL EXAM

### Appearance:

It may be challenging to distinguish the trafficked adolescent from the rebellious adolescent. While both may appear sleep deprived, be dressed inappropriately for the weather, and have tattoos, the trafficked adolescent may provide poor explanations for these findings.<sup>17</sup> For example, some adolescents choose to wear looser clothing to minimize attention to their bodies, reasoning which might be elucidated in a HEADSS assessment. But a trafficked teen may be trying to hide burns, scars, or obvious brands.<sup>17</sup> The non-trafficked teen may be more likely to explain the significance of her tattoo. The same tattoo pattern on the same body part appearing on multiple patients may raise concern for the ink serving as a marker of victims controlled by a certain trafficker. Patients may show additional signs of stress and neglect, such as malnutrition, poor dentition, and hair loss inappropriate for their age.<sup>18</sup> The most obvious red flag may be that the patients presenting with a sexually related complaint appear younger than their stated age.<sup>19</sup>

### Behavior:

The patient's behavior throughout the encounter may raise suspicions for abuse, even trafficking. The patient may exhibit resistance to elements of the history and physical or display outright hostile behavior,<sup>18</sup> or appear rushed or inattentive in order to avoid completion of some elements of the encounter.

The patient's use of a cellular device may be telling. Constant texting may represent a deliberate effort to avoid engagement with the provider or acquiescence to the trafficker's demands for updates. Regardless of cell phone use, it is important to pay attention to the patient's eye contact for clues to their submissiveness.<sup>17</sup> This is especially true if the patient is accompanied by a self-proclaimed relative who is reluctant to leave the room.<sup>17</sup> Be aware of signs of hypervigilance, such as exaggerated startle response and constant gaze toward the exit, as these may be signs of a traumatic stress response.<sup>21</sup>

Additional elements of the interaction between the patient and the individual accompanying them may reflect coercion and control in the relationship. A physician and staff members should be aware of who holds the patient's identification if the patient is age 15 years or older as this may be a sign that the patient has no control over personal documentation or money.<sup>17</sup> A clear red flag is when the accompanying individual provides the vast majority of the history and refuses to allow the patient to engage in the conversation.<sup>17</sup> There may be a large age discrepancy between the patient and the individual they introduce as their romantic partner. The patient may also display addictive behaviors or signs of drug withdrawal. Provision of drugs is a frequently used method of control employed by traffickers.<sup>19</sup>

Finally, the patient may display several behaviors that might initially be attributed to noncompliance, such as not returning for follow-up appointments, not filling necessary prescriptions, or returning to the clinic with a similar chief complaint. Such behaviors should be viewed with caution in a pediatric patient as they may indicate abuse or neglect.

## Physical findings:

The remainder of the exam may reveal additional signs of abuse or physical force. Any injury to the head and neck or limb dislocation/fracture should be viewed as suspicious.<sup>17</sup> Hematomas and burns may appear on parts of the body aside from extensor surfaces, and the patient may have a black eye and missing or broken teeth.<sup>21</sup> The pairing of a chief complaint of pelvic pain and a pelvic exam causing adnexal tenderness is concerning for pelvic inflammatory disease regardless of the patient's potential denial of fever or discharge.<sup>17</sup> The sexually trafficked patient may also have obvious vaginal lacerations and/or rectal trauma.<sup>17</sup>

## IMPORTANT QUESTIONS

If you are suspicious that a patient is a victim or imminently at risk, it is important to engage the patient in a discussion of their safety. At the very least, you should ask the patient if they feel safe. Additional useful questions for possible trafficked children and adolescents are included in Table 3.

### IMPORTANT QUESTIONS TO ASSESS FOR RISK OF HUMAN TRAFFICKING

Do you feel safe?

Has anyone hit you or hurt you?

Do you have a place to stay? Where are you living?

Has anyone forced you to do anything you didn't want to?

Do you work, live, and sleep all in the same place?

Do you have any scars on your body due to someone harming you?

If you wanted, could you leave?

Has anyone threatened to hurt you or your family?

Tell me about this tattoo... Did you choose to get your tattoo(s)?

Do you have to ask for permission to use the restroom/to eat/ to sleep?

Are there pictures of you on the internet? Where?

Have you ever traded anything for sex? Food, money, shelter?

What made you leave your home country?<sup>22</sup>

Did you have any problems with persons working for the government, military, police, or any other authorities?<sup>22</sup>

In your home country, did you ever have problems because of religion, political beliefs, culture, or any other reason?<sup>22</sup>

*Table 3: Important Questions to Assess for Risk of Human Trafficking*

## WHAT DO YOU DO IF YOU SUSPECT THAT SOMEONE IS BEING TRAFFICKED?

The safety of our patients is of primary importance. Pediatricians are mandatory reporters of suspected abuse and the Florida Department of Children and Families (DCF) must be contacted for suspected child victims. The situation becomes more nuanced for patients aged 18 years and older. The average age of recruitment is in early adolescence, and it is clear that the coercion and control these patients experience does not suddenly disappear when they reach the age of 18. However, at that point the pediatrician is no longer able to reach out without the patient's consent.

There are many factors that may dissuade a victim of trafficking from seeking assistance; provision of essential needs by their trafficker, threats of harm to their loved ones and substance dependence, to name just a few. Distrust of law enforcement and the judicial system is also common among these patients. It may be helpful to reassure patients that there are laws in Florida that can help them to expunge some arrests in their youth from their record and help with job placement. Providing reassurance that their communication is confidential, establishing a therapeutic relationship, and providing access to follow up are key steps in ensuring that help will be available once the patient decides they are ready to take that step.

The National Human Trafficking Hotline (1-888-373-7888) or their Be Free Textline (Text "Be Free" to 233733) are excellent

resources. It may help to provide the patient with safe time and space within your healthcare setting to contact these resources. If they are not ready to make these contacts yet, it is helpful to provide them with these numbers in a discrete way that will not be easily recognized by their trafficker. Options for this include palm-sized resource cards that may easily be hidden, small personal items such as toothbrushes with numbers printed on them, or placing numbers directly into patients' phone contacts under a false name so as to not attract suspicion.

Safehouses are available in Florida for both genders. Among the services that these organizations may provide are safe housing in an undisclosed location, comprehensive, trauma-informed care including telehealth/teletherapy, limiting of access to mobile devices/social media, online schooling, and court hearing assistance.

## LOOKING FORWARD

The aim of this article is to encourage readers to know the risk factors and red flags within the pediatric population regarding human trafficking and to avail themselves of local resources to aid victims. It is our responsibility as healthcare providers to educate ourselves and our peers, engage in discussion with lawmakers as advocates for our patients, and combat human trafficking, both at the time of the 2021 Super Bowl and on a daily basis. We must dispel the myth that trafficking is a foreign crime and cannot impact our patients and children.

To attain a better perspective on the impact of human trafficking close to home, the authors recommend the PBS special "Close to Home: Human Trafficking" that gives a voice to many Tampa Bay Area neighbors who are now recovering survivors and advocates within our community.<sup>23</sup>

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## 2021 Medical Student Forum Abstracts

Despite the challenges of this past year, the Department of Pediatrics and the University of Florida College of Medicine sponsored the 7th Annual Pediatric Medical Student Research Forum during FCAAP's annual conference, The Future of Pediatric Practice 2021 in Orlando, FL. This was truly a national stage, with over 60 students from coast-to-coast and from north to south participating. We were impressed by the superior level of research of the platform and poster presentations.

Our sincerest appreciation to our key note speaker Dr. Stephanie Davis, current President of Society for Pediatric Research, and our faculty judges, Drs. Michael Haller, Erik Black, Jim Wynn, Lindsay Thompson, Deb Weiner (Boston Children's Hospital) and Gene Chen (Orlando Health), that traveled to Orlando to help make this forum such a success.

Each faculty participant was critical in offering feedback and inspiration to all of the medical student participants. We believe that each medical student left the forum inspired to better care for children and challenged to make discoveries that will improve our understanding of pediatric illnesses.

We also extend special appreciation to our sponsors and partners at Society for Pediatric Research, the University of Florida College of Medicine and the Florida Chapter of the American Academy of Pediatrics.

Congratulations to the 2021 Medical Student Forum Winners: Jamie Clarke, Jenny Raman, Amber Bulna, Victoria Hoang, Lekha Chilakamarri, and Pranshu Bhardwaj. Winning presentations are featured in the following pages of the Journal.

Special thanks to the dedicated student forum organizers and 2021 sponsors: Society for Pediatric Research, the University of Florida College of Medicine and the Florida Chapter of the American Academy of Pediatrics; Maria Kelly, MD; Clinical Associate Professor & Associate Division Chief, General Academic Pediatrics, University of Florida ; Desmond Schatz, MD; Professor and Interim Chair, University of Florida Pediatrics; Lindsay Thompson, MD; Professor & Associate Division Chief, General Academic Pediatrics, University of Florida.

Special thanks to our student forum judges: Erik Black, MD; Gene Chen, MD; Michael Haller, MD; Maria Kelly, MD; Desmond Schatz, MD; Lindsay Thompson, MD; Debra Weiner, MD, PhD; Jim Wynn, MD

Thank you to our student forum keynote speaker, Stephanie Duggins Davis, MD, Brewer Distinguished Professor, Chair of the Department of Pediatrics at the University of North Carolina, and President of the Society for Pediatric Research for her presentation "Let Your Passion Define Your Path: Choosing the Road Less Traveled".



## Effect of Newly Proposed Definitions on Incidence and Classification of Severity of Bronchopulmonary Dysplasia

Bulna, Amber<sup>1</sup>; Claire, Nelson<sup>1</sup>; Aguilar Caballero, Daniela<sup>1</sup>; Schmidt, Augusto<sup>1</sup>; Jain, Deepak<sup>2</sup>; Vanbuskirk, Slivia<sup>1</sup>; Bancalari, Eduardo<sup>1</sup>

<sup>1</sup>Division of Neonatology, Department of Pediatrics, University of Miami-School of Medicine, Miami, FL

<sup>2</sup>Pediatrics, Robert W Johnson School of Medicine Rutgers University, New Brunswick, NJ

### BACKGROUND AND OBJECTIVES

The increased use of nasal cannula in extremely preterm infants has led to the revision of diagnostic classifications of BPD. It is not known how the new diagnostic classifications of BPD will compare to each other. Our objective is to demonstrate a change in BPD incidence and severity classification when using newer definitions.

### METHODS & ANALYSIS

Prospectively collected data from a cohort of 383 preterm infants 23-28 weeks' gestational age admitted to the NICU and who were alive at 36 weeks PMA. Classified infants according to 2001, 2018 and 2019 proposed definitions.

### RESULTS

The incidence of BPD changed from 62% per 2001 definition to 35.5% with 2018 definition and 44.4% with 2019. More than 90% of no/mild cases were newly classified as no BPD when 2018 and 2019 classifications were used. 49.2% of previously moderate cases were reclassified as Grade I per 2018 definition. 58.7% of originally severe cases were classified as Grade II per 2019 definition.

### CONCLUSIONS

Making slight changes to BPD definitions can have a significant impact on disease incidence and infant assessment. Newer definitions may provide a more applicable classification of presence and severity of BPD in the setting of new modes of respiratory support.



## Complex Chromosomal Rearrangement Involving 15q11-q13 Interstitial Triplication and Duplication: A New Case Report of Dysmorphic and Neuropsychiatric Features

**Lekha Chilakamarri, E. Lizbeth Mellin-Sanchez, MD.**  
University of Texas Rio Grande Valley School of Medicine

### INTRODUCTION

15q11-q13 interstitial triplication is a rare condition resulting in a tetrasomy of imprinted genes in the Prader-Willi/Angelman critical region (PWACR), with only 12 cases reported to date. The genotype-phenotype correlation is advancing, with a range of varying features such as craniofacial dysmorphism, developmental delay (DD), hypotonia, ataxia, seizures, behavioral impairment, and autism spectrum disorder.

### CASE PRESENTATION

We present an eight-year-old female patient who displays mild craniofacial dysmorphism (strabismus, arched eyebrows, midface hypoplasia, long philtrum, thin upper lip), global developmental delay, behavioral impairment, and all the previously reported neurological features related to tetrasomy of this region. Whole-genome single nucleotide polymorphism (SNP) microarray analysis detected a 6.05 Mb triplication at 15q11.2-q13.1 and a 3.48 Mb duplication at 15q13.1-q13.

### DISCUSSION

Our patient is the first case to encompass the full spectrum of reported features related to tetrasomy of this region. In addition, she has a complex chromosomal rearrangement (CCR) spanning the largest region of chromosome 15q11-q13 thus far, including a rare interstitial duplication reported in only four cases to date. Our study contributes to the genotype-phenotype correlation regarding developmental delay especially impacting speech, and expands the knowledge about the prognosis for achievement of developmental milestones with early utilization of intensive speech, physical, and occupational therapies. Finally, we acknowledge the barriers our patient and her family faced to access specialized genetic clinical care and advocate for expanded access to clinical genetic care for under-represented populations.

# Effect of Underlying Connective Tissue Disorders on Pediatric and Adolescent Chiari I Malformation Neurosurgical Patients: A National Inpatient Sample Analysis

Jamie E. Clarke, M.S.<sup>1</sup>, Shelly Wang, M.D., M.P.H.<sup>2,3</sup>

<sup>1</sup>Leonard M. Miller School of Medicine, University of Miami, Miami, Florida, USA

<sup>2</sup>Division of Neurosurgery, Department of Surgery, University of Miami, Miami, Florida, USA

<sup>3</sup>Department of Neurosurgery, Nicklaus Children's Hospital, Miami, Florida, USA

## BACKGROUND

Chiari malformation type I (CMI) is a relatively common neurosurgical finding in both pediatric and adult populations. However, the pathophysiology of CMI is multi-faceted, complex, and still poorly understood. Furthermore, the role of connective tissue disorders (CTDs) on craniocervical instability and CMI remains poorly characterized. Given the high likelihood of surgical complications commonly seen in children and adolescents with CTDs, the authors assessed CTD patients who underwent neurosurgical treatment of their CMI for demographics, presenting symptoms, comorbidities, and perioperative courses.

## METHODS

Patients with CMI admitted for suboccipital decompression or laminectomy from January 2008 to September 2015 were captured using the National Inpatient Sample (NIS). Information on patient demographics, comorbidities, and perioperative course was collected. Diagnoses and procedures were determined by ICD-9-CM and ICD-9-PCS codes, respectively. Descriptive and regression analyses as well as categorical subgroupings were performed in SPSS version 26 (SPSS Inc., Chicago, IL, USA).

## RESULTS

38,611 CMI patients, 362 of whom with CTD, were identified. CMI patients with CTD were more likely to be female ( $p<0.001$ ) and present during the teenage (ages 13-18;  $p=0.055$ ) or young adult (ages 19-35) years ( $p<0.001$ ). Compared to the CMI without CTD group, far fewer patients within the CTD group were young children (ages 0-12;  $p<0.001$ ), late adult age (36-65 years old), or geriatric age (>65 years old;  $p<0.001$  &  $p=0.022$ , respectively). Despite the predominantly teenage and young adult age of patients with CTD and CMI, they have more chronic issues ( $p<0.001$ ): systemic comorbidities include asthma ( $p=0.006$ ), postural orthostatic tachycardia syndrome, cardiac dysrhythmias, gastroparesis, and elevated white blood cell count (all  $p<0.001$ ). Central nervous system (CNS) comorbidities include migraine, tethered cord, and urinary incontinence (all  $p<0.001$ ). They have increased arthropathy and joint instability, including craniocervical instability (all  $p<0.001$ ), as evidenced by increased concomitant posterior cervical fusion surgeries and application of cervical halo procedures (both  $p<0.001$ ) during the same inpatient stay. Patients with CTD had longer length of stay (6.6 vs. 4.0 days), more procedures during hospitalization, and increased hospitalization charges (\$87,811.2 vs. \$58,497.2; all  $p<0.001$ ).

## CONCLUSIONS

Patients with coexisting CTD and CMI are more likely to present with complex Chiari and associated CCI. Most are female, teenage, rather than young children, and present with systemic, CNS, and joint abnormalities. They have longer, more complicated, and more expensive hospitalizations. Understanding the pediatric population age subsets in which these coexisting conditions present, how to make these diagnoses, and the unique perioperative and post-surgical challenges these patients face allows neurosurgeons to utilize specific guidelines for this patient population to best prepare and achieve optimal outcomes.

# Missed Opportunities in HPV Vaccine Administration in a Pediatric Outpatient Clinic

**Trenkner S, Raman J, McNelly C, Lucas S, Rodriguez SA, Tiro JA, Francis JKR**

*University of Texas Southwestern Medical Center*

## BACKGROUND

The human papilloma virus (HPV) is known to cause genital warts and cancers such as cervical, anal, vaginal, vulva, oropharyngeal, and penile cancers and can be prevented with the HPV vaccine. The CDC recommends administration of HPV, tetanus, diphtheria, and pertussis (Tdap), and meningococcal (MCV4) vaccines at ages 11 to 12 years old. Vaccine administration on a local, clinical level should constantly be assessed to reduce missed opportunities and subsequently reducing the occurrence of preventable medical conditions and complications.

## OBJECTIVE

We conducted a mixed-methods study to identify quality improvement targets for adolescent HPV vaccination within a pediatric outpatient clinic. We sought to: (1) develop a process map to describe adolescent clinical vaccination processes, (2) identify gaps in the delivery of adolescent vaccines, and (3) track adolescent vaccination opportunities to identify and compare trends in adolescent vaccination delivery of HPV, Tdap, and meningococcal vaccines.

## METHODS

We conducted key-informant interviews with providers, nurses, medical assistants, and front desk staff at a pediatric primary care outpatient clinic. Interview topics included participants' roles within the clinic, HPV vaccination processes, vaccination documentation, and patient hand-offs between clinical team members. Findings were translated into a process map illustrating patient flow, provider and staff roles in vaccination, and gaps in service delivery. Retrospective chart review was conducted using quality improvement reports of vaccine administration extracted from the electronic health record for patients who were due for a vaccine (HPV, Tdap, Meningococcal) from 1/1/2019 to 12/31/2019. All non-sick visits were included for patients 11 to 19 years old who were eligible to receive the vaccine. The rates of opportunities taken in HPV vaccine administration were compared to the rates of opportunities taken in Tdap and meningococcal vaccine administration. The rates of opportunities taken in HPV vaccine administration were analyzed for differences by gender, age group, provider type, and visit type.

## RESULTS

In a pediatric outpatient clinic with 2,656 annual visits, we demonstrated that eligible children were receiving the HPV vaccine at a statistically significant lower rate (56%) than Tdap (67%) or MCV4 (77%) vaccines. The following subgroups had the highest rates of opportunities taken in HPV vaccine administration in each respective category: 11-12 year olds (age), resident/fellow (provider type), and established well visit (visit type). One front staff, two medical assistants, one charge nurse, one pediatric resident and two attending physicians were interviewed to identify gaps in vaccine administration. Responses were organized into a process map. Notable gaps included EHR glitches (records not documented in the EHR, missed pre-charting, follow up visits not scheduled) and provider concerns (staff believing HPV is 'optional' or provider not knowing the vaccine schedule). Next steps of the project are to use the gaps identified from the qualitative work (process map) to improve communication between the EHR and state vaccine registry and improve staff as well as provider education about HPV vaccine importance and schedule.

## CONCLUSION

This study establishes a baseline for HPV vaccine trends compared to Tdap and MCV4 trends among pediatric patients. HPV vaccine administration had a lower rate in opportunities taken than Tdap or MCV4. Using a process map, gaps were identified in the vaccine process that could explain missed opportunities in vaccine administration.



# Diagnostic Delay of Untreated Chronic Diabetes Insipidus and Rapidly Progressive Puberty in a 10-Year-Old

**Pranshu Bhardwaj B.S.<sup>1</sup>; Rachel M. Coleman M.D.<sup>2</sup>; Marie L. Rivera-Zengotita M.D.<sup>3</sup>;  
John H. Rees M.D.<sup>4</sup>; Angelina V. Bernier M.D.<sup>5</sup>**

<sup>1</sup>*University of Florida College of Medicine, Gainesville, Florida*

<sup>2</sup>*Department of Pediatrics, University of Florida Health Shands Hospital, Gainesville, FL*

<sup>3</sup>*Department of Pathology, Immunology and Laboratory Medicine, University of Florida Health College of Medicine, Gainesville, FL*

<sup>4</sup>*Department of Radiology, Division of Neuroradiology University of Florida College of Medicine, Gainesville, FL;*

<sup>5</sup>*Department of Pediatric Endocrinology, University of Florida Health Shands Hospital, Gainesville, FL.*

## INTRODUCTION

A 10-year-old Hispanic male presented with a 5-year history of polydipsia and polyuria. He underwent evaluation in Venezuela, where diabetes insipidus (DI) was reportedly ‘ruled out’; however, no head MRI was performed. After two years in the US struggling to acquire insurance, he presented to his pediatrician with worsening symptoms.

## CASE PRESENTATION

A head MRI, ordered to evaluate dilute high-volume urine output, revealed a suprasellar mass extending superiorly into the hypothalamus. He was admitted for diagnostic evaluation and met the criteria for DI. Notably, he had an elevated  $\beta$ -Human Chorionic Gonadotropin ( $\beta$ -HCG) level. Biopsy confirmed the diagnosis of a Central nervous system (CNS) germinoma. He was treated with DDAVP and proton therapy with subsequent remission of his tumor.

## DISCUSSION

Multiple medical and cultural factors led to various lengthy delays in care and diagnosis. The patient did not present with symptoms more typical of CNS Germinomas such as headaches, nausea, and vomiting. His increased stretched penis length and Tanner staging, which were identified later in his disease course, were contradicted by his pre-pubertal testicular volume and bone age. Poverty in Venezuela, lack of insurance, anxiety regarding COVID-19, and the language barrier also contributed to these delays. To our knowledge, this is the first case report of a pediatric patient presenting with a 5-year history of untreated polyuria and polydipsia due to undiagnosed DI with a  $\beta$ -HCG secreting CNS germinoma, without metastasis. This study highlights a rare presentation of DI and emphasizes the importance of supporting Spanish-speaking families as they navigate our complex healthcare system.

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KIMBERLY COFFEY, 17



EMILY STILLMAN, 19

*"Like most parents, we thought our daughters were fully protected against meningococcal meningitis. They were not."*

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