



# VIRGINIA • PEDIATRICS

## American Academy of Pediatrics • Virginia Chapter

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American Academy of Pediatrics  
DEDICATED TO THE HEALTH OF ALL CHILDREN™  
Virginia Chapter

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Virginia Pediatrics  
**Jane Chappell:**  
Executive Director

2821 Emerywood Pkwy | Suite 200  
Richmond, VA 23294  
• Phone: (804) 622-8135 •  
• Fax: (804) 788-9987 •  
• email: [jchappell@ramdocs.org](mailto:jchappell@ramdocs.org) •  
• [www.virginiapediatrics.org](http://www.virginiapediatrics.org) •

- Next Issue: Winter 2015 •
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### *Environmental and Child Health*

#### *Issues and Educational Opportunities for Pediatricians*

Samantha Ahdoot, MD, FAAP

Member of the AAP COEH Executive Committee

*Why does the AAP care about Ozone regulations, the Toxic Substances Control Act, or the Clean Power Plan?*

The environmental health education for most pediatricians today was limited to effects of lead and tobacco exposure. This field, however, is expanding rapidly. There is increasing understanding of how a wide range of environmental exposures may affect child health. From Bisphenol A (BPA), to particulate matter, to nanoparticles to climate change, research is increasing our understanding of the complex relationships between child and environmental health.

While this field may create a knowledge gap for many pediatricians, the National AAP is increasingly engaged in legislative activities around these issues. There are many educational opportunities for pediatricians wishing to learn more.

1. The AAP Council on Environmental Health (COEH) publishes the book *Pediatric Environmental Health*, or "Green Book" now in its 3rd Edition. This comprehensive resource for the pediatrician covers a range of environmental health topics. COEH membership also provides notification of educational and opportunities and legislative activities in which the Academy is engaged on environmental topics.

2. The NCE offers a variety of presentations on environmental health topics. Presentations in 2015 include epigenetics and toxic stress; toxins in the home; and counseling parents about environmental contamination and disasters.

3. Pediatric Environmental Health Specialty Units (PEHSUs) are an invaluable resource for consultations and education. Between 2010–2014, the North American PEHSU network delivered more than 2000 presentations ranging from a general introduction to children's health and the environment to focused presentations on air pollution, asthma, lead poisoning, and mold, reaching nearly 250,000 participants. To learn more, go to: <http://www.pehsu.net>.

4. The CDC offers CME online covering a range of environmental health topics. Register at <http://www.2a.cdc.gov/TCEOnline/index.asp>. The CDC's site National Center for Environmental Health <http://www.cdc.gov/nceh/> is also a great resource of information.

5. The National Institute of Environmental Health Sciences is an invaluable source of detailed information, as well as brochures and fact sheets, on environmental exposures. <http://www.niehs.nih.gov/health/index.cfm>

6. Children's Environmental Health Network is an education, policy and research organization in Washington D.C. which is focused on child health and the environment. <http://cehn.org/programs>

If you are interested in joining the AAP's Council on Environmental Health (COEH), or in learning about initiatives in Virginia around child and environmental health, please contact Samantha Ahdoot, MD, FAAP. Dr. Ahdoot is a member of the COEH Executive Committee. She can be reached at [atkinssam@yahoo.com](mailto:atkinssam@yahoo.com).



## President's • MESSAGE

Barbara L. Kahler, MD, FAAP | *President Virginia Chapter | American Academy of Pediatrics*

Things are getting busy now that the summer is over and kids are back to school. The AAP and the Chapter are no exceptions.

Every quarter, the AAP Board meets and our Chapter delegates get our input with a joint phone call right before that meeting. We just completed this quarter's call. Subjects included: how the AAP can support practices as we go through practice transitions, (both private practices and employed pediatricians) vaccine purchasing/storage, formation of Clinically Integrated Network, and EHR issues.

The AAP Board has also recently made public their response to the Top 10 Resolutions. They are available at [http://www.virginiapediatrics.org/wp-content/uploads/2011/09/2015\\_top\\_ten\\_resolutions\\_board\\_response.pdf](http://www.virginiapediatrics.org/wp-content/uploads/2011/09/2015_top_ten_resolutions_board_response.pdf)

National has been busy helping our fellow pediatricians in S.C. with their needs after their historic flooding. If you are so inclined, donations to Friends of Children will help support them with this disaster and wherever the next one happens. Some of you may not be aware of the information that comes from AAP to the state Disaster Preparedness Representative. We send links to information on how to handle Mental Health stress after the event, and how to help communities prepare for an imminent event. Virginia (through EMSC) is forming an email network to push this information to appropriate individuals and communities.

*Now for an update on the grants we are involved with:*

1) **Telemedicine Grant** - Funds have been received and practices recruited. (you may still be able to participate) This grant is looking at how we can integrate telemedicine into our private practices to help prevent dilution of the Medical Home. Sandy Chung is the Lead MD on this one.

2) **HPV** - Funds have been received and practices are being recruited. This grant is looking at strategies to improve HPV vaccination rates. We are partnering with N.C. Chapter to share the expenses of a Quality Improvement coach. Kristina Powell is the Lead MD on this one.

3) **Bright Futures** - Kick off meeting was in late September in Chicago. Funding is pending and we are recruiting practices. We are especially interested in including continuity clinics at residency programs and the CORNET network is available to help with logistics and IRB issues. This grant is looking at best practices for Bright Futures Guidelines inclusion in practices. We will be receiving the new Guidelines as they are published. The Va. Team has representation from Anthem, DMAS, VDH, VCU, home visitation organizations, parents. Barbara Kahler is the lead MD on this one.

As you can see, there are plenty of opportunities to participate, to improve the care for the children of the Commonwealth!



## *Legislative Update* Aimee Seibert, Chapter Lobbyist

The 2016 Virginia General Assembly Session is less than three months away! The VA AAP is determining its legislative agenda and working with fellow stakeholders on the important issues coming up. But first, we have to get through elections.

The entire legislature (40 Senate seats and 100 House of Delegates seats) is up for election on November 3. With the retirement of many long-time Senators, there are going to be new faces and a potential power shift in the Senate. Currently, Republicans hold the majority with 21 seats. If it ends up 20-20, Lieutenant Governor Ralph Northam will be the tie-breaking vote and that will give control of the Senate to the Democrats. Stay tuned!

2016 is already gearing up to be a busy session. It looks like the independent practice of nurse practitioners will be one of our biggest issues. We have been working with MSV and the nurse practitioners to address the issue of what happens to the collaborative practice agreement when a collaborating physician passes away, moves or loses their license. Unfortunately, they appear to want to go further than this narrow issue and want us to consider independent practice for NPs. If this is the direction they decide to go forward with, it a major priority for the physician community and we are working closely with the Medical Society and other specialty groups.

We also continue to be committed to legislation regarding banning indoor tanning for minors, which MSV will be spearheading; and bills prohibiting smoking in cars when children are present; and addressing the barriers of prior authorization.

The VA AAP will also be working on new legislation this year. The Department of Health has drafted legislation that would improve HPV vaccine data collection and also expands the vaccine to boys. VDH has also expressed interest in legislation that would allow expedited partner therapy. We have provided comments and requested that physician liability be included in this legislation.

We are also working with Voices for Virginia's Children on a budget proposal regarding mental health in pediatric primary care that addresses toxic stress and adverse childhood events. Secretary Hazel has expressed interest in this topic and specifically requested the VA AAP works on this.

We will update you again after the elections and as the legislative session approaches. It is sure to be another eventful session for the medical community!

Save the Date -  
Pediatric General Assembly Day  
January 28, 2016!



Marissa Levine, MD, MPH, Virginia State Commissioner of Health was presented the VA-AAP Child Advocate Award during the Donald W. Lewis Pediatric Update 2015 on Saturday, September 19, 2015 in Williamsburg. We applaud Commissioner Levine on her leadership in working on infant mortality throughout the state and now "thriving infants" has been important and valuable for our patients and pediatricians in Virginia.



## *Dates to Remember ...*



### ***Pediatric General Assembly Day 2016***

***Thursday, January 28, 2016 | 7:30 AM – 2:00 PM***

*The home base for the Pediatric General Assembly Day: Hilton Garden Inn  
Located at 501 E. Broad Street In Richmond.*

*This venue is a flat, 3.5 block walk from the General Assembly Building.  
Shuttle service will also be available.*

*The Hilton Garden Inn offers valet parking and is convenient to several public parking lots.*

*For more information go to [www.virginiapediatrics.org](http://www.virginiapediatrics.org) after January 1, 2015.*



Present

# VIRGINIA•PEDIATRICS NEWSLETTER

American Academy of Pediatrics – Virginia Chapter

## Continuing Medical Education

This activity has been planned and implemented in accordance with the Essential Areas and policies of Medical Society of Virginia through the joint sponsorship of Children's Hospital of The King's Daughters and the American Academy of Pediatrics – Virginia Chapter.

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**C. W. Gowen, Jr., MD**

Professor of Pediatrics, Eastern Virginia Medical School

EVMS Foundation Director

Chairman, Department of Pediatrics, EVMS

Senior Vice-President for Academic Affairs, CHKD

### CME Committee

Nancy Leigh Gainfort, RN, BSN, C.W. Gowen, Jr., MD,

Eric Y. Gyuricsko, MD, John Harrington, MD,

Jamil Khan, MD, Rosalind W. Jenkins, Windy Mason-Leslie, MD, Amy Sampson, Natasha Sriraman, MD

### How to Obtain Credit:

Review the articles on pages 5-11. Complete the VA-AAP Newsletter Registration and Evaluation Form on page 12 and return to the Children's Hospital of The King's Daughters, CME Office, 601 Children's Lane, Norfolk, VA 23507, or 757-668-7122. You may also visit <https://www.surveymonkey.com/r/VAAAPFall2015> and complete online. Please allow up to 8 weeks to receive your certificate.

### Disclosure of Significant Relationships with Relevant Commercial Companies/Organizations

The Children's Hospital of The King's Daughters endorses the Standards for Commercial Support of Continuing Medical Education of the Medical Society of Virginia and the Accreditation Council for Continuing Medical Education that the providers of continuing medical education activities and the speakers at these activities disclose significant relationships with commercial companies whose products or services are discussed in educational presentations. A commercial interest is defined as an entity producing, marketing, re-selling, or distributing health care goods or services consumed by or used on patients.

For providers, significant relationships include large research grants, institutional agreements for joint initiatives, substantial gifts or other relationships that benefit the institution. For speakers, significant relationships include receiving from a commercial company research grants, consultancies honoraria and travel, other benefits, or having a self-managed equity interest in a company.

### Disclosures:

The following faculty have disclosed that they do not have an affiliation with any organization that may or may not have an interest in the subject matter of this CME activity and/or will not discuss off-label uses of any FDA approved pharmaceutical products or medical devices.

Elizabeth Berry, DDS, MSD, MPH  
David Lanning, MD, PhD

Matthew Schedffft, MD  
Ruth Trivelpiece, MD

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The following faculty have disclosed that they have an affiliation with an organization that may or may not have an interest in the subject matter of this CME activity and/or will discuss off-label uses of FDA approved pharmaceutical products or medical devices.

None.

## *Familial Hypophosphatemia: A Case Study Linking the Importance of Interdisciplinary Knowledge and Referral*

Elizabeth Berry, DDS, MSD, MPH

Vice Chair, Department of Pediatric Dentistry

VCU, Department of Pediatric Dentistry

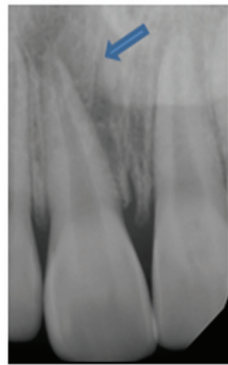
**Objective:** Readers will be able to explain the importance of diagnosis, management, and referral to a pediatric dental specialist for patients with familial hypophosphatemia.  
**ACGME Competencies:** Patient Care, Medical Knowledge, Systems-Based Practice

### Case:

A case of a 14-year-old Caucasian male diagnosed with X-linked hypophosphatemia (XLH) presented to orthopedic surgery at Children's Hospital of Richmond at VCU to have removal of hardware after repair of a left Slater-Harris III fracture of the left distal femur bone. Prior to removal of the hardware, the patient complained of pain in the premaxilla area. On examination, a mild facial cellulitis associated with the anterior teeth was found. After the surgery was



Note the radiolucent lesions (abscesses) apical to multiple anterior teeth



been recognized with renal phosphate wasting as the main abnormality, which in turn has led to the use of phosphate replacement regimens. Specifically, the basic physiological defect in XLH is impaired proximal renal TRP.

Patients typically present in childhood with bowing of the legs, short stature, and medial tibial torsion. Unfortunately, XLH is often misdiagnosed as nutritional rickets, metaphyseal dysplasia, or physiological bowing. As such, many patients are not properly diagnosed with XLH until a later age when their legs begin to show characteristic bowing pattern resulting in circumduction gait. This gait requires the patient to swing each leg outward while walking to avoid striking the planted limb with the moving limb. Progression of the disease can lead to progressive bone deformity, dental abscesses, enthesopathy, arthritis and severe osteomalacia.

### Management and Treatment:

Treatment of children with XLH takes place from the time of diagnosis until growth is complete. Hypophosphatemia and low-normal circulating 1,25-dihydroxyvitamin D levels are the typical biochemical findings, with a serum alkaline phosphatase activity elevated and the serum calcium normal. Current treatment with a balance of activated vitamin D (calcitriol or alfacalcidol) and phosphate are usually required. A three month interval with laboratory monitoring is suggested to avoid complications and treatment should be adjusted based on therapeutic outcomes rather than correction of serum phosphate levels, with radiographs taken every 1 to 2 years, to guide medical management.

XLH children are typically treated non-surgically. However, surgical treatment may

be considered when other forms of medical management have been unsuccessful. Longstanding alignment radiographs in both AP and lateral planes are therefore obtained to assess and plan for correction of bony deformity if indicated. Children with bony deformities that result in activity limitation or pain are considered for surgical intervention.

Dental management of patients with XLH largely depends on the severity of the disease, with the main goal being prevention of dental abscesses. There is typically a deficiency in the mineralization of dentin (the second layer of the tooth) which leads to channels that connect the pulp (the nerve of the tooth) to the oral environment with mild attrition. This leads to bacteria entering the pulp which leads to spontaneous abscesses. Spontaneous dental abscesses can occur in as many as 25% of patients with XLH. Successful treatment involves careful observation with recalls every 6 months with a pediatric dentist, preventative measures such as sealant resins (a protective coating), and crowns are advised to minimize dental abscesses. Referral to a pediatric dentist at young age can therefore prevent pain and dental abscesses in children diagnosed with XLH.

The clinics at VCU School of Dentistry and Children's Hospital of Richmond at VCU have strong inter- and intra-professional programs that specialize in team-based care. Due to the established network of specialty colleagues throughout VCU Health, the dental team is able to provide for each patient's special need such as this unique patient case.

### Suggested Readings:

1. Sharkey MS, Grunseich BA, Carpenter TO. Contemporary Medical and Surgical Management of X-linked Hypophosphatemic Rickets. *The American Academy of Orthopedic Surgeons*, July 2015, Vol 23(7), pp 433-442
2. Carpenter TO, Imel EA, Holm IA, Jan de Beur SM, Insogna KL. A Clinician's Guide to X-Linked Hypophosphatemia. *Journal of Bone and Mineral Research*, July 2011, Vol 26(7), pp 1381-1388.

completed, the patient was referred to a pediatric dentistry.

Consequently, the complexity of treatment involved multiple dental specialists at VCU School of Dentistry, including the Department of Pediatric Dentistry and the Department of Endodontics. The patient had 6 root canal therapies on maxillary and mandibular teeth to treat the multiple teeth with irreversible pulpitis with periapical infection, or what most know as abscessed teeth. Left untreated, abscesses lead to swelling, pain, and facial cellulitis. Additionally, sealants were placed on all teeth and a recall visit was encouraged every 6 months to monitor and prevent spontaneous abscesses.

### Background:

X-Linked Hypophosphatemic rickets (XLH) is the most common heritable form of rickets with an incidence estimated to be approximately 1 in 20,000 live births. XLH has now

## Adolescent Weight-loss Surgery

David Lanning, MD, PhD

Melanie Bean, PhD

Nancy Thompson, MS, RN, CPNP

Claudio Oiticica, MD

Edmond Wickham, III, MD, MPH

Children's Hospital of Richmond

**Objective:** Readers will be able to discuss the CHoR's surgical weight-loss program.

**ACGME Competencies:** Patient Care, Medical Knowledge, Systems-based Practice

While some progress is being made at preventing childhood obesity, it still remains a significant health problem on a state and national level. In fact, almost 1 out of 5 children in Virginia are considered obese (body mass

index [BMI] > 95th percentile for age and sex). Of significant concern is the observation that rates of severe obesity (BMI > 99th percentile) continue to increase, presenting significant risks to affected youth. Unfortunately, numerous studies have demonstrated that adolescent obesity typically persists into adulthood, and that adolescents with the highest BMI's are least likely to respond to behavioral treatment alone. Children who have not responded to traditional weight management strategies in the pediatrician's

office are recommended by expert panels to be referred to a multidisciplinary tertiary care clinic such as we have at the Healthy Lifestyle Center at the Children's Hospital of Richmond at VCU. Our team includes pediatric specialists with expertise in endocrinology and obesity medicine, psychology, nutrition, exercise physiotherapy, and surgery.

The hallmark of our treatments is family-based, multidisciplinary lifestyle intervention; however, weight-loss surgery is an option (in addition to ongoing lifestyle modification) for carefully-selected adolescents with severe obesity who meet rigorous criteria and who have experienced insufficient weight loss despite demonstrating adherence to at least 6 months of structured, comprehensive, behavioral intervention. The multidisciplinary program has provided weight-loss surgery, as part of ongoing comprehensive care, to a growing number of adolescent patients over the last several years. Many of our patients have lost over 100 pounds and significantly improved or resolved their obesity-related medical conditions. Our program currently offers two different surgical approaches, one of which involves a novel operation (gastric plication) that is being performed as part of a research study and is thought to be a lower risk procedure than traditional approaches. More specifically, the laparoscopic gastric plication does not entail removing or rerouting any part of the stomach or intestine. We are the first program in the country to offer this option to our adolescent patients. Importantly, our program is the only specialized adolescent weight-loss surgical program in Virginia that is verified by the American College of Surgeons and the American Society of Metabolic and Bariatric Surgery.

Fortunately, not all children with obesity need weight-loss surgery; however, for those patients that have experienced inadequate weight loss to reverse serious health conditions such as Type 2 diabetes mellitus with aggressive, multidisciplinary, non-surgical interventions, this treatment is now available to children in our region. When conducted at a specialized center such as the Healthy Lifestyle Center at Children's Hospital of Richmond at VCU, increasing data support the potential role of weight-loss surgery in the ongoing treatment of adolescents with severe obesity and weight-related serious health conditions.<sup>1</sup> Data also suggest that delaying surgical interventions, when indicated, until later in adulthood may increase the risk of complications and result in less robust results.<sup>2</sup>

It is easy to schedule an appointment to see anyone in our multidisciplinary program, including one of our two surgeons, for an initial consultation by calling 804-828-CHoR (2467). Please see the attached figure that details the algorithm for entering patients into our program and their consideration for weight-loss surgery. Questions regarding the algorithm or the Healthy Lifestyles Program can be answered at 804-527-4756. Also, please visit our website at [www.Chrichmond.org/bariatric](http://www.Chrichmond.org/bariatric).

### References

1. Evaluation and Treatment of Severe Obesity in Childhood. PMID: 25567296
2. Bariatric surgery for pediatric extreme obesity: now or later? PMID: 17173060

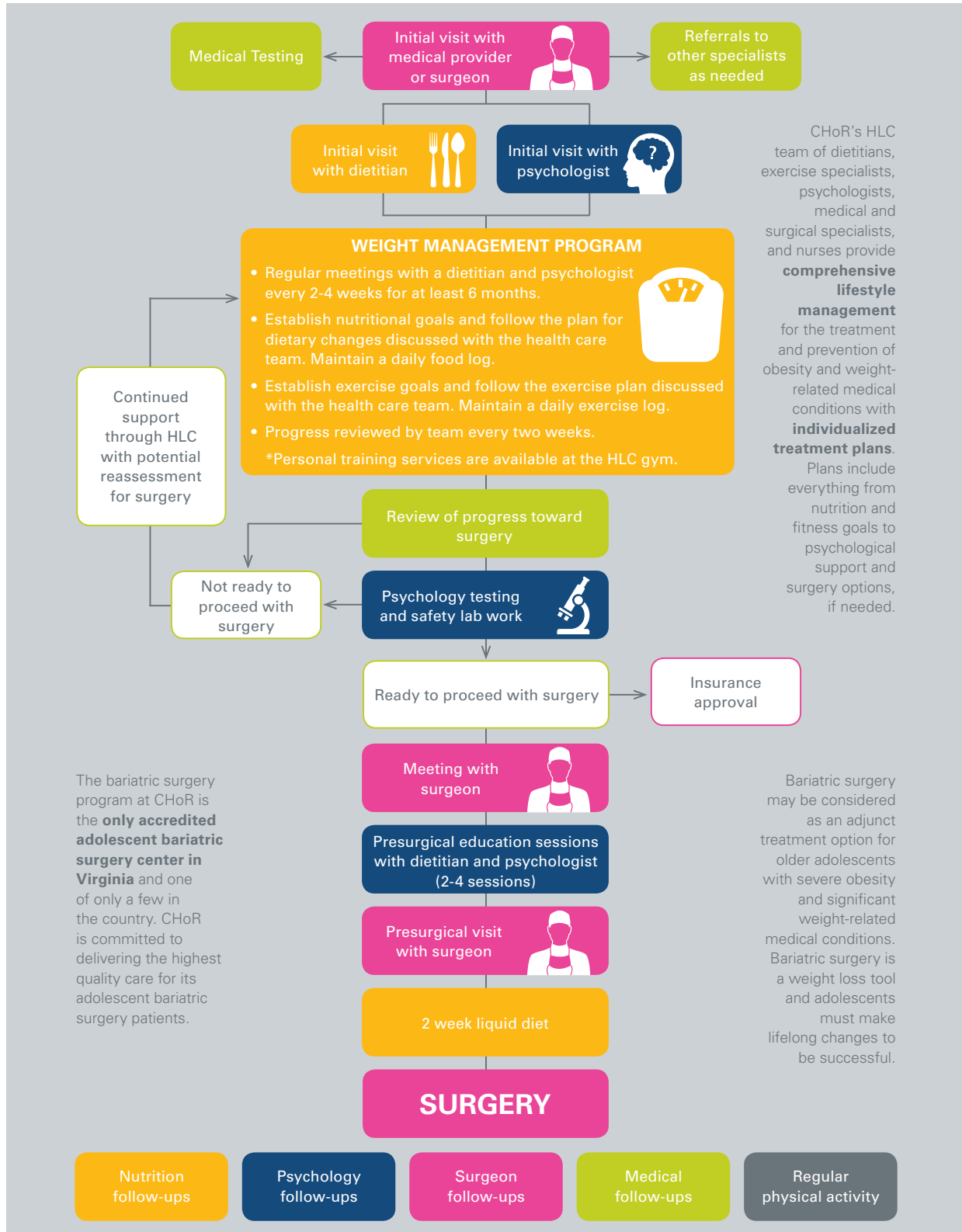
index [BMI] > 95th percentile for age and sex). Of significant concern is the observation that rates of severe obesity (BMI > 99th percentile) continue to increase, presenting significant risks to affected youth. Unfortunately, numerous studies have demonstrated that adolescent obesity typically persists into adulthood, and that adolescents with the highest BMI's are least likely to respond to behavioral treatment alone. Children who have not responded to traditional weight management strategies in the pediatrician's

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# Recipe for Success

The Healthy Lifestyles Center (HLC) at the Children's Hospital of Richmond at VCU (CHoR) aims to stem the rising tide of childhood obesity by promoting healthy weight management, eating, exercise and lifestyle habits that can last a lifetime. The chart below will help you navigate through our adolescent bariatric surgery program. If you have any questions or need more information about the HLC, **please call us at 804-527-4756**.



Connect with Us



[chrichmond.org/HLC](http://chrichmond.org/HLC)

## The Evolving Management of Immune Thrombocytopenic Purpura (ITP)

Matthew Schefft, DO

Madhu Gowda, MD

Gita Massey, MD

**Objective:** Readers will be able to discuss current understanding of the diagnosis, causes, and treatment of ITP with a special focus on the move to observe low risk patients and avoid unnecessary hospitalization.

**ACGME Competencies:** Patient Care, Medical Knowledge

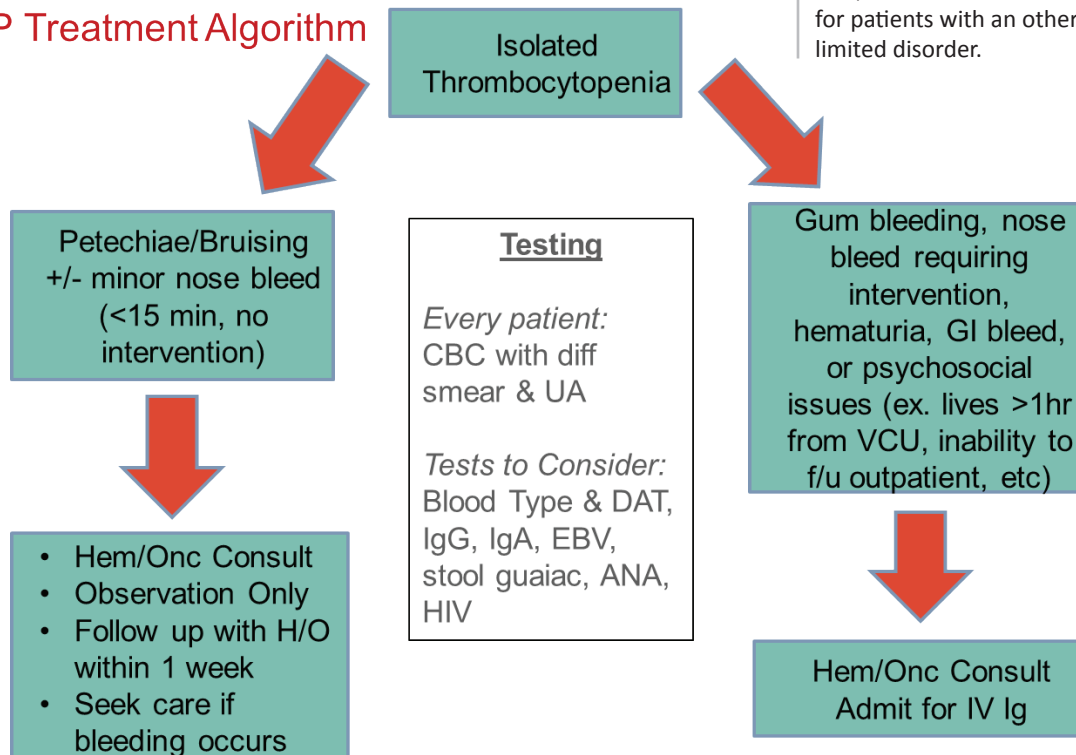
Immune thrombocytopenic purpura (ITP) is one of the most common diseases seen by pediatric hematologists. It is an autoimmune destruction of platelets that frequently occurs after a viral illness or immunizations. Otherwise healthy and active children will develop bruising, petechiae, and occasionally bleeding from the gums, nose, or other sites. Blood work reveals a very low platelet count without abnormalities in the other cell lines. Traditionally, ITP has been treated inpatient with either intravenous immunoglobulin (IV Ig), anti-Rh immunoglobulin (WinRho), and/or steroids. Patients remained in the hospital until the platelet count increased to at least 20,000. The reason for such conservative management was the concern for rare but serious bleeding events such as intracranial hemorrhage. Intracranial hemorrhage occurs in about 0.6% of patients with ITP. The literature shows that IV Ig and WinRho both have the potential to increase platelet counts faster than steroids or observation alone. Unfortunately, there is no evidence to suggest that treat-

ing ITP actually prevents serious bleeding events like intracranial hemorrhage. In fact, the American Society of Hematology (ASH) has recommended against treating patients based on platelet count alone as a part of the national Choose Wisely campaign. Like any other medication, IV Ig and WinRho are not without side effects. IV Ig is known to cause severe headache, carries a small risk of anaphylaxis, and can affect a child's ability to receive vaccinations over the next year. WinRho, in addition to headache and chills, most concerning, is known to cause intravascular hemolysis. These side effects are in addition to the inherent risks that come with hospitalization (infection, medication errors, etc). There is also a significant cost burden placed on the family with hospital admission. The average cost of hospitalization for ITP is just over \$18,000.

At the Children's Hospital of Richmond, we have recognized the growing evidence that the costs of treating ITP far exceed the benefits for most children. We have created

a care pathway designed to decrease the rate of admissions and cost of care to the families of central Virginia without increasing the risk of bleeding events. Our management focuses on risk factors for significant bleeding rather than platelet count. If a child has gum bleeding, persistent nose bleeds, or blood in the urine or stool, we still admit the patient and give them medical treatment. Where we have changed our practice, is that we no longer admit patients who only have petechiae and bruising. As long as the child has transportation to return if bleeding occurs, we will see them in our clinic within a week of originally being seen in our emergency department (ED). We do advise that children avoid contact sports, gym class, and choose calm activities during recess and after school. We also advise that they do not take non-steroidal anti-inflammatory drugs (NSAIDs) until the platelet count improves. If they develop bleeding symptoms, they are advised to call and we will see them that day either in our clinic or the ED. We believe that our care pathway provides for safe, cost-effective and evidence-based care for patients with an otherwise benign, self-limited disorder.

### Acute ITP Treatment Algorithm





## *Efficiently Discharging Patients Improves Quality Outcomes*

Matthew Schefft DO

Kyle Seedlock MD

Clifton Lee MD

Jose Munoz MD

Children's Hospital of Richmond

**Objective:** Readers will be able to describe a quality improvement project that increased discharge efficiency and apply these methods at their home institutions.

**ACGME Competencies:** Patient Care, Practice-based Learning and Improvement, Systems-Based Practice.

Like most children's hospitals, Children's Hospital of Richmond (CHoR) sees an influx of patients each winter because of RSV, influenza, and other common seasonal illnesses. The influx creates a bottleneck between admissions and discharges which hinders our ability to move patients from the emergency department to the inpatient floor. It also makes direct admission from clinics and transfers from community hospitals difficult to arrange. In order to accommodate the growing number of families



choosing CHoR to care for their sick children, we aimed to improve hospital throughput so that patients have access to inpatient beds when they need them. We targeted the discharge process for the patients on the pediatric hospital medicine service as part of a quality improvement project. Our work was based upon previous efforts by Dr. Christine White and her team at Cincinnati Children's Hospital<sup>1</sup>.

Our project team included attending physicians (Dr. Lee and Dr. Munoz), a hospital medicine fellow (Dr. Schefft), a resident (Dr. Seedlock), and two nurse managers (Monika Melbrech and Tracy Lowerre). We created discharge criteria for three common diagnoses (asthma, bronchiolitis, and fever < 60 days of life) which were expanded to ten diagnoses. The diagnoses were vetted by the hospital medicine attendings with unanimous agreement. Our goal was to reduce the time from when a patient is ready

to go home until they physically leave the hospital. We aimed for 75% of our patients to be discharged within three hours of meeting the discharge criteria. We educated the attending physicians, residents, and nurses about the criteria with an emphasis on communication between medical team members surrounding goals of care. We used two week PDSA cycles for rapid improvement. During these cycles, we tackled nursing involvement through direct engagement and nurse-resident communication, improv-

ing the visibility of the criteria in resident work rooms, checklists for residents and nurses, emphasis on the use of whiteboards in the patient rooms, and expansion of the criteria. The whiteboards were a focus to increase patient and family engagement by explicitly writing goals of care on the boards. Within the first three months of the project, the percentage of patients discharged within three hours increased from 44% to 100% (figure 1, p 10). We have maintained our percentage of discharge

within 3 hours at more than 85% even with expansion of diagnoses and an influx of new interns. In fact, we are currently discharging 73% of our patients within two hours of meeting discharge criteria. As a result, we are seeing our patients leave earlier in the day. Our median discharge time has improved from 3:30pm to 12:30pm (figure 2, p 10). A somewhat surprising consequence of the project is that our length of stay for the diagnoses we have included in the project has decreased by 1.2 days. At the same time, we have seen a reduction in our readmission rate from 3.5% to 2.1%. It was important to us that we gain efficiency without rushing patients out the door.

We have learned a number of lessons from our efforts so far. The keys to our early success have been buy-in from the attending physicians, residents, and nurse managers. We have extensively educated the residents and floor nurses regarding the criteria. We

have had variable success in our efforts to reflect the discharge criteria on the whiteboards in the patient rooms during rounds. We have not been successful in incorporating discharge criteria during resident hand offs. Verbal communication of barriers to discharge between physicians and nursing is another area for improvement. We have experimented with verbal reminders and paper tools but continue to search for a better sustainable communication tool/strategy. As is common in academic centers, our efficiency suffered in July when the new interns arrived. This is an area we have begun brainstorming for next year in an attempt to maintain high quality, safe, and efficient care throughout the year.

Our next focus is on increasing awareness of the project's successes with the administration in hopes of garnering additional resources. Thus far, the project has required manual data extraction and analysis. In the near future, we aim to leverage the technology inherent in the electronic health record (EHR) to extract data for us. Eventually, we see integration of discharge criteria into the EHR admission orders with alerts on the computer screen when a patient has met the discharge criteria determined on admission.

We believe that common discharge criteria have decreased the variability in care. By reducing length of stay, we are able to safely allow parents to bring their children home sooner with lower medical bills and less chance of medical errors. We look forward to expanding the program to benefit children beyond the pediatric hospital medicine service in the coming months. We will be sharing our results at that AAP National Conference on October 24th.

### References

1. White CM et al. Using quality improvement to optimise paediatric discharge efficiency. *BMJ Quality & Safety*, May 2014, 23 (5), pp428-36.

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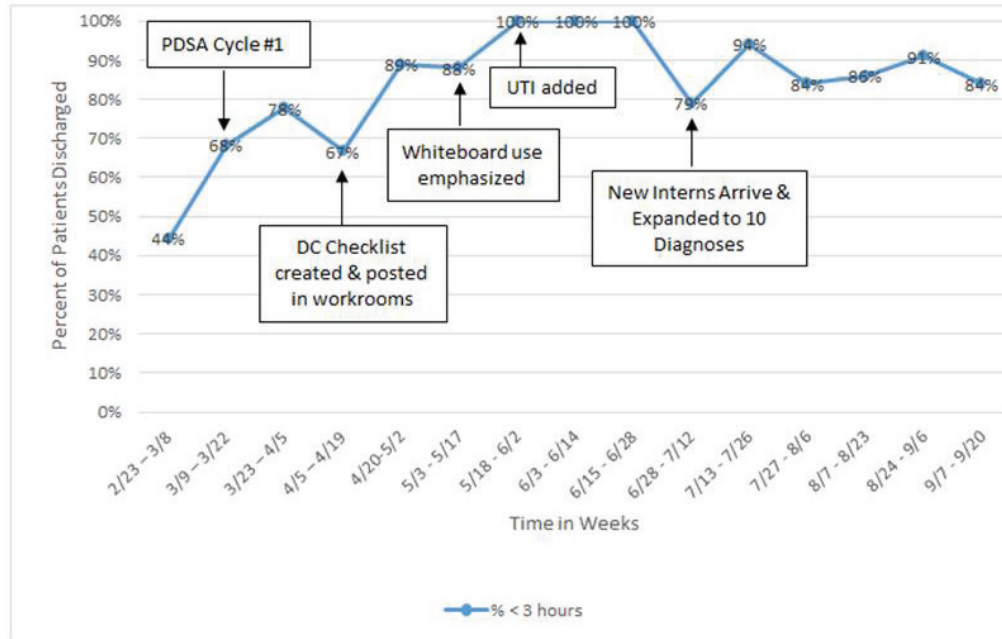


Figure 1. Percentage of hospital medicine patients discharged within 3 hours of meeting discharge criteria during each PDSA cycle.

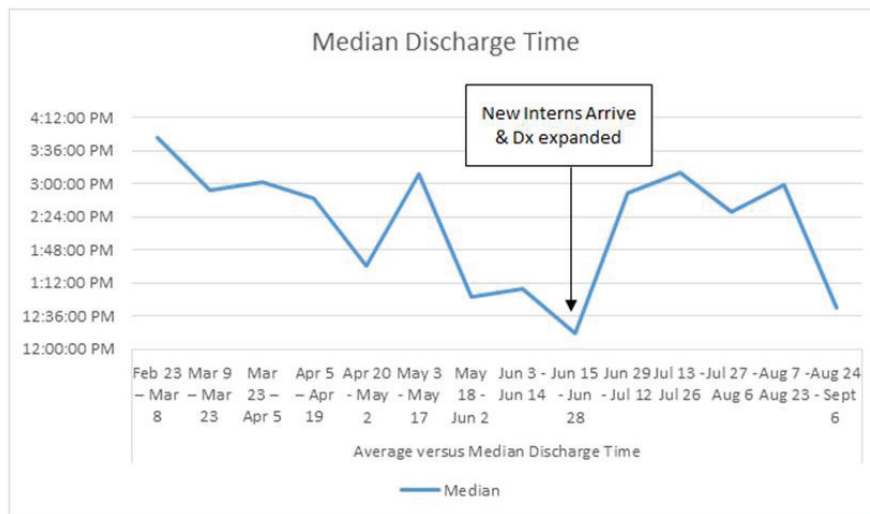


Figure 2. Median time of discharge for hospital medicine patients meeting the discharge criteria during each PDSA cycle

## *The Vascular Birthmark Clinic: Caring for Children with Vascular Malformations*

Ruth Trivelpiece, MEd,  
Program Coordinator  
Jennifer Rhodes, MD,  
Medical Director  
Children's Hospital of Richmond at VCU

**Objective:** Readers will be able to describe the most common vascular anomalies in children and treatment modalities. Explain the need for early referral with the multidisciplinary team.  
**ACGME Competencies:** Patient Care, Practice-based learning and Improvement, Medical Knowledge

Having a child with a vascular anomaly can be challenging and frightening for families. At the VCU Vascular Birthmark Clinic, families receive expert and comprehensive care from a team of dedicated specialists who work together to provide accurate and timely coordinated care, following children until their treatment needs are completed. One in every 10 children is born with a vascular anomaly such as a hemangioma or vascular or lymphatic malformation. These abnormal clusters of veins, arteries, or lymphatics occur during fetal development and the exact cause is unknown. Up to 60 % of children will require some form of treatment for these disorders, which are often inaccurately diagnosed and labeled.

The Vascular Birthmark Clinic at Children's Hospital of Richmond at VCU provides comprehensive, multidisciplinary care to provide diagnosis, treatment and support to children and families affected by all types of vascular anomalies. Dedicated pediatric specialists from surgery, plastic surgery, otolaryngology, dermatology, orthopedic surgery, interventional radiology, occupational therapy, psychology, nursing, care coordination and genetic counseling meet together on a regular basis and review medical records, photographs and imaging studies prior to seeing each patient at the clinic. Direct and continuous communication between the team members, family and pediatrician enables specialists to provide optimal coordinated and integrated care for every child.

### **The Need For Accurate Identification**

The key to successful management of the different vascular anomalies is accurate diagnosis. Physical examination and utilization of imaging techniques may be recommended, including ultrasound, CT, xray, MRI and angiogram.

Hemangiomas represent a localized growth of plump endothelial cells with increased mast cells and are the most common benign vascular tumors seen in infants. About 30% are visible at birth and the rest become visible within four weeks. Over 80% of hem-

angiomas occur in the head and neck areas and early on may be labeled as "superficial", appearing reddish and flat, or appear blue and are considered "deep". There may be a combination of both categories. Hemangiomas can also occur on internal organs. Children presenting with three or more hemangiomas will undergo abdominal ultrasound to evaluate internally. Hemangiomas will grow rapidly during the proliferative period for up to 18 months before beginning their involution phase, which can last up to 10 years.

Vascular malformations occur anywhere in the body and may occur in isolation or as part of another disease process. These benign lesions have flat endothelial cells and normal mast cell numbers, and depending on the type of vessel involved, are categorized as venous, lymphatic, arterial, capillary, or a combination. Low blood flow lesions grow slowly with a child and high blood flow lesions grow quickly and may become life threatening.

Venous malformations are low flow and blanch when compressed. They are often confused with hemangiomas. Lymphatic malformations occur when excess fluid accumulates within the lymphatic vessels. Arteriovenous malformations (AVM) are present at birth but not always noticed, sometimes not appearing until adulthood. AVM is a complex mass of arteries and veins associated with defective blood flow and as the lesion ages the vessels enlarge and thicken to compensate for the increased blood supply. The mass can be compressed and blanching and a pulse will be appreciated. They are commonly found on the lips, other head and neck sites and in the brain.

While many vascular malformations occur as a unique finding, there are some syndromes which are associated, particularly with vascular malformations. These include PHACE, Sturge-Weber, Klippel-Trenaunay, Proteus and blue rubber bleb syndrome.

### **Treatment Options**

The management of vascular malformations

depends upon the type, depth and location of the areas involved.

While many infantile hemangiomas may involute without any consequences, the American Academy of Pediatrics issued a report in September 2015 highlighting recent research and advances in diagnostic and management strategies for infantile hemangiomas. Emphasis was placed upon the need for early identification by the pediatrician and referral to multidisciplinary specialists for lesions which are at risk for ulceration, scarring and potentially causing functional and/or cosmetic disfigurement in areas such as perineum, airway, liver, eyes, nose, and lips.

Use of beta blocker medications including topical timolol for more superficial hemangiomas and oral propranolol for hemangiomas requiring systemic treatment has proven very effective in the management of these lesions. Extensive efforts have been devoted to educating the caregivers, who are responsible for administering medication, in being alert to any side effects or reactions to medication. Families are followed on a monthly basis if prescribed propranolol therapy.

Children with venous malformations are followed regularly through the Vascular Birthmark Clinic. Having the availability to perform ultrasound during the team evaluation allows the healthcare specialists to provide updated imaging and directly discuss findings and recommendations with the family. Treatment options may include compression therapy, antibiotic therapy, sclerotherapy, embolization, laser surgery and surgery. Together, team members plan each child's treatment protocol and specific days are scheduled in Interventional Radiology's procedure rooms and the hospital's operating rooms to coordinate the surgeons and radiologists efforts as they work together to accomplish the goals of treatment. Pediatricians are encouraged to make referrals to the team's program coordinator who will introduce families to the program and provide education and support as well as gather any records or imaging studies.

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