VIRGINIA • PEDIATRICS

• Next Issue: Winter 2020 •
• Deadline for entries: 11/15/2019 •

Virginia Chapter | FALL 2019

American Academy of Pediatrics
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Quality Improvement

Virginia Chapter continues to guide our members, practice teams etc. as we implement more and more Quality Improvement activities.

The chapter has done several HPV Q1 projects and per Kristina Powell, MD, VA-AAP Q1 Project Leader:

"Using the Model for Improvement, the Virginia AAP chapter completed a quality improvement project focused on improving HPV initiation and completion rates by using strong provider recommendations. We were able to reach and/or exceed our goal of 75% HPV vaccination series initiation, 70% vaccination series completion, and 95% counseling/strong provider recommendation. This project involved 19 healthcare providers from all over Virginia. The project taught these providers that strong provider recommendations work. The chapter hopes that what they have learned will be sustainable and that they will teach this to other providers in their groups. This will greatly benefit many adolescents throughout Virginia by reducing HPV related cancer rates."

Our president Sandy Chung, MD has been working toward improving Mental Health Access in Virginia by establishing VMAP (Virginia Mental Health Access Program). To tackle this issue, our Chapter was awarded a HRSA grant in collaboration with Virginia Department of Health for $2.2 million over five years to establish VMAP. The Virginia Chapter has established a Project ECHO model-training program to train the PCPs on screening, diagnosis, and treatment of mental health. A mental health screening Q1 program has been established to provide MOC Part 4 credit for our members who participate.

We invite you to be a part of the team!

REACH programs coming in the spring in Norfolk, Charlottesville and Lynchburg, as well as a Project ECHO for the western area of the state.

If you have been involved in any of the many Virginia Chapter Q1 projects, you realize the value not only to ourselves but also to our patients. Please keep abreast of what your chapter is doing for you by reviewing your email Member Alerts and the Virginia Pediatrics Newsletter!

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VMAP
Virginia Mental Health Access Program

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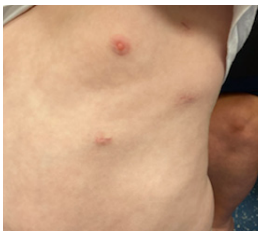

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President's • MESSAGE

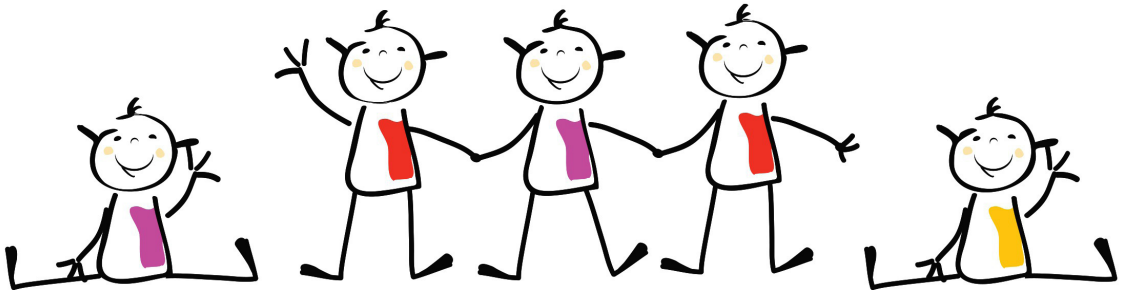
It is hard to believe that we are already nearing the end of 2019! As we close out the year, we could use you help with advocating for issues that help child health, including mental health, immunizations, injury prevention, gun safety, food adequacy, as well as those issues that protect our profession. Our General Assembly Day on Wednesday, January 22, 2020, is a time when you can join other pediatricians, pediatric nurse practitioners, physician assistants, residents and medical students in going to Richmond to speak to legislators. Educating them on the importance of protecting children in all that they do is incredibly important! If you've never done it before, it may seem intimidating, but it is really an extension of what we do every day when we teach parents and caregivers. Almost all of the legislators are not physicians and are not in the medical field, yet they will be voting on legislation that will directly impact us and the children and families that we serve.

On our website, you find access to information about bills that we will be following, a way to sign up for alerts about important issues, as well as information on how to become an advocate. If you are interested in attending Pediatric General Assembly Day, please email our Executive Director, Jane Chappell at jchappell@ramdocs.org.

We are excited to have many opportunities through the year for you to become involved. Our various committees need your help and expertise. These included Gun Violence Prevention, Immunizations, Food Insecurity, Immigrant Health, Pediatric Council (payment issues), and (Virginia Mental Health Access Program (VMAP). We also have members who focus on Early Childhood, Medicaid, Environmental Health and Breastfeeding. If you have a passion or interest and think that the Virginia Chapter should be doing more, please contact me so that we can see how to make it happen!

Our Chapter has accomplished much including published op-eds, letters to the editors, participating in state level taskforces and national committees, established VMAP, advised Medicaid and other state agencies, sponsored Medical Society of Virginia resolutions, advocated for bills for child health, and much more. We are proud of our state Chapter which was recognized by national AAP with a Chapter Achievement Award! We should applaud the hard work of the individuals who have volunteered their time to make these initiatives a reality. Come join us to continue the excellent accomplishments so that we have an amazing year in 2020!

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



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REACH PPP Mini-Fellowship

On September 27-29, the Virginia Chapter of the AAP sponsored a REACH PPP (Resource for Advancing Children's Health - Patient Centered Mental Health in Pediatric Primary Care) Mini-fellowship in Richmond. VCU/ChoR hosted this event for 47 providers, most of whom are Pediatricians from the central region, but attendees also included faculty and residents from VCU and many providers from Federally Qualified Health Centers in the region.

This program, lauded for its ability to train pediatric providers to be better equipped to diagnose and treat behavioral health disorders, was funded largely by a grant from Cigna, enabling providers to attend virtually tuition free.

REACH combines an interactive teaching model with faculty comprised of general pediatricians and child psychiatrists to deliver a curriculum that is very relevant to primary care providers' needs.

REACH supports the education arm of VMAP, the Virginia Mental Health Access Program (www.vmapforkids.org), along with a recently launched teaching collaborative based on Project ECHO (Extension for Community Healthcare Outcomes), a hub and spoke model that involves monthly case presentations, didactics from a faculty group, and group discussion using the web-based Zoom platform. If you are interested in being involved with Project ECHO please send an email to projectecho@vmapforkids.org.

Other offerings of REACH have been scheduled in the coming year, and VMAP is in the process of developing its own training teams to help provide this valuable training to all providers throughout the Commonwealth.

Walter Chun, MD's comment on REACH:
"Awesome! The tools that this course provides will be a game changer in the way our practice treats behavioral health disorders!"

Accreditation

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of Eastern Virginia Medical School and the American Academy of Pediatrics-Virginia Chapter. Eastern Virginia Medical School is accredited by the ACCME to provide continuing medical education for physicians.

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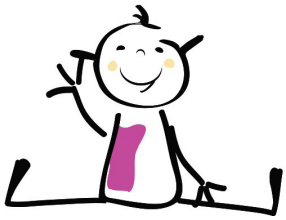

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How to Obtain Credit:

Review the articles on pages 5-11. Complete the attached VA-AAP Newsletter Registration and Evaluation Form and return to the the Children's 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/s/VAAAPSpring2019 and complete online. Please allow 1-2 weeks to receive certificate.

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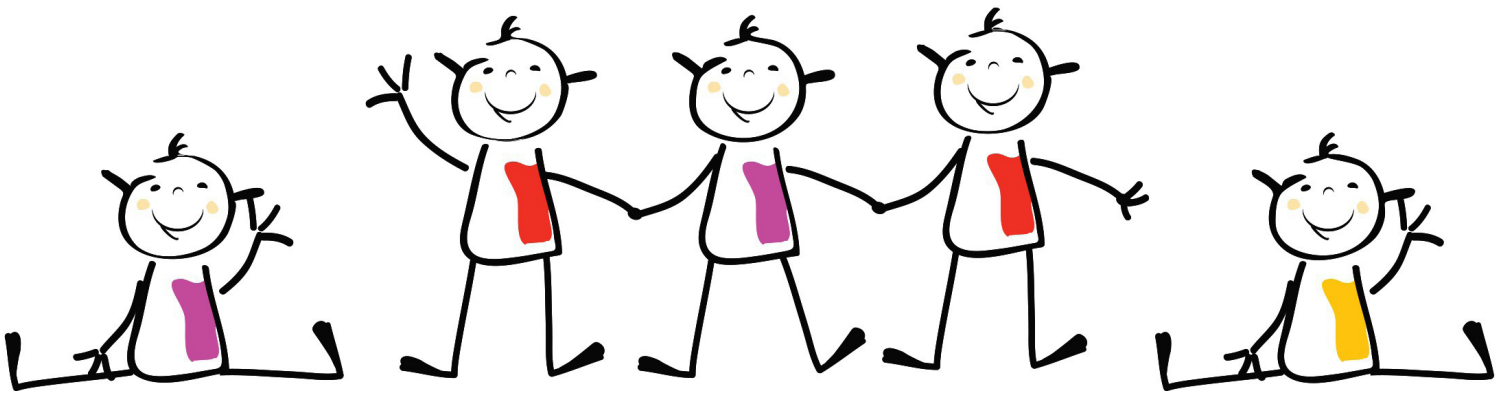

Robotic Total Thymectomy for Myasthenia Gravis

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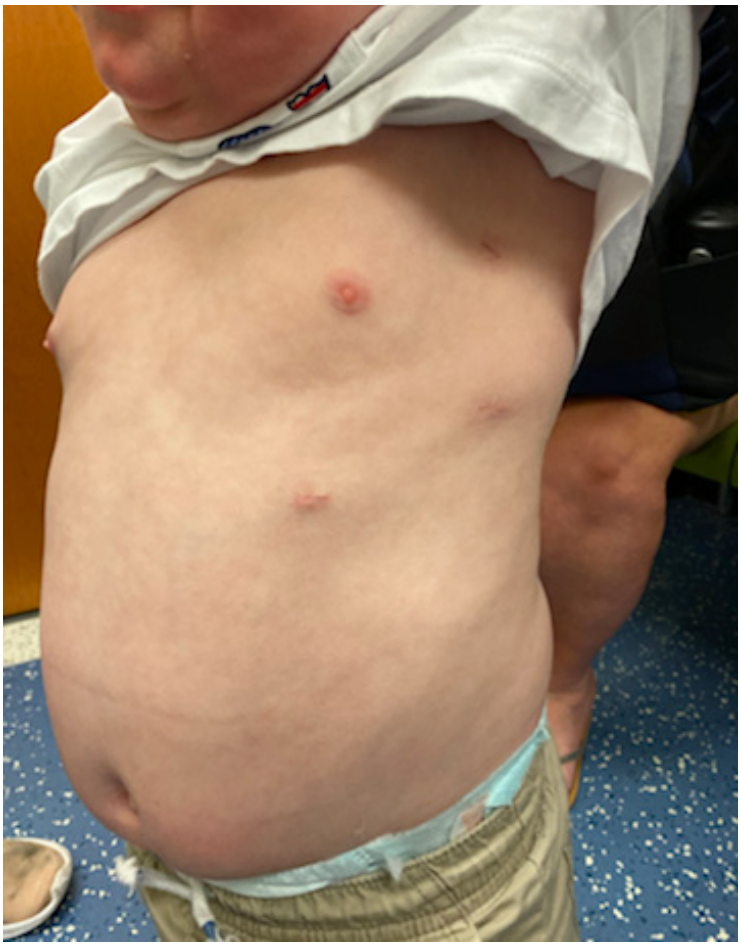

Figure. Three-year old boy two weeks after his robotic total thymectomy.

Myasthenia Gravis (MG) is a devastating autoimmune disorder, in which autoantibodies are directed against acetylcholine receptors at post-synaptic neuromuscular junctions, inhibiting their stimulatory effect and leading to muscle weakness. In the United States, the prevalence of MG is approximately 14 to 20 per 100,000. [1, 2] Approximately 12-25% of new cases are diagnosed in children. [2] Most patients are managed medically on a combination of acetylcholinesterase inhibitors and corticosteroids. Surgical thymectomy has demonstrated some success in the treatment of the disease, particularly when performed early in the disease course. [3] A complete resection of all thymic tissue is correlated with a better outcome for patients. [4] Thus, it is critical that the procedure used when performing a thymectomy maximize the resection of thymic tissue. The goals of thymectomy in MG patients are to improve clinical symptoms and decrease the use of treatment medications, which carry significant side effects. A principal measure of successful treatment is through complete stable remission (CSR), which is defined as exhibiting no symptoms for at least one year and receiving no therapy during that time. [5]

Historically, a thymectomy was performed via a median sternotomy and a majority of the morbidity of the procedure was associated with the incision. More recently, video assisted thoracoscopic surgery (VATS) has been used for thymectomies. Compared to median sternotomy, this minimally invasive procedure reduces postoperative pain and the chance for infection, leads to shorter hospital stay, less tissue injury and blood loss, and better cosmetic results, while maintaining a very low postoperative mortality. [6, 7] However, studies have suggested that VATS thymectomies are not as successful in removing all thymic tissue. [8] This is thought to be due to technical limitations in visualization and restriction of access to the superior most portions as well as the contralateral thymus in many patients.

Robot-assisted thymectomy is a relatively new procedure with proven feasibility and success. [9, 10] It offers the aforementioned benefits of VATS, but also a three-dimensional view and has the technical advantages of articulating arms that provide greater access to the superior portion of the thymus and the contralateral lobe. [10, 11, 12] A retrospective study in adults has demonstrated a more complete resection in robot-assisted patients compared to VATS thymectomy and, accordingly, a significantly improved rate of CSR. [12]

In general, surgery in children requires special considerations, particularly when it is robot-assisted [11]. This is especially true for thymectomies performed in pediatric patients with MG, as the larger thymus gland in a smaller chest poses unique anatomical challenges that may affect outcomes. Studies have also shown more favorable clinical outcomes when a thymectomy is performed on younger patients, and when patients are in the earlier stages of disease. [13, 14, 15] One recent study of pediatric patients with ocular and systemic myasthenia gravis showed that 49.8% of patients improved clinically, and showed a significant trend towards decreased steroid use. [16]

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Since 2007, we have performed 18 robotic total thymectomies on children ranging form 2 to 17 years of age with excellent results. Nearly all patients have had improvement in their preoperative symptoms. Sixteen patients were discharged the next day on minimal pain medication as no chest tubes were used and there were only 3 small incisions on the left side of their chest, see figure. The remaining two patients stayed 2-3 additional days because of the severity of their preoperative symptoms.

A total thymectomy is indicated for juvenile MG in children with moderate or severe generalized disease and complete stable remission is achieved in 68% of patients in 3 years. [17] Long-term administration of steroids and immunosuppressant medications have a number of significant side effects in children including decreased growth velocity, diabetes, hyperlipidemia, central obesity, immunocompromised state, and pathologic bone fractures. In addition, the greatest benefit from thymectomy in disease remission is seen early in the disease course. [18] Therefore, we advocate for early thymectomy in children directed by disease onset and severity. The decreased morbidity and improved cosmesis associated with a minimally invasive approach removes some of the barriers for parents and providers in proceeding with surgery at a young age. Using the three-dimensional visualization and articulating instruments of the surgical robot, a total thymectomy for MG in children can be performed safely and with excellent efficacy. Furthermore, with this minimally-invasive approach, we have been able to send patients home the following day with minimal pain and an almost immediate return to normal activities. Hopefully, the dramatic improvement in the surgical care of patients with MG will result in patients receiving this potentially curative treatment earlier in the course of their disease such that they can avoid a long course of steroids and other medications and have a higher chance for complete resolution of their symptoms.

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High Flow Nasal Cannula in Children with Bronchiolitis

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Introduction

Bronchiolitis is classically a seasonal illness with an incidence of about 11-15% in the first year of life[1]. Diagnosis is clinical and management is usually supportive. In recent years, the use of high flow nasal cannula (HFNC) for the treatment of bronchiolitis has grown in popularity[2]. The goal of HFNC is to administer heated and humidified oxygen at higher flow rates in an attempt to decrease work of breathing and perhaps prevent intubation or subsequent ICU escalation, while allowing for the use of a lower fraction of inspired oxygen (FiO2)[3]. Though its use remains controversial in the literature, HFNC may be considered as a safe, well-tolerated alternative for infants with increased work of breathing or substantial hypoxia.

Learning Objectives:

1. Discuss the indications and triggers to start HFNC in the ED
2. Develop a strategy to escalate care once admitted
3. Discuss feeding strategies while on HFNC
4. Determine the appropriate dosing of the flow. How much is too much? Where do we go next?

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HFNC in the Pediatric Emergency Room

Risk stratification is the first step when considering the management of a patient with bronchiolitis in the Pediatric Emergency Room. High flow nasal cannula has been recommended to treat infants with moderate to severe bronchiolitis. In their last update of Clinical Practice Guidelines for the management of bronchiolitis (2014), the American Academy of Pediatrics (AAP) indicates age less than 12 weeks, history of prematurity, and underlying While there is still no consensus regarding severity assessment of bronchiolitis, for everyday practice, it might be helpful to consider the following as potential signs of severe disease[2]:

- Persistently increased respiratory effort (as assessed during repeated examinations every 15 minutes: tachypnea (Kelly et al looks at triage respiratory rate above 90th percentile for age[4]), nasal flaring, retractions, accessory muscle use
- Especially if there is no sign of improvement after supportive measures like suction, fever control, and oxygen support through nasal cannula
- Hypoxemia (different recommended O2 saturation ranges depending on the source but hypoxemia most frequently set at SpO2 < 90%): to be interpreted in the context of other clinical signs like mental status or overall appearance
- Apnea or acute respiratory failure (of note patients with apnea, suspected hypercarbia, or impending respiratory failure need invasive or non-invasive ventilatory support and HFNC is not appropriate for this population)

Our protocol for the management of bronchiolitis in the Pediatric Emergency Room at the Children's Hospital of Richmond[5] uses the Modified Respiratory Assessment Score to determine severity (**Figure 1**, page 11).

When HFNC was used for patients with moderate to severe bronchiolitis, Bressan et al were able to show significant improvement in respiratory rate[6]. A retrospective cohort study by Kawaguchi et al looked at the impact of HFNC in pediatric respiratory distress and observed a significant reduction in risk of intubation with the introduction of HFNC[7].

In 2018, Franklin et al published a randomized control trial (n = 1472) studying the efficacy of HFNC in the emergency department and pediatric inpatient units8. Infants with bronchiolitis requiring supplemental oxygen therapy were assigned to receive either HFNC or standard oxygen therapy (regular nasal cannula). The primary outcome was escalation of care due to treatment failure (defined as meeting ≥3 of 4 clinical criteria: persistent tachycardia, tachypnea, hypoxemia, and medical review triggered by a hospital early-warning tool). However, physicians were allowed to escalate care if they thought it to be appropriate regardless of whether patients met criteria or not. Overall, they established that there was a significant difference in treatment failure rates of care between the two groups, in favor of those on HFNC ($p < 0.001$). The rate difference was found to be significant for both situations: when looking strictly at patients who met criteria for treatment failure and when physicians used gestalt to escalate care regardless of meeting criteria. For example, altered or decreased mental status is not specifically mentioned as a reason to escalate care but it is an important part of the evaluation for respiratory distress and may have been a trigger factor for some of the physicians in the study to declare treatment failure. This supports that beyond specific respiratory parameters, an overall evaluation of a patient is helpful when deciding appropriate treatment, and will more likely than not lead to positive results. Regarding secondary outcomes, they found no differences in length of stay (LOS), LOS in the intensive care unit (ICU), and duration of oxygen therapy. Also, they were unable to show decreased rates of intubation. However, it is important to note that around 39% of patients initially receiving standard oxygen therapy were escalated to HFNC and the paper does not clarify how many of those eventually required intubation.

This is the largest and most recent randomized controlled trial done on the efficacy of HFNC in pediatric patients with bronchiolitis. No serious adverse events were reported.

What is the Right Flow?

In children, HFNC was initially used at flows of 4 to 8 L/min. In a retrospective study of 115 infants with bronchiolitis, McKiernan et al showed that a flow of up to 8 L/min was associated with a significantly lower rate of intubation, compared to a historical cohort[9]. When adjusting for age, weight, and RSV status, the adjusted odds ratio for intubation was 0.32 ($p=0.049$). In a similar retrospective study of 330 infants with bronchiolitis on HFNC up to 8 L/min, Schibler et al showed a decrease in the intubation rate over time, from 37% initially to 7% when the HFNC was widely adopted in their institution[10]. Also using a HFNC flow of 8 L/min, Wing et al showed a decrease in total intubations from 16% to 8% ($p=0.004$) in 848 infants with bronchiolitis, but no effect on the pediatric intensive care unit (PICU) length of stay ($p=0.25$)[11].

The first large randomized controlled trial evaluating HFNC was published in 2017. Milesi et al enrolled 142 infants with moderate to severe bronchiolitis, comparing nasal continuous positive airway pressure (nCPAP) set at 7 cmH2O, with 2 L/kg/min oxygen therapy administered with HFNC[12]. The primary endpoint was the percentage of failure within 24 h of randomization using prespecified criteria: (1) a 1-point increase in modified Wood's clinical asthma score (mWCAS) compared with baseline; (2) respiratory rate (RR) rise >10 bpm compared with baseline, with RR >60 bpm; (3) a 1-point increase in the EDIN neonatal pain and discomfort scale compared with baseline, with EDIN >4 despite the use of hydroxyzine; and (4) more than two severe apnea episodes per hour (i.e., requiring bag and mask ventilation), despite a loading dose of caffeine after the first apnea. The authors found that nCPAP was superior to HFNC, with a failure rate of 31% vs 51%, respectively ($p=0.001$).

The following year, the same group published a second randomized controlled trial, this time evaluating the failure rate of 2 L/kg/min vs 3 L/kg/min[13]. Using the same definition of failure, the authors showed that the rate of failure was similar in both groups: 38.7% (2L) vs. 38.9% (3L; $p=0.98$). However, 3 L/kg/min was asso-

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ciated with a threefold increase in discomfort (p=0.002).

Therefore, it seems that HFNC is optimal at a flow of 2 L/kg/min, although the failure rate is 20% higher than nCPAP at 7 cmH2O.

Escalation of care while on HFNC

Previous literature identified prematurity and comorbidities have been associated with severe bronchiolitis such as RVS amongst other demographic factors[14,15]. In otherwise healthy infants, other factors identified for respiratory decompensation include age, race, and work of breathing[16]. Damore et al sought to perform a multicenter prospective cohort study of patients to identify predictors of ICU admission in patients with bronchiolitis[17]. The Multicenter Airway Research Collaboration included 30 emergency departments (EDs) across the United States. The majority of EDs were in children's hospitals or pediatric EDs in general hospitals, and included some general EDs in general hospitals across the United States. Fifty patients were identified who required ICU admission compared to 533 children admitted to the regular floor for over 24 hours. In multivariate analysis, respiratory rate and oxygen saturations were not found to be independent predictors for ICU, but age less than two months, ED visit in the past week, moderate/severe retractions, and inadequate oral intake were found to predictors for ICU admission. They did not find that different demographic and history factors such as gender, socioeconomic factors, or parental asthma, amongst others, as predictors for ICU admission, though young age was consistent with previous literature. Limitations include a relatively small ICU sample size, and the authors note that there was a smaller number of patients with specific illnesses or prematurity.

In 2017, Betters et al, through retrospective review, looked at qualities associated with failure of HFNC outside of the ICU at two freestanding children's hospitals, as defined by intubation or cardiopulmonary arrest[18]. They included all patients who received HFNC on the general floor. 83% of the patients did have a primary respiratory diagnosis. The definition of failure of HFNC included intubation or cardiopulmonary arrest. As part of their guidelines, maximum flow rate was set at 8L/min and maximum FiO2 at 50%. The majority of the patients in the study were diagnosed with respiratory illnesses. Six percent of patients (n=14) progressed to HFNC failure and these patients were more likely to have a cardiac history and prior history of intubation, as well as a higher FiO2 requirement, but less likely to have the diagnosis of bronchiolitis. Cardiopulmonary arrest occurred in two of these patients, both with complex congenital heart disease; 12 patients were transferred to the ICU. In hospital-adjusted, univariate logistic regression in patients who progressed to HFNC failure, maximum FiO2 was the strongest predictor. The diagnosis of bronchiolitis was the least predictive.

Dadlez et al wanted to study the feasibility and safety of HFNC use outside of the ICU at the Children's Hospital at Montefiore however the study excluded patients with complex comorbidities[16]. In the 80 patients admitted on HFNC over a two-year period to the general floor, the flow varied from 3-10L/min. 41% (33/80) required transfer to the ICU, with 91% of these transfers occurring in the first 24 hours after initiation of HFNC. 58% required escalation of respiratory support however no patients were intubated, developed a pneumothorax, or had an aspiration event.

In exploring HFNC use, Kline et al looked at HFNC therapy for patients with bronchiolitis across the emergency department and acute care floor, and looked at HFNC inpatient floor initiation protocols amongst various institutions[19]. The majority of institutions included had a maximum flow limit of approximately 10L/min though one site went up to 15L/min in the 18-24 month age group.

Therefore, HFNC is an increasingly used support modality in children and in respiratory illnesses, especially amongst children diagnosed with bronchiolitis. The majority of studies involved patients with bronchiolitis. Evidence suggests that while HFNC is a relatively safe modality, there may be certain risk factors for patients where a lower threshold for transfer to the ICU should be considered. These include age less than two months, history of cardiac disease, complex comorbidities, or increased FiO2 delivery. Variability of flow limits exist for the general floor, and it is important to have mechanisms in place for escalation of care and transfer to the ICU in a timely and safe manner.

Feeding while on HFNC

Poor nutrition has been known to be associated with mortality and length of stay in critical illness[20–23]. The AAP guidelines recommend appropriate fluid and nutritional support in patients with bronchiolitis[3]. The discussion of the safety of enteral feeds while on HFNC surround the risk of impending respiratory failure, aspiration, or loss of feeding coordination. Data has shown that use of noninvasive ventilation such as HFNC is strongly associated with delayed enteral nutrition[24]. As HFNC is used more and more, there is now some initial evidence for enteral feeds in patients with bronchiolitis.

Two studies published in 2017 explored

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enteral feeding in patients diagnosed with bronchiolitis on HFNC. Slain et al performed a retrospective chart review of patients admitted to the ICU of a single tertiary academic children's hospital for bronchiolitis[25]. The primary outcome measure was incidence of feeding-related adverse events defined as respiratory distress or emesis, and feed route and maximum HFNC delivery were recorded in 8-hour nursing shifts. 70 children received HFNC and enteral nutrition, and they were fed 63% of the nursing shifts. The majority fed orally and the level of respiratory support at feed initiation varied. The number of adverse events (most commonly emesis, followed by respiratory distress) were documented in only 6% shifts with a feed, and the incidence did not differ based on levels of respiratory support. Interestingly, children who were feed within 16 hours of presentation to the ICU had a shorter ICU stay, shorter HFNC use, and lower total hospital charges compared to those who were fed later. Additionally, Sochet et al conducted a prospective, observational study a tertiary medical center and looked at the incidence of aspiration-related respiratory failure and nutrition interruptions[26]. Ninety-seven percent of 132 patients included in the study received enteral feeds orally, and the flow rates of HFNC were anywhere from 0.3-1.9L/kg/min. Only one patient in the study developed aspiration-related respiratory failure, which was defined as an aspiration-related event with clinical or radiographic evidence of aspiration and if invasive ventilation occurred temporally to initiation of nutrition, bolus feeds, or clinician-observed emesis. 9.1% experienced nutrition interruptions (of longer than 8 hours). Patients with interruptions had a longer length of stay by 2.5 days and received an additional day on HFNC. Only 42% of the patients achieved nutritional goals by time of discharge.

Dadlez et al, in their study looking at the safety of HFNC outside of the ICU, found that there were no aspiration events occurred out of the 83% that fed while on HFNC16. Even more recently in 2019, a retrospective cohort study was published exploring whether feeding exposure during HFNC was associated with discharge time or feeding-related adverse events[27]. Initiation and use of HFNC may have occurred in either the ICU or the general floor. 63% of 123 patients were fed (41% of the 123 patients fed exclusively by mouth and 23% had tube or mixed oral and tube feedings). The median time to discharge was 29.5 hours for those that were fed, and 39.8 hours for those that were not fed. Those that received any feeds, and those with exclusive oral feeds had a shorter time to discharge following HFNC completion in adjusted models, as compared to those without feeds. These results were similar when looking at time to discharge from HFNC. Adverse events were reported in three patients, one with intubation, one with aspiration pneumonia, and one readmission, and occurred in both fed and not fed groups.

In conclusion, emerging evidence demonstrates that enteral feeding while on HFNC is promising and overall, feeding-related adverse events were not common and are not likely related to the level of respiratory support. Many patients were fed orally in these studies. However, further study is needed to standardize feeding while on HFNC including initiation of feeds.

Current Evidence

In 2019, Lin et al published a systematic review that included nine randomized controlled trials with 2121 children[28]. Overall, the quality of evidence was good. When comparing HFNC to standard oxygen therapy, the authors showed a decrease by half in the risk of failure (risk ratio 0.5, 95%CI 0.4;0.6) and a trend toward shorter length of stay (mean decrease by 1.5 days, 95%CI -3.3;0.3). When comparing HFNC to nCPAP, the authors showed a 60% increase in the risk of failure (risk ratio 1.6, 95%CI 1.1;2.4) and no effect on the length of stay (mean increase by 0.5 days, 95%CI -0.7;1.7).

Conclusion

The current evidence suggests that HFNC is superior to standard oxygen therapy in terms of risk of failure, but is inferior to nCPAP, despite the flow being optimally set at 2 L/kg/min. In addition, the current evidence suggests that HFNC does not preclude enteral feeding. Considering the ease of use, minimal side effects, and the fact that HFNC seems to be feasible outside of the PICU, HFNC seems to be appropriate for patients who require more support than just oxygen. However, one must be aware of the high failure rate (up to 50%) and should plan accordingly, being prepared to escalate to nCPAP and perhaps invasive mechanical ventilation.

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Figure 1: Modified Respiratory Assessment Score, as defined in our protocol[5]

Clinical Signs	Age	Mild	Moderate	Severe
Respiratory Rate	2-12 Months	<50	51-70	>70
Respiratory Rate	12-24 Months	< 40	41-60	>60
Work of Breathing		None	Intercostal or Subcostal Retractions	Nasal flaring, grunting, head bobbing or suprasternal retractions
Oxygen Requirements		None	< 1.5 Liters per minute	> 1.5 liters per minute
Mental Status		None	Agitated	Lethargic or inconsolable

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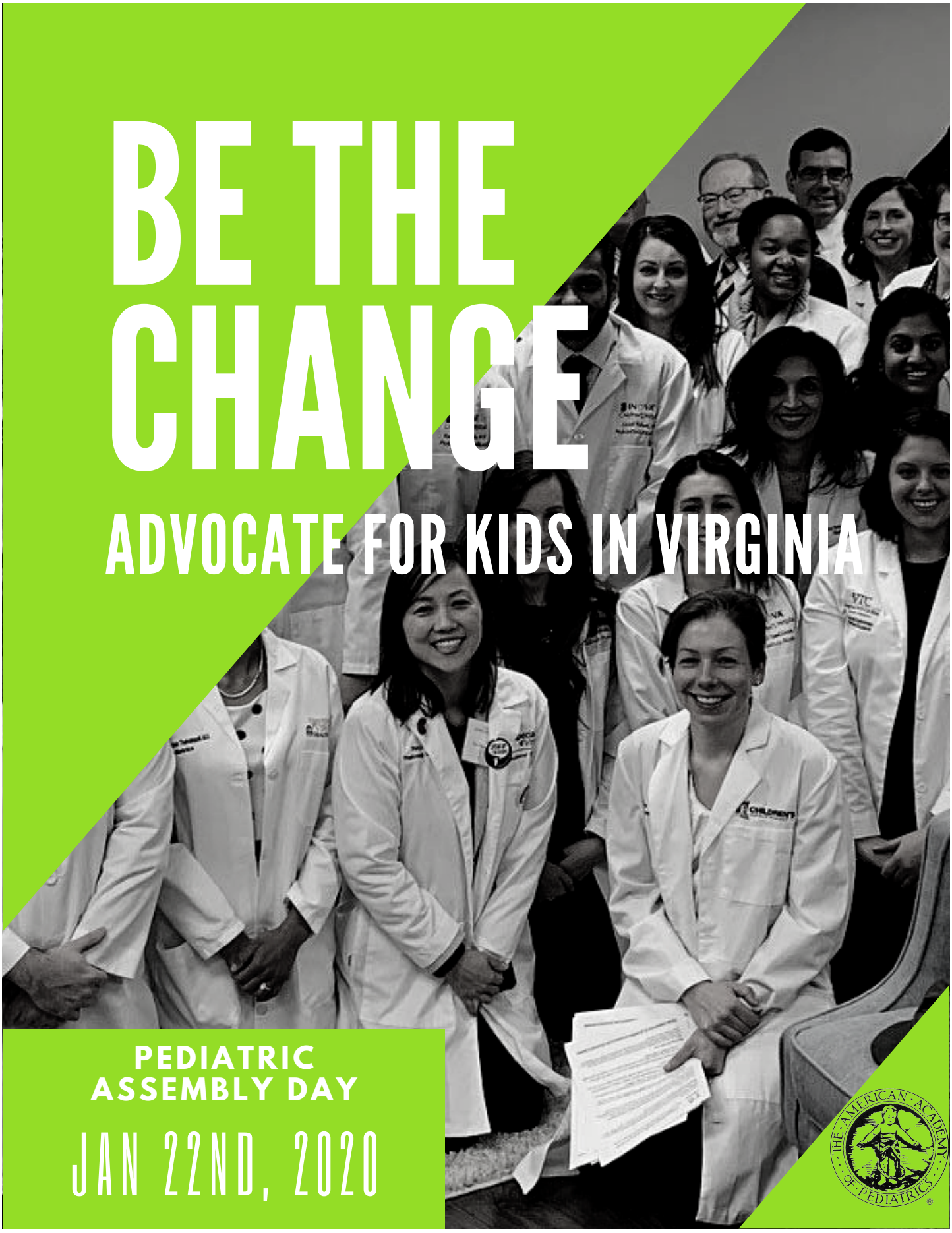

PEDIATRIC ASSEMBLY DAY

JAN 22ND, 2020

Children's Hospital of Richmond at VCU has broken ground, kicking off construction of its new inpatient children's hospital. The $350 million hospital will replace existing inpatient beds and consolidate pediatric inpatient and emergency care to one location, adjacent to the outpatient Children's Pavilion on the VCU Medical Center campus in downtown Richmond.

The new hospital is part of a comprehensive plan to address the needs of the community and the state, becoming a destination for children and their families seeking exceptional health care. The facility is also planned to be a hub for research and education, attracting clinicians dedicated to improving the future of pediatric medicine

"We heard our families and our community when they said how critical it was to have a dedicated pediatric inpatient environment with proximity to our outpatient Children's Pavilion," said Elias Neujahr, CEO of CHoR. "When this new building is complete, we'll have an entire city block dedicated to caring for kids."

The 500,000-square-foot facility is set to open at the end of 2022 and will house trauma and emergency care; 86 private rooms for acute and intensive care; operating rooms; increased capacity for imaging services; family amenities including playrooms, performance spaces, Ronald McDonald House Charities rooms and outdoor gardens; and spaces for collaboration and education. The 16-story building will also include four levels of below-ground parking. NICU beds will remain in VCU Medical Center's Critical Care Hospital, keeping premature and critically ill newborns in close proximity to labor and delivery.

The new hospital has been designed for the community, and with them. Prior to groundbreaking, nearly 300 families attended a community design fair where they engaged with architects and hospital leaders to share what they would like to see in their new children's hospital. The hospital's family advisory network will remain actively involved throughout the planning and construction process, providing feedback and recommendations based on their first-hand experiences seeking and receiving care for their children.

Unused shell space in the Children's Pavilion is being used to simulate hospital rooms and work spaces so clinical teams can visualize, test and provide feedback with the end goal of building a safe, collaborative and healing environment for all.

Learn more about the hospital at chrichmond.org

Get in touch!

We welcome your opinions and ideas. Please contact **Virginia Pediatrics**:
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