Chair Update

Vikas Dharnidharka, MD, MPH, FAAP

Greetings again to all our AAP Nephrology Section members. I believe that now we are finally putting COVID-19 somewhat behind us! I am proud to say that your AAP SONp has also continued its many activities, to benefit our members, pandemic or not. We finally met many of you in-person at the Pediatric Academic Societies (PAS) meeting in Denver in late April. Our AAP Section of Nephrology’s Executive Committee met in-person at that time. We made this change back in 2019 to move from meeting in-person at Renal Week to doing so during the PAS, but had to meet virtually these past 2 years. I had the privilege of chairing this meeting in-person for the first but also last time (more below).

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One of our most important activities is the selection of the annual Henry Barnett lifetime achievement awardee in pediatric nephrology. For many decades we have recognized the best and greatest in our field with this award. Selection is no small responsibility, one which our three committee members (Larry Greenbaum, Katherine Dell and Matthew Grinsell), took very seriously. Once again they received many great nominations, making the task quite difficult, appropriately so. All of you received the formal announcement in March 2022 that this year’s Barnett awardee is Dr. Eileen Brewer. Most of you know Eileen well as a tireless and forceful advocate for pediatric nephrologists across many domains, including clinical care, billing and coding, reimbursement, and governmental policy. We formally recognized Eileen and presented the Barnett award to her in-person at the PAS Denver meeting. (see the photos).

In my last newsletter, I informed you about a new initiative that our Section created on equity/diversity/inclusion (EDI). We initially formed a mini-work group within our executive committee comprised of Drs. Doug Silverstein, Juan Kupferman and Julie Reardon. We then solicited additional members from within our AAP SONp, and are pleased to inform you that the following members have joined: Drs. Kaye Brathwaite, Celina Brunson, Anita Perez and Patricia Seo-Mayer. This EDI Workgroup will assist the executive committee in integrating EDI principles into the section’s structure and activities.

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The AAP has previously performed pediatric workforce surveys that have highlighted the shortages of professionals in our pediatric nephrology subspecialty. The AAP will again be coordinating subspecialty workforce surveys in 2022 and the SONp and ASPN will again be collaborating on in this initiative. Thank you to SONp and ASPN members Drs. Darcy Weidemann, Adam Weinstein and S. Sudha Mannemuddhu, who will lead this effort for the pediatric nephrology survey.

The AAP is also going to update the urinary tract infection clinical practice guidelines that are now outdated and also represent EDI conflicts. Our SONp has nominated several section members to serve as members or for vice-chair of this committee. We expect to know the final composition soon.

Our Section continues to add more Nephrology articles to the AAP website HealthyChildren.org, all of which are also in Spanish and can be printed.

1. **New Articles published:**
   a. **Nephrotic syndrome** (Craig Langman/Kelsey Richardson)
   b. **Proteinuria** (Elahna Paul/Laura Malaga-Dieguez)

2. **Articles in process:**
   a. Single Kidney (Patricia Seo-Mayer/Vikas Dharnidharka)
   b. Childhood Kidney Transplants (Roshan George)
   c. Prenatal Hydronephrosis (Juan Kupferman/Darcy Weidemann)
   d. Dialysis Overview (Beth Vogt/Craig Langman)

Finally, I warmly congratulate Dr. Amy Wilson on being elected as the next Chair of the SONp Executive Committee. Amy will succeed me in November 2022, for a 2-year term, so she will chair our executive committee meeting in Spring 2023. Amy has been an active SONp Executive Committee member these past few years, and I am excited to see her in a leadership role for our section. We all look forward to great things from her.

Vikas Dharnidharka, MD, MPH, FAAP

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**American Academy of Pediatrics Section on Nephrology 2022 Henry L Barnett Award Recipient**

The AAP Section on Nephrology (SONp) recognizes one individual yearly for lifetime achievement in the field of pediatric nephrology. The SONp Executive Committee is pleased to present the 2022 Henry L. Barnett Award to **Dr Eileen Brewer**.

Dr. Eileen Brewer is an internationally known expert in pediatric kidney related disease, dialysis, transplantation and hypertension. She currently is a Professor and former Head of the Renal Section of the Department of Pediatrics at Baylor College of Medicine in Houston, Texas. Dr. Brewer is known for her pioneering work on adapting peritoneal and hemodialysis for children. She has been the medical director of pediatric dialysis units at two institutions and is currently the medical director of kidney transplant at Texas Children's Hospital in Houston, which is now one of the largest pediatric kidney transplant programs in the nation. Dr. Brewer's clinical research career has focused on children with rare renal tubular disorders, kidney related bone and mineral disorders and end stage kidney disease, including participation in many multicenter clinical trials.

From the left, SONp Chair, Dr Vikas Dharnidharka, 2022 Henry Barnett Award recipient, Dr Eileen Brewer and presenter, Dr Sarah Swartz.
Dr. Brewer is a respected teacher of nephrology and has had a major role in teaching fellows, residents, medical students, undergraduates and young faculty. Dr. Brewer was the fellowship director of Baylor's pediatric nephrology program for 18 years and a member of the American Board of Pediatrics, General Examinations and Maintenance of Certification Committees for 25 years. In addition, since 2012, she has mentored pre-medical students in the Big Owl/Little Owl program at Rice University, helping to guide the career decisions of many young adults. Her nominator, Dr. Swartz, highlighted Dr. Brewer's mentorship skills when she accompanied her as a medical student to a camp for children receiving dialysis and noted, “…I, like many other learners she taught, began to understand that providing medical care encompassed more than just disease management.”

Dr. Brewer has been recognized nationally for her advocacy for children with kidney disease and her contributions to service in the field of nephrology. She has served and continues to be active on many committees of national medical organizations focused on public policy and healthcare payment. She is the current Chair of the AAP Committee on Coding and Nomenclature and the AAP alternate representative to the AMA Relative Value Update Committee. Additionally, she was a co-Chair of a seminal NIH Task Force on chronic kidney disease in children in 2002 and has served on multiple CMS technical expert panels for pediatric quality and payment for end stage kidney disease. Dr. Brewer has been a tireless and effective advocate for children with kidney disease at CMS and with public officials on Capitol Hill, working with both the American Society of Pediatric Nephrology (ASPN) and the Renal Physicians Association. She is past president of the ASPN and long-time member and past chair of the ASPN Public Policy Committee. In the last 15 years, she was active with OPTN/UNOS as committee member, committee chair and board member, ensuring that pediatrics is represented and a priority in the national transplant system.

The award presentation occurred at the Pediatric Academic Societies (PAS) annual meeting in Denver, Colorado in conjunction with the ASPN Award Luncheon, held on Saturday, April 23, 2022. Please join us in congratulating Dr. Brewer on this achievement!

A Word from the Editor . . .

Teri Jo Mauch, MD, PhD, FAAP

It's springtime in the northern hemisphere - a time when the world emerges from the dormancy of winter and everything seems fresh and new. This year we also share the particular hope of emergence from the pandemic, something made possible by new vaccines using new technologies. This issue of the Newsletter highlights new developments in pediatric nephrology, some driven or accelerated by the pandemic, and others by scientific advances made possible by ongoing collaboration between dedicated scientists and clinicians.

Advances in technology and travel have opened access to new experiences and cultures different from our own. In the training fellow liaison column, Dr. Carol Shen shares her thoughts on cultural humility in a beautifully written and thought-provoking piece. We also congratulate Dr. Shen on another new development, as she welcomed baby Samuel this year. In keeping with this theme, in this newsletter's new member spotlight, we welcome international member Dr. Isaac Solis-Bretado, who practices in Mexico.

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Most patient care has moved from paper charts to the electronic medical record, and patients are becoming more active partners in their own care. The AAP.org website includes three new links to help providers understand and navigate the Final Rule governing how electronic health information is shared with patients and their parents. Links to these pages are provided below (21st Century Cures Act).

In 2022, we have expanded our capacity to provide dialysis for babies, including the exciting Carpediem CRRT machine for neonates and infants. These developments rely on ingenuity and creativity, as Dr. Tej Mattoo reminds us in his Perspectives contribution, describing how he overcame supply and equipment limitations to provide life-saving peritoneal dialysis for a newborn girl with AKI in Saudi Arabia in 1985.

The definition of optimal fluid management continues to evolve, and sometimes circles back to tried and true solutions. New contributor Dr. Katie Manning and her mentor Dr. Veronica Taylor discuss advances in fluid and electrolyte management in a child with diarrhea and hypovolemia. Please visit the SONp collaboration site (AAP login and password required) to read the entire article, which reminds us how to calculate free water deficits and discusses fluid choices that help to prevent iatrogenic hyperchloremic acidosis. And while you are there, review the other cases and let us know what you think by answering a few questions here.

We are grateful to regular contributors, who continually find something fresh and new to share! Dr. Gurinder Kumar summarizes biologics currently used in pediatric nephrology, including both FDA approved uses and off-label uses. Please see his table for a nice overview.

In the Business of Nephrology Coding Corner, Drs. Mark Joseph and Eileen Brewer summarize critical care coding and billing by pediatric nephrologists, another recent development for our field that recognizes and rewards the level of care we provide. This is a step in the right direction, and we hope that increased compensation for nephrologists may help to attract more pediatricians to the field. As one who has personally sought her advice, I want to congratulate Dr. Brewer on her receipt of this year’s Henry Barnett award, which recognizes her life-long contributions to the field of pediatric nephrology.

Technologic advances have provided not only new treatments, but also new ways of teaching. We are grateful to our Hematology/Oncology colleagues for sharing tips to incorporating technological innovations into medical education, in an article authored by Dr. Eleny Romanos-Sirakis.

As you probably know, formula recalls are affecting our patients. To fill this urgent need, Abbott is providing limited quantities of Similac PM60/40 for infants with chronic kidney disease. Please see the related article in AAP News.

I also want to recognize our section manager, Suzanne Kirkwood, whose tireless efforts are critical not only to publication of this newsletter, but to the function of the SONp. Finally, we thank Dr. Vikas Dharnidharka for his years of service and leadership of our section, and welcome Dr. Amy Wilson to the role starting in November. It’s going to be a great year!

Please continue to encourage your colleagues to join us and submit ideas for future newsletters to me at teri.mauch@unmc.edu.
I would like to thank the SONp for the opportunity to step into the role of Fellow Liaison for the next two years, and I look forward to contributing to the section's efforts and collaborating with other sections across the AAP. As I was thinking about what topic to write about in this newsletter, I reflected on a few of my recent patient interactions in which I wished I had better insight into what led them to make the health decisions they did, knowing that their cultural backgrounds and perspectives likely played a role. I felt it was timely to learn more about how we can increase our cultural awareness and humility in the field of nephrology, so I would like to briefly share what I learned below.

With the rapid expansion of migration and diversification of the US population in the last few decades, health care professionals are called to treat patients from increasingly varied and rich cultural backgrounds, which invariably play an integral role in patient decisions and the physician-patient relationship. In medical education, the focus has gradually shifted from cultural competence, which implies a finite goal that could be achieved with sufficient knowledge and practice, to cultural humility, which is the idea that maintaining openness and awareness of culture in all interpersonal relationships is more important.

In the field of nephrology, in which decisions could significantly alter the course of an individual's life, it is especially important to maintain openness and humility to how the patient may form attitudes and decisions about the treatments we recommend.

Culture plays a multifaceted role in an individual's identity and beliefs. To ascribe the entirety of one's personal belief system to their cultural background would be too simplistic, and culture itself is not a monolithic entity uniformly experienced by its members. However, I found it illuminating to read about thematic differences in how patients from different cultural backgrounds might view the kidneys and kidney diseases. To share a few limited examples: in China, the kidneys are viewed as most essential organs that play a key role in a person's vitality, whereas in Mexico there tends to be a general lack of cultural beliefs and familiarity surrounding the kidneys. Research in Egypt has shown that patients frequently associate their kidney disease with toxins in the environment and contaminated food supply, and poor regulation from the government.

Culture also affects perceptions of treatment modalities and can explain some of our patients' fears and hesitancy. Hemodialysis patients in Turkey described feeling like their bodies were not their own, with human parts being slowly replaced by something non-human. To take an example from my own experience, a Chinese patient believed that hemodialysis would weaken her body because it extracted blood outside her body. In terms of transplantation, it has been reported that transplantation rates are lower in African American patients. Apart from the glaring role of systemic racism in causing healthcare disparities (which is a crucial factor but outside the scope of this review), one cited patient-centric reason is the refusal to place a family member at risk, especially if the patient believes dialysis is going well.

The benefits of practicing cultural humility are manifold, both in terms of improving outcomes and also enhancing the physician-patient relationship. Culture influences how an individual perceives their illness, and studies have shown that illness perception affects patients' adherence to treatment, coping strategies and health behavior, which ultimately affect outcomes. It is also important to understand the historical context contributing to certain cultural perceptions that might lead to barriers to a successful physician-patient relationship, for example, the horrendously unethical Tuskegee trials in black American men in the 1930s. Understanding where patients obtain information could also lead to more effective counseling, as patients often rely on trusted nonmedical sources to make decisions, oftentimes family and community members. As a personal example, we had a Yemeni patient whose parents refused to initiate peritoneal dialysis because a friend whose father had died on dialysis in Yemen was strongly discouraging them from pursuing this treatment. With the patient's consent we spoke with the friend and came to understand that in their country, they believed that patients were placed on dialysis as palliative treatment before eventual death. Their attitude changed when we explained the role of dialysis as a bridge to transplantation in this patient's case, not death.

This brief overview illustrated a few examples of the effect of culture on patient perceptions, decisions and the physician-patient relationship, and hopefully underscored the need for health care professionals to practice cultural humility in the field of nephrology.
nephrology. So how can this seemingly daunting task be put to practice? I found the seven questions by Kleinman and Benson\(^8\) to be helpful in framing conversations with patients: “1) What do you call this problem? 2) What do you believe is the cause of this problem? 3) What course do you expect it to take? How serious is it? 4) What do you think this problem does inside your body? 5) How does it affect your body and your mind? 6) What do you fear most about this condition? 7) What do you fear most about the treatment?” Ultimately there is no singular correct approach, but hopefully with openness, curiosity and willingness to engage with our patients’ cultural beliefs and backgrounds, we may be able to better understand and care for them.

References:
3. Hamdy S. When the State and your kidneys fail. *Am Ethnol,* 35 (2008), pp. 553-569
5. Gordon EJ. They don't have to suffer for me': Why dialysis patients refuse offers of living donor kidneys. *Med Anth Quarterly,* 15 (2001), pp. 245-267

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**Critical Care Coding: Should a Pediatric Nephrologist Bill for Critical Care Services?**

*Eileen Brewer, MD, FAAP, Renal Section, Department of Pediatrics, Baylor College of Medicine and Texas Children's Hospital, Houston, TX; Chairperson, AAP Committee on Coding and Nomenclature; AAP Alternate, AMA Relative Value Update Committee
And
Mark Joseph, MD, FAAP, Phoenix Children's Hospital and Member, AAP Committee on Coding and Nomenclature*

Pediatric nephrologists often provide care for critically ill children. To know when and how it may be reasonable for pediatric nephrologists to use critical care codes is important for successful billing.

According to Current Procedural Terminology (CPT), “A critical illness or injury acutely impairs one or more vital organ systems such that there is a high probability of imminent or life-threatening deterioration in the patient's condition. Critical care involves high complexity decision making to assess, manipulate, and support vital system function(s) to treat single or multiple vital organ system failure and/or to prevent further life-threatening deterioration of the patient's condition.”

**Daily Critical Care codes for children from 1 day of age to 5 years of age**

Only one physician may report these codes once per day. As a pediatric nephrologist, if you are not providing all the critical care, particularly in the ICU, you should not use these codes. The codes are usually reported by neonotologists or intensivists for daily care. The codes include many procedures related to critical care that are bundled into the daily codes and not separately billable.

*Continued on Page 7*
Renal replacement therapies (hemodialysis, peritoneal dialysis, CRRT) and placement of dialysis catheters are not included in critical care codes, so should be billed separately by the consulting pediatric nephrologist. Evaluation and Management (E/M) services are bundled into the inpatient dialysis codes, so no separate E/M code should be billed by a pediatric nephrologist on inpatient dialysis billing days.

**Time based Critical Care Codes for patients more than 5 years old**

Critical care CPT codes 99291 and 99292 are the most likely codes that a pediatric nephrologist might utilize for critical care billing. CPT code 99291 is used for the first 30-74 minutes, and CPT code 99292 is utilized for 30 minute time intervals starting after 74 minutes. The physician does not need to be at the bedside for all the critical care time but must be immediately available to render care for the patient during the critical care time that is being billed and only a single patient may be cared for during this block of time. When considering billing for a 24-hour period, the clock starts over at midnight. However, if the Critical Care is continuous and started before and after midnight, then the billing can occur for the day that the encounter started. Only one physician can bill across a continuous block of time. Other providers, such as intensivists or other physician groups, may provide critical care for the same patients, but must be during a separate time frame.

These codes are time based and best utilized by documenting the time by the clock that a nephrologist spends managing the patient through the critical illness. For example, documenting 1045-1135 and 1230-1250 to demonstrate that the provider spent a total of 70 minutes is recommended to show that the nephrologist managed the critically ill patient specifically during this time frame. The total time and clock times involved should be documented for the day. It is important to remember that teaching residents or fellows is excluded from management time. The time does not need to be continuous but must total a minimum of 30 minutes of critical care time to bill critical care codes for the day.

Documentation should include evidence of organ system failure and why there is a high probability of imminent or life-threatening deterioration. Documentation should consider the impact of the failing organ system or the summary of events that led to the life-threatening situation, including discussions with family, staff, and other physicians.

Kidney replacement therapies may only be billed on the first day of critical care. They must be documented in a separate note. A -25 modifier should be used with the 99291 CPT code. Modifier -25 is used to report an E/M service on a day when another separately identifiable E/M service was provided to the patient by the same physician or other qualified health care professional.
The following table shows the wRVUs associated with CPT codes 99291 and 99292 with comparison to usual inpatient E/M codes:

<table>
<thead>
<tr>
<th>CPT code</th>
<th>Description by CMS 2022</th>
<th>2022 wRVU</th>
</tr>
</thead>
<tbody>
<tr>
<td>99291</td>
<td>Critical Care (&gt;5 yo), 30-74 min</td>
<td>4.50</td>
</tr>
<tr>
<td>99292</td>
<td>Critical Care (&gt;5 yo), each subsequent 30 min</td>
<td>2.25</td>
</tr>
<tr>
<td>99232</td>
<td>Subsequent hospital care/day 25 min</td>
<td>1.39</td>
</tr>
<tr>
<td>99233</td>
<td>Subsequent hospital care/day 35 min</td>
<td>2.00</td>
</tr>
</tbody>
</table>

Examples of times spent by pediatric nephrologist providing critical care for > 5yo and appropriate CPT codes are described in the following table:

<table>
<thead>
<tr>
<th>Total Time Duration of Critical Care</th>
<th>Appropriate CPT code(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30 minutes</td>
<td>99232, 99233, or other appropriate E/M code</td>
</tr>
<tr>
<td>30-74 minutes</td>
<td>99291</td>
</tr>
<tr>
<td>75-104 minutes</td>
<td>99291 x 1, 99292 x 1</td>
</tr>
<tr>
<td>105-134 minutes</td>
<td>99291 x 1, 99292 x 2</td>
</tr>
<tr>
<td>135-164 minutes</td>
<td>99291 x 1, 99292 x 3</td>
</tr>
<tr>
<td>165 minutes or longer</td>
<td>99291 x 1, plus 99292 x 4 or more</td>
</tr>
</tbody>
</table>

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In Memory of Dr George Richard

Vikas Dharnidharka, MD, MPH, FAAP
Vice-Chair for Clinical Investigation, Department of Pediatrics
Professor and Chief, Division of Pediatric Nephrology, Hypertension & Pheresis
Washington University School of Medicine & St. Louis Children’s Hospital

It is with sadness that we inform you of the passing of pediatric nephrologist, Dr. George Richard, on Easter Sunday April 17, 2021, at age 87. George battled a chronic progressive illness with strength and dignity, features that epitomized his entire life.

George Anthony Richard was born in 1934 as the 10th of 10 children to Lebanese immigrants in West Virginia. He obtained his bachelor’s degree from the University of West Virginia, then went to the University of Pittsburgh for his medical education, pediatric residency and chief residency. When it comes to career advancement, it didn't take him long to shoot straight to the top. His meteoric rise began when he came to the University of Florida (UF) in 1967 as a special trainee in children’s kidney disease. Six months later, he started a new division of pediatric nephrology as its first chief. He ended up staying on at UF for the next few decades.

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Through his long career, George had multiple accomplishments in clinical care, research, education and administrative service. Partnering with newly hired pediatric urologist R. Dixon Walker, George and Dixon together provided superior care for the next 35 years to generations of children with nephro-urologic abnormalities. George co-authored more than 100 peer-reviewed publications, with a focus on urinary tract infections in children and young adults. He partnered with microbiologist Mary Brown to secure an NIH R01 grant to study urinary tract infections in females at college. George also conducted multiple urinary tract infection studies with industry partners, accumulating reserves of greater than $1 million for his division, a remarkable achievement.

George was very proud of his instrumental role in the early 1970s in lobbying the State of Florida legislature to provide funding for a statewide children's kidney program. Those efforts eventually led to the funding and opening of pediatric dialysis centers throughout the state. In his own words “the program brought life to children with kidney disease who previously succumbed to their illness”.

In 1972, George started a pediatric nephrology fellowship program. His first fellow, Dr. Robert Fennell (on the right in the above photo), was his divisional associate for the next 30 years and performed several seminal studies of neurodevelopmental abnormalities in chronic kidney disease. Other major graduates of the fellowship program include Drs. Denis Geary, Norman Pryor, Eduardo Garin, John Orak and Susan Massengill. George served as the Pediatric Nephrology division chief at the University of Florida for 35 consecutive years. He also served the Department of Pediatrics as the Acting or Interim Chair of Pediatrics several times in the early to mid-1980s. He held several important committee leadership roles in the American Academy of Pediatrics, including as the Chair of the Section of Nephrology from 1983-1986. Despite these accomplishments, George was unassuming and did not even want a formal ceremony at his retirement.

George retired to part-time status in 2002 and then to complete retirement in 2007. He leaves behind his wife Twana, 2 daughters and 2 sons, plus several grandchildren. Both sons have become physicians themselves. George contributed immensely to pediatric nephrology in the Southeast USA region, and to Pediatrics at the University of Florida. He will be missed.

21st Century Cures Act: AAP Resources Available

On April 5, 2021, portions of the 21st Century Cures Act Interoperability Final Rule governing how electronic health information is shared with patients went into effect. Some aspects of the Final Rule have raised questions for pediatricians and pediatric medical and surgical specialists. Members of the Council on Clinical Information Technology and the Child Health Informatics Center Project Advisory Committee developed the resources below to support pediatric providers in effectively implementing the Final Rule.

There are 3 new pages on aap.org to help pediatric providers understand the Cures Act Final Rule:

- What Pediatricians Need to Know About the 21st Century Cures Act Interoperability Final Rule
- Guiding Principles for Information Sharing and Blocking in Pediatric Care
- 21st Century Cures Quick Talks
- Pediatric Information Blocking Use Cases

Members can email CHIC@aap.org for questions and support in implementing the Cures Rule
Perspective: Necessity is the Mother of Invention

Tej K. Mattoo, MD, DCH, FRCP, FAAP
Professor of Pediatrics (Nephrology) and Urology, Wayne State University School of Medicine
Detroit, Michigan

After spending the most formative years of my life in Kashmir, India, I had the good fortune of working in the United Kingdom and Saudi Arabia before settling down in the United States. Each place provided me with great opportunities I remember with gratitude. The main reason I moved from London to Saudi Arabia with my family in 1985 was my exhilaration over starting the first pediatric nephrology program in the Kingdom. This possibility came up through the Saudi Health Attaché in London, who acted as a liaison for treatment of Saudi children with renal problems referred to Guy's Hospital in London, where I was training to be a pediatric nephrologist.

On reaching Riyadh, I woke up to the fact that there was nothing in place to start the program and that my role was going to be even bigger than what I had anticipated. However, the enthusiasm and support of the Ministry of Health and other local administrators was exceptional, and the process started with their decision to build the program as a new department at the children's hospital in Riyadh, the largest in the country, with about 400 beds. I was asked to finalize the space requirement for inpatient beds and dialysis unit, help select machines and supplies for hemodialysis and peritoneal dialysis, and select nurses for inpatient/outpatient care and the dialysis unit. I was lucky enough to find many enthusiastic nurses in the adult hemodialysis program in the sister hospital whom I could train quickly on the intricacies of dialysis in children. About a year later and with the help of a few young, dedicated pediatricians interested in nephrology (including one with some experience in adult nephrology) we had a fully functioning ~24-bed inpatient floor exclusively for nephrology, and a dialysis unit with hemo-and peritoneal dialysis facilities.

While in Riyadh, my wife and I witnessed the incredible economic transformation of the Kingdom. Most of Riyadh had been rebuilt with a modern infrastructure as well as new housing and shopping malls. A few remaining remnants of old Riyadh that we could visit revealed what the place must have been like a decade or so earlier. Tremendous improvements in the health care sector attracted doctors and nurses from all over the world and the upcoming generation of Saudi doctors were keen participants in rapidly emerging world-class health care. The money was good, and shopping was fun; nothing had prepared me and my wife for the breathtaking sight of shops dripping with gold at the souks.

With all the excitement about starting the new program there were some challenges too, especially in the beginning. One such challenge came up long before the nephrology unit started coming together. A female baby was born at the Prince Salman Hospital who suffered from birth asphyxia due to face presentation. She was born full-term, weighed 2.6 kg, and had significant bruises on her face. Active resuscitation was needed at birth and her subsequent clinical course was complicated by seizures, sepsis, disseminated intravascular coagulation, severe anemia, pulmonary edema and renal failure. She became anuric after birth and the administration of aminoglycosides for sepsis wasn't helpful for her kidneys either. She received supportive care, including mechanical ventilation, intravenous (IV) antibiotics, fluid restriction, and packed red blood cell transfusions for very low hemoglobin, which could not be avoided.

Over the next couple of days, she showed overall clinical improvement with no apparent motor deficit, and everything seemed to be working well except for her kidneys. She did not have any more seizures and sepsis responded to antibiotic administration. However, she remained anuric and repeated fluid challenges with and without a diuretic were not helpful. As a result, she became edematous with bilateral pitting edema of lower limbs and severe ascites. She needed increasing ventilatory support because of worsening pulmonary edema. She also developed hyperkalemia and it became obvious that she wouldn't survive without dialysis. Unfortunately, dialysis seemed impossible because we did not have the necessary supplies and the hospital director's efforts to get the supplies or transfer the baby to another facility were expectedly futile. My thoughts repeatedly wandered back to Guy's Hospital, where peritoneal dialysis of infants seemed so routine, particularly in those with cardiac surgery, which was a newly emerging medical breakthrough for life-threatening congenital heart disease.

Standing by the incubator and watching this baby, feeling helpless, I had a Eureka moment when my eyes caught the IV fluid bottle hanging over the incubator. In those days, IV fluid came in glass bottles with a plastic tube inside to allow air

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entry for uninterrupted flow of the fluid. This plastic tube became my peritoneal dialysis (PD) catheter. One end of the tube was beveled with a blade to create a sharp pointed edge. Holes were made for a couple of centimeters with the help of a safety pin, turned red-hot by a cigarette lighter, forgetting that it could be a fire hazard in the NICU. With this “dialysis catheter” ready, the next thing to do was to prepare the dialysis fluid, which was easy because we had everything that we needed. We mixed normal saline (0.9%) 649 mL, dextrose (5%) 300 mL, sodium bicarbonate (8.4%) 30 mL, and distilled water 21 mL, which gave a PD fluid concentration of Na+ 130 mEq/L, Cl- 100 mEq/L, HCO3 30mEq/L, and Dextrose 1.5%. Also added were MgSO4 1.5mEq/L and heparin 300 units/L. Potassium 4 mEq/L was added later, after the resolution of hyperkalemia.

Under aseptic precautions and after local anesthesia, a small incision was made in the midline about 1.5 cm below the umbilicus. The catheter insertion was easy because of severe ascites, as many pediatric nephrologists who have inserted hard PD catheters would know. IV tubing was used to connect catheter with PD fluid and manual PD was started as per the established protocol (Figures 1 and 2). The dialysis went very well. Urine output started on day three after birth, which was followed by a rapid improvement in blood chemistry and baby’s general condition. We dialyzed her for six days with the same catheter and there were no complications. By the time dialysis finished, she had shown a remarkable overall improvement (Figure 3) and was feeding well on her own. The baby stayed in the NICU for another week or so before she was discharged home with resolving bruises and a big smile on her face (Figure 4).

This survival of this baby seemed like a miracle, and I was wonderstruck by the extraordinary effort by the nursing staff. None of them had seen anyone on dialysis, let alone done one, and that too, in a newborn baby. A year later, once the program was established, dialysis in children, including babies, rapidly became a routine process. However, the excitement for me and my team only grew as we got busier running at full service and taking care of renal patients referred from all over country ... and life moved on.

Note: Photos of the patient during and after treatment could not be published because of the unavailability of needed permissions.

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Case Q&A: Fluid and Electrolyte Management in a Child with Hypovolemia

Katie Manning, MD Pediatric PGY-II, Department of Pediatrics, University of Nebraska Medical Center, Omaha, NE

Veronica Taylor, MD, MS FAAP, Assistant Professor, Division of Pediatric Nephrology Department of Pediatrics, University of Nebraska Medical Center, Omaha, NE

A 5-month-old previously healthy female presented with one week of fever, diarrhea, and poor oral intake. She is breastfeeding less frequently and has had only one wet diaper in the past 24 hours. In the Emergency Department she was noted to have dry mucous membranes, sunken eyes, capillary refill of 4-5 seconds, abnormal breathing, and lethargy. Her heart rate was 160 beats/min and blood pressure was 74/46. Her weight was 5.4 kg, and her family recalls that her weight last week at her pediatrician visit was 6.8 kg last week. Initial blood gas showed a severe metabolic acidosis with pH 6.92 and she was placed on RAM cannula. Serum chemistries showed sodium 171 mmol/L, potassium 5.6 mmol/L, chloride 132 mmol/L, bicarbonate 7 mmol/L, blood urea nitrogen 119 mg/dL, creatinine 2.24 mg/dL. Blood and urine cultures were obtained and showed no growth. Infectious testing revealed Rotavirus and Coronavirus OC43.

• What are the steps to determine this patient’s fluid deficit?
• What are the most common causes of hypernatremia in children?
• What are the symptoms of hypernatremia?

For a discussion regarding these questions and more, login to the SONp Collaboration site here.

More details about what is in the SONp collaboration site can be found later in this newsletter.

Tips to Incorporating Technological Innovations into Medical Education*

Eleny Romanos-Sirakis, MD, MS, FAAP, Assistant Professor of Pediatrics, Staten Island University Hospital Northwell Health, Zucker School of Medicine at Hofstra Northwell

Our current modern learners have grown up surrounded by technology; they are not only comfortable with technology, but they also expect it to be incorporated into teaching and education. With the COVID-19 pandemic, medical educators were thrust into using technology even more with the sudden shift to remote learning. The TPACK model (Technological, Pedagogical, and Content Knowledge) was described in 2006 by Mishra and Koehler, and highlights the importance of integrating and balancing all 3 of these core components in teaching. Technology should be integrated into the content and pedagogy of the learning environment. The TPACK model can be visualized as a Venn diagram with each of these 3 core components of teaching; the ideal learning environment exists in the center, where all 3 circles overlap, and the components are balanced.

As everyone might suspect, technology and remote learning are both likely to remain an integral part of medical education. With some preparation, we can all continue to utilize technology to help maximize teaching and learning.

1) **Use technology to enhance the lecture:** Technology should be used to supplement and enhance your teaching and should not overtake the entire teaching session. Try out the technology in advance and make sure it works. Always have a back-up plan in case you run into technical difficulties.

2) **Maximize your presence when teaching remotely:** Being an effective teacher requires some degree of charisma and creating the foundation of a connection with learners. Engaging your audience is a necessary step for teaching and

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learning to occur. It can be even more difficult to engage an audience remotely. Optimizing how you appear to the audience can improve engagement. Consider the lighting in the room, the camera angle (best angle is at eye-level), and the background (best is uncluttered and neat). Take advantage of platform setting such as the HD setting and an option to “touch up my appearance.”

3) **Active learning methods through remote learning**: More information is retained when educators utilize active learning techniques. Even though you are teaching remotely, you can still utilize some of the same active learning techniques you would use in an in-person session. Breakout rooms can be used for small group discussions. Use the chat feature to allow for audience participation. The whiteboard allows you to actively illustrate a topic in real-time with the audience. The learners can participate by annotating the drawing. The annotation tools can also be used to survey the learners who can vote on lists you make and present. The whiteboard can also be used to centralize ideas brought forth by the group’s brainstorming efforts.

4) **Videos**: Incorporating videos into teaching can be very effective. Videos can efficiently share a concept or demonstration, simplify topics, and serve as attention-grabbers. Videos should be limited in duration, optimally a few minutes long. You can make your own videos or use pre-created material. You can incorporate videos into the teaching sessions or create a library of short videos or even full-length lectures for learners to review at their own pace. Utilizing a flipped classroom approach, videos can be assigned for review prior to the session, allowing for more in-depth discussion during the session. Some free program options include:
   - **Edpuzzle** ([www.edpuzzle.com](http://www.edpuzzle.com)) allows you to make your own videos or take pre-created videos (for example, from YouTube) and add questions for learners to answer throughout the video to make it a more interactive session and include formative assessments.
   - **Screencastify**: Screencastify is a Chrome browser extension that allows you to record, edit, and assign screencasts. While recording, you can use the tools to write, draw, erase, or spotlight a section on the screen. You can record yourself explaining difficult concepts, recapping the day’s main objectives, demonstrating an idea, or giving students audio or video feedback on their work. Students could use Screencastify to demonstrate what they’ve learned, how they solved a problem, or give presentations. The free version allows for 5-minute videos to be created.

5) **Games**: Gamification and game-based learning can make learning more fun and engaging, and can appeal to the competitive nature often intrinsic to many of our learners. Games can increase motivation to learn, facilitate formative assessments and lead to a higher retention of knowledge. There is a wide range of games and technological components that can be brought into learning sessions, from creating word searches on-line, to jeopardy sessions for use during the session, to using new platforms for quiz-type games. A few options to consider include:
   - **Kahoot** ([www.kahoot.com](http://www.kahoot.com)): Create quizzes with a fun game-show-like feel, with music and all! Learners log into kaoot.it and enter the code- they then enter the game. Learners can play all together at the time of the center, or play at their own pace at home.
   - **Jeopardy**: Everyone knows the gameshow, and it can be incorporated into any teaching session. Use a template and create a jeopardy board that can be presented easily through PowerPoint.

6) **Polls and Quizzes**: Use quizzes and polls to objectively assess learners’ understanding or to check in with the audience on their feelings, perceptions, or needs. You can use determine their goals, baseline experiences with a topic, or comfort with aspects of the material. Consider the following free options:
   - **Socrative** ([www.socrative.com](http://www.socrative.com)): Create a set of questions to assess learners’ knowledge with this quiz-based formative assessment tool. The “space race” option can also be used during a session to tap into learners’ competitive nature; learners work to quickly answer questions to help their team win the race.
   - **Mentimeter** ([www.mentimeter.com](http://www.mentimeter.com)): Create word clouds and questions to engage the learners and check-in with the learners on their understanding or comfort with a topic; the results of the poll or word cloud can be displayed in real-time on your screen and can be used to spark discussion and direct the teaching session. Answers can be multiple choice, open-ended, or rankings. Learners just need to enter the code you post that is created once you activate your set of questions for the presentation. FYI, it works best if you don't embed the questions into your PowerPoint slides.

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Biologics in Pediatric Nephrology at a Glance

Gurinder Kumar, MD, FASN, FAAP
Department of Pediatrics, Metrohealth Medical Center, Cleveland, Ohio

The regulatory definition provided in the Public Health Service Act (as amended in 2010) states that a biologic is “a virus, therapeutic serum, toxin, antitoxin, vaccine, blood, blood component or derivative, allergenic product, protein (except any chemically synthesized polypeptide), or analogous product, or arsphenamine or derivative of arsphenamine (or any other trivalent organic arsenic compound) applicable to the prevention, treatment, or cure of a disease or condition of human beings”. Biologics, according to the US FDA, include “a wide range of products such as vaccines, blood and blood components, allergens, somatic cells, gene therapy, tissues and recombinant therapeutic proteins”. Since 1972, the Food and Drug Administration (FDA) has been responsible for the regulation of biologics. Biologics are slowly being approved for pediatric use. Omalizumab (anti-IgE monoclonal antibody), Mepolizumab (anti-IL-5 monoclonal antibody) and Benralizumab (anti-IL-5 monoclonal antibody are FDA approved for pediatric asthma. Biologics such as Ixekizumab (for patients aged 6 years and older), Etanercept (4 years and older), Secukinumab (6 years and older), and Ustekinumab (6 years and older) are approved for pediatric psoriasis. Below is the summary of current biologics being used in various renal conditions in pediatric nephrology and their FDA approval status.

As background regarding the nomenclature:
- momab = 100% murine-derived monoclonal Ab
- ximab = chimeric murine-human monoclonal Ab
- zumab = mostly human-derived monoclonal Ab
- umab = fully human-derived monoclonal Ab
- tinib = tyrosine kinase inhibitor
- cept = fusion protein

*This article was reprinted from the Section on Hematology/Oncology fall 2022 newsletter with permission.
<table>
<thead>
<tr>
<th>Agent</th>
<th>Target</th>
<th>Mechanism of Action</th>
<th>FDA approval (Renal indications)</th>
<th>Off label use</th>
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<tbody>
<tr>
<td><strong>Rituximab</strong> (chimeric MAb)</td>
<td>CD20</td>
<td>Depletes normal as well as pathogenic B cells while sparing plasma cells and hematopoietic stem cells (as they do not express the CD20 surface antigen).</td>
<td>On 19 April 2011, the US Food and Drug Administration (FDA) approved rituximab in combination with corticosteroids for the treatment of two forms of anti-neutrophil cytoplasmic autoantibody (ANCA)-associated vasculitis (AAV): granulomatosis with polyangiitis (Wegener’s) and microscopic polyangiitis.</td>
<td>Systemic lupus erythematosus, nephrotic syndrome, including minimal change disease and membranous nephropathy, mixed essential cryoglobulinemia, focal segmental glomerulosclerosis, antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis and hemolytic uremic syndrome, specifically in cases which are resistant to conventional therapy. In transplantation. Also used in induction/desensitization in refractory-B-cell-associated or antibody-associated rejection.</td>
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<td><strong>Eculizumab</strong> (recombinant humanized MAb)</td>
<td>Complement Protein C5</td>
<td>Eculizumab binds to C5, thereby inhibiting the cleavage of C5 by the C5 convertase into C5a, a potent anaphylatoxin with prothrombotic and proinflammatory properties, and C5b, which then forms the terminal complement complex C5b-9 which also has prothrombotic and proinflammatory effects. Both C5a and C5b-9 cause the complement-mediated events that are characteristic of PNH and aHUS.</td>
<td>In September 2011, FDA approved its use for Atypical HUS. Also approved for treatment of PNH.</td>
<td>Treatment of severe STEC HUS with atypical presentation, including neurologic changes, solid organ transplant rejection.</td>
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<td><strong>Alemtuzumab (humanized MAb)</strong></td>
<td><strong>CD52</strong></td>
<td>CD52 is highly expressed on lymphocytes (T and B cells), and alemtuzumab depletes these cells from circulation in the periphery.</td>
<td>Alemtuzumab is used off label as an induction agent for the prevention of rejection and as a rejection treatment in kidney transplant recipients.</td>
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<tr>
<td><strong>Daclizumab (humanized MAb)</strong></td>
<td><strong>CD25</strong>, the alpha subunit of the IL-2 receptor of T-cells.</td>
<td>Daclizumab blocks IL-2 receptors containing the alpha subunit (CD25), which include the high-affinity receptors. The blockade of CD25 inhibits effector T cell activation, regulatory T cell expansion and survival, and activation-induced T-cell apoptosis.</td>
<td>In 1997, the US Food and Drug Administration (FDA) approved daclizumab for prophylaxis of acute organ rejection in renal transplant patients, but the product was discontinued in 2009. Prophylaxis of acute organ rejection in patients receiving renal transplants.</td>
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<td><strong>Bortezomib</strong></td>
<td><strong>Proteasome</strong></td>
<td>Selective inhibitor of the 26S proteasome, preventing the activation of NF-κB. It induces apoptosis of rapidly dividing metabolically active cells with extensive protein synthesis.</td>
<td>Multiple myeloma (MM) since 2003. Multiple myeloma and monoclonal gammopathy of renal significance. It is sometimes used in combination with anti-B cell MAbs to target plasma cells.</td>
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<td><strong>Belatacept</strong></td>
<td><strong>CD80 (B7-1), CD86 (B7-2)</strong> on APCs</td>
<td>It binds to CD80 and CD86 on antigen-presenting cells, thereby blocking CD28 mediated co-stimulation of T lymphocytes.</td>
<td>In June 2011, approved for prophylaxis of organ rejection in adult kidney transplant recipients.</td>
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<td><strong>Fresolimumab (GC1008)</strong></td>
<td><strong>Transforming growth factor beta (TGF-β)</strong>.</td>
<td>It binds to and inhibits all isoforms of the protein transforming growth factor beta (TGF-β).</td>
<td>FSGS</td>
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<td><strong>Belimumab</strong></td>
<td>IgG1γ monoclonal antibody directed against soluble B lymphocyte stimulator (BlyS).</td>
<td>It does not bind B cells directly, but by binding BlyS, it inhibits the survival of B cells, including auto reactive B cells, and reduces the differentiation of B cells into immunoglobulin-producing plasma cells.</td>
<td>FDA approved for the treatment of adult patients with active lupus nephritis (LN).</td>
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## Biologics in Pediatric Nephrology at a Glance

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<th><strong>Tofacitinib</strong></th>
<th>Janus kinase (JAK) 3 inhibitor. inhibits the JAK-STAT pathway (which transmits extracellular information into the cell nucleus, influencing DNA transcription) to decrease the inflammatory response.</th>
<th>Tofacitinib blocks cytokine signaling by the IL-2Rγ chain cytokine receptor and increases susceptibility of T cells, B cells and NK cells to apoptosis.</th>
<th>Renal transplant clinical trials in humans have demonstrated tofacitinib to be noninferior to cyclosporine in terms of rejection rates and graft survival. There was also a lower rate of new onset diabetes after transplant. However, there was a trend toward more infections, including cytomegalovirus and BK virus nephritis.</th>
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<tr>
<td><strong>Thymoglobulin</strong></td>
<td>APC: HLA-DR, CD58, CD80, CD86, CD40 and others. Several receptors present on plasma cells, monocytes, dendritic cells, leucocytes, and others.</td>
<td>Blocks several T- and B-cell receptors, causing cell dysfunction, lysis, and long-lasting depletion.</td>
<td>U.S. Food and Drug Administration (FDA) approved Thymoglobulin® [anti-thymocyte globulin (rabbit)], for use in conjunction with concomitant immunosuppression in the prophylaxis, or prevention, of acute rejection in patients receiving a kidney transplant.</td>
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<td><strong>Basiliximab</strong> (Chimeric MAb)</td>
<td>CD25</td>
<td>The drug competes with IL-2 to bind to the alpha chain subunit of the IL2 receptor on the surface of the activated T lymphocytes and prevents the receptor from signaling. This prevents T cells from replicating and from activating B cells.</td>
<td>In 1998 to prevent immediate transplant rejection in patients who are receiving kidney transplants, in combination with other agents.</td>
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**References:**

Welcome to our New SONp Members

If you know of others who might be interested in joining the Academy and the Section, please have them call Customer Services at: 866-843-2271 or go to the AAP website. Current Academy members may join the Section here.

New Member Spotlight: Dr Isaac Solis-Bretado

I am Dr Isaac Solis-Bretado. I did my medical school in Mexico at the Health Sciences Faculty of the Universidad Juárez del Estado de Durango in Gómez Palacio. Later, I did my pediatrics residency in Mexico City in La Raza National Medical Center. At the end of this period, I did my Pediatric Nephrology fellowship in Hospital de Pediatria Siglo XXI in Mexico City also. I worked in Mexico City for 7 years after I finished my studies in La Raza National Medical Center in the areas of pediatric emergencies, internal pediatric medicine and pediatric nephrology. I came back to my hometown at the northern part of Mexico in the area known as Comarca Lagunera in the state limits of Coahuila and Durango. I have been married to my wife Ericka since 2006 and I have two kids: Isaac 9 years old and Elijah 3 years old. At this time, I work at a General Hospital of the Instituto Mexicano del Seguro Social and my private practice. I am also a teacher of pediatrics at the Faculty of Health Sciences of the Universidad Juárez del Estado de Durango in Gómez Palacio.

I have wished for a long time to become an international member of the American Academy of Pediatrics, and finally this year I was able to. I was pleased to know there is a section in pediatric nephrology and so without hesitation I decided to be a part of it. I hope to learn a lot and exchange knowledge in general pediatrics and pediatric nephrology. And maybe in some time that I can contribute to the knowledge and experiences of other pediatricians.

Thank you for making me a part of this group.

Isaac Solis-Bretado
2022 AAP SOECP Research, Education, and Advocacy Awards

Do you know someone who has been an incredible mentor, especially to those underrepresented in medicine? Is an early career physician in your practice leading noteworthy quality improvement projects that are worth celebrating? Are you on a team that is championing community initiatives that address health disparities? We want to hear about these great things!

The AAP Section on Early Career Physicians (SOECP) excited to open the nomination forms for our awards and showcase the incredible work of the Academy’s early career physician members. Click on the links below for more information about each award and to submit a nomination.

- Advancement in Research Award
- Excellence in Education Award
- Leadership in Advocacy Award

Deadline: June 1, 2022

Details: Nominations and self-nominations are welcome. One individual person or entity is awarded each of the above awards each year. The award recipient will be honored during an SOECP Networking and Awards Reception in 2022. The award provides full general registration for the 2022 AAP National Conference and Exhibition and a $1,000 honorarium.

Eligibility: Nominees are not required to be members of the Section on Early Career Physicians; however, preference is given to Section members. View the application details at the links above for further eligibility requirements.

In alignment with the AAP Equity Agenda, the SOECP is committed to celebrating the work of members from groups underrepresented in medicine. We encourage nominations for diverse candidates in terms of race, ethnicity, religion, sex, sexual orientation, gender identity, disability, subspecialty, practice location, and/or national origin.

Click here to learn more about the awards and check out our 2021 honorees.

Questions? Contact Britt Nagy
Section on Nephrology Collaboration Site!

As a member of the AAP Section on Nephrology (SONp) you have access to the SONp Collaboration Web site. This member’s only benefit of the SONp grants each current Section member access to the following:

• Opportunities to get involved in the SONp leadership committees.
• Information on how to recognize a colleague through nomination for the Henry L. Barnett Award.
• Information for trainees regarding a career in pediatric nephrology.
• Section publications including the newsletter, AAP News articles, PN Choosing Wisely list and parent articles on PN topics.
• Quick links to professional resources for SONp members.
• Quick access to new and/or existing AAP policies of interest to SONp members.

And much more!

The access instructions are below. For questions regarding the SONp collaboration site please contact SONp Staff, Suzanne Kirkwood or the SONp Chair, Dr Vikas Dharnidharka.

Step 1: Visit http://www.aap.org and scroll down and click on Collaborate.
Step 2: Log in with your AAP login credentials.
Step 3: Access your Section collaboration site
Step 4: Begin navigating your site. Note- You can bookmark your site for future use

Welcome to the SONp Collaboration Site!

The Section on Nephrology (SONp) welcomes all Academy members who are actively involved in some aspects of the care of infants, children and adolescents with nephrology conditions and who are interested in contributing toward the mission of the Section. Activities focus on developing physician education, providing technical expertise in policy and publication development, and supporting advocacy initiatives. For additional information regarding SONp activities please refer to the Section Fact Sheet.
The Section on Nephrology
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We welcome your input and encourage you to submit ideas or information by email to Teri Mauch, MD, PhD, FAAP at teri.mauch@unmc.edu or Suzanne Kirkwood at skirkwood@aap.org for future issues of the newsletter.