

Sharing Innovations and Insights with Our Partners in Care

PEDIATRIC ROUNDS



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 **Children's**
Hospital of Wisconsin

Exceeding expectations

*Children's Hospital of Wisconsin is recognized
for excellence in surgical care*


BY THOMAS T. SATO, MD

I am very pleased to announce that the Children's Hospital of Wisconsin has been recognized as a verified American College of Surgeons (ACS) Level I Children's Surgical Services site. The ACS Children's Surgery Verification program has been in place nationally for several years, and we are the first hospital and health system to have been re-verified as a system that meets or exceeds the optimal standards for children's surgical care.

We go through the verification process not only to recognize our past efforts, but to learn from others and share best practices throughout the national community of children's hospitals. One example of this is reflected in our new management protocol for appendicitis. To limit children's exposure to ionizing radiation, we have reduced the numbers (by two-thirds) of CT scans for diagnosis of abdominal pain while increasing our rates of ultrasound. Our radiologists have an excellent record of success with this method.

Further on the appendicitis front, we have just closed enrollment for a multicenter clinical trial evaluating the use of antibiotics alone in children with acute appendicitis. This trial was funded by the Patient-Centered Outcomes Research Institute and performed at 11 children's hospitals, including ours. We anticipate results of this study sometime next year. With appendectomy being the most common urgent pediatric surgical procedure after trauma, we hope that having a medical option, which is generally less expensive than surgery, will be of significant value to the children and community we serve.

Best,



*Thomas T. Sato, MD, FACS, FAAP
CEO, Children's Specialty Group
Senior Associate Dean of Clinical Affairs,
Professor of Pediatric General and Thoracic
Surgery, Medical College of Wisconsin*



"We go through the verification process not only to recognize our past efforts, but to learn from others and share best practices."

Beyond the biopsy

Monitoring heart transplant rejection with a blood test

For patients who've had a heart transplant, the first postoperative year is filled with as many as a dozen biopsies to check for allograft rejection. The current gold standard for monitoring rejection is catheter-based endomyocardial biopsy (EMB), which is associated with some risk and considerable expense. In addition, a single tissue sample doesn't always identify rejection underway in other parts of the heart. Yet early detection of rejection is critical in improving outcomes.

A BETTER WAY

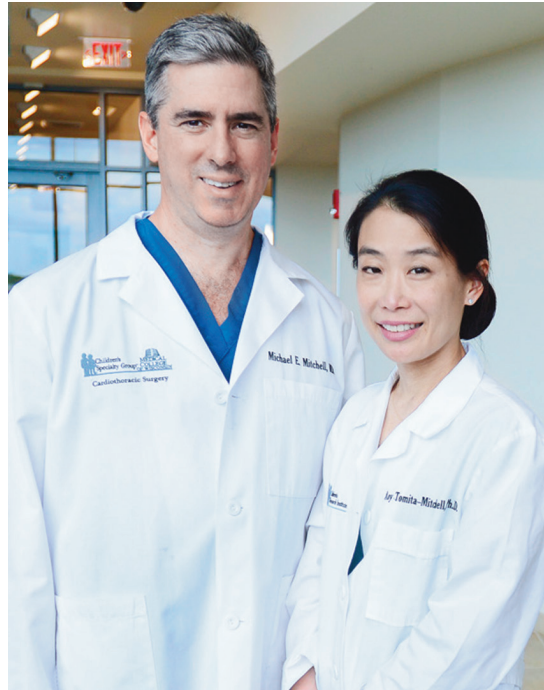
A new blood test developed by a team led by Michael E. Mitchell, MD, cardiothoracic surgeon at the Herma Heart Institute at Children's Hospital of Wisconsin, and Aoy Tomita-Mitchell, PhD, professor of pediatric cardiothoracic surgery and biomedical engineering at the Medical College of Wisconsin and investigator for the Children's Hospital of Wisconsin Research Institute, could dramatically improve the identification of early transplant rejection.

The test uses quantitative genotyping to measure donor-specific cell-free DNA (cf-DNA), fragments of normal cell turnover, cellular injury and inflammation. The fraction of cell-free DNA increases with injury to the donor organ, providing an early warning system of potential rejection.

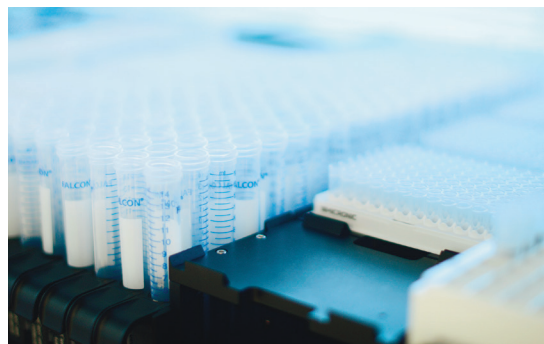
A PROMISING START

Dr. Mitchell was the principal investigator on a prospective, blinded pilot study that collected 53 blood and biopsy samples from 32 pediatric transplant patients who had undergone

Continued on page 4



Michael E. Mitchell, MD, and Aoy Tomita-Mitchell, PhD, are each inventors of the DNA-based test and each hold leadership positions at TAI Diagnostics, Inc., as the chief clinical advisor and the chief scientific officer, respectively.



A new blood test could dramatically improve the identification of early transplant rejection.

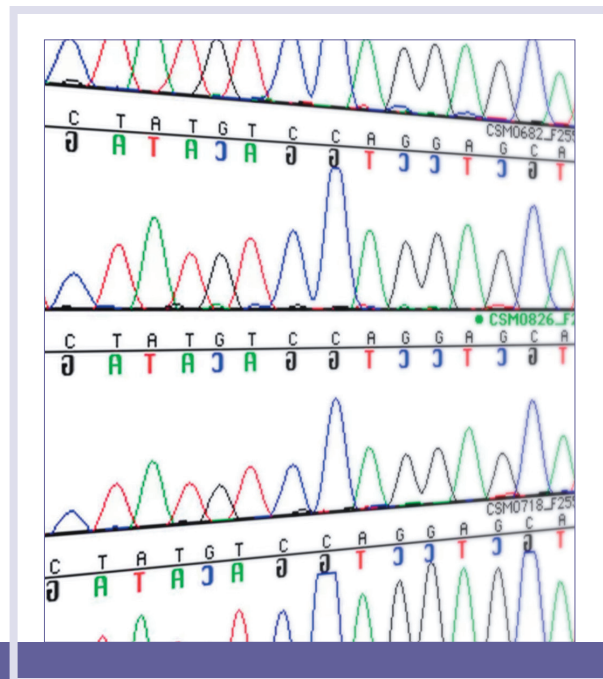
scheduled surveillance EMB, unscheduled diagnostic EMB because they were symptomatic, or those with proven rejection (samples collected before, during and one week after treatment). Find the study at ncbi.nlm.nih.gov/pmc/articles/PMC4988656.

All patients diagnosed with rejection demonstrated elevated levels of donor cf-DNA, with no rejection seen in those with levels less than 1%. In conclusion, results showed that quantifying cf-DNA “constitutes a sensitive, rapid and cost-effective non-invasive tool potentially suitable for rejection surveillance as an alternative to EMB.”

“We’re hoping to dramatically decrease the need for surveillance biopsy, which is invasive and potentially dangerous, while also increasing the frequency of monitoring so we can ensure the health of the donor heart,” Dr. Mitchell says. “The earlier you identify rejection, the more likely it is that you can stop it.”

Dr. Mitchell and his team are now investigating the test in a larger clinical trial involving 480 adult and pediatric heart transplant patients at five hospitals around the country. Find the trial at clinicaltrials.gov/ct2/show/NCT02109575.

“We’re hoping to dramatically decrease the need for surveillance biopsy, which is invasive and potentially dangerous.”



The blood test uses quantitative genotyping to measure donor-specific cell-free DNA.

In good company

Michael E. Mitchell, MD, is a cardiothoracic surgeon at Children’s Hospital of Wisconsin and a professor and section chief of pediatric cardiothoracic surgery at the Medical College of Wisconsin. Dr. Mitchell has a special interest in neonatal cardiovascular surgery, pediatric valve reconstruction, heart transplantation and tracheal reconstruction.

Aoy Tomita-Mitchell, PhD, is a medical researcher at Children’s Research Institute and a professor of pediatric cardiothoracic surgery and biomedical

engineering at the Medical College of Wisconsin. Dr. Tomita-Mitchell has a special interest in cell and developmental biology, heart disease and solid organ transplantation.

In addition to dedicating their careers to Children’s, the couple co-founded TAI Diagnostics, Inc., a biotechnology company that uses proprietary technology to test for donor rejection in a more accurate and less invasive manner, potentially improving the lives of transplant patients everywhere.

Children’s Hospital of Wisconsin has a financial interest in TAI Diagnostics, Inc.

The value of collaboration

When we work together to care for children, everyone benefits

Collaboration is one of Children's Hospital of Wisconsin's five core values. When effective collaboration is practiced, everyone benefits, according to Carey A. Ehlert, MD, a neonatologist at Children's, director of provider experience for Children's Specialty Group and associate professor of Neonatology at the Medical College of Wisconsin.

PRACTICING COLLABORATION

Collaboration occurs across all functions at Children's, from patient care and advocacy to hospital initiatives and policies. "By having a network of people around us who are experts in their individual fields, we can all come together to provide the best care for our patients and our families," Dr. Ehlert explains. "That includes working both internally with each other and externally with our referring providers."

Bringing that network together requires keeping the lines of communication open. We communicate with providers regularly at Children's weekly grand rounds, and we also reach a broad range of providers via continuing medical education events throughout the year.

To collaborate effectively, we must recognize that communication goes both ways. "We have to keep our minds open to all the different perspectives that others bring to the table," Dr. Ehlert adds. "We have to stay curious, and by doing so, we continue to learn from each other."

In this spirit, Children's also continues to seek feedback from referring providers, with two quick specialty-specific surveys and the bi-annual referring provider survey coming out later in 2019. "We are the only organization that is taking that specialty-specific approach to

referring provider feedback that we know of," Dr. Ehlert says.

PATIENTS BENEFIT THE MOST

Working with specialists within the hospital and reaching out to referring providers results in the best quality of care for patients. Referring providers have a deep understanding of their patients, and we work to make sure that knowledge and history is seamlessly transferred. "It gives our specialist the opportunity to understand the entire patient and what could be contributing to the specific problem for which they're coming to us," Dr. Ehlert says.

Learn more about the values that guide and inspire us at chw.org/about/mission-and-values.

ONGOING EFFORTS

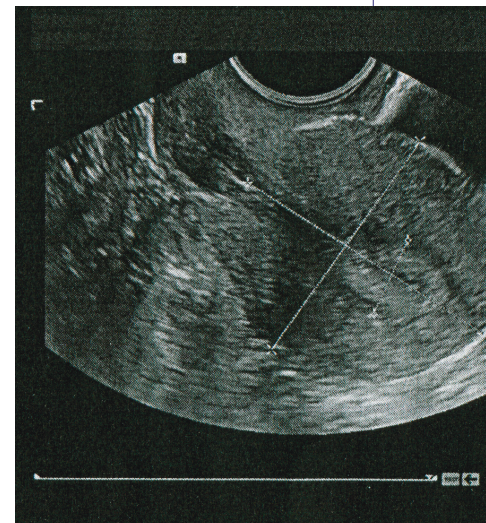
Children's has several upcoming opportunities for continuing education, including the Best Practices conference in March. (See page 13.) Look for communications about referring provider surveys to come by email later this year.



Cutting-edge heart care begins before birth

Over the past decades, Children's Hospital of Wisconsin has built one of the premier fetal heart programs in the country. Today, all fetal cardiac imaging is performed in the Fetal Concerns Center, located right across the hall from the Herma Heart Institute, and Children's renowned cardiology care spans from the fetal stage through adulthood.

Pediatric Rounds interviewed Michele Frommelt, MD, about the program's innovations in imaging, diagnosing and treating fetal heart conditions. [Read the article at chw.org/fetal-heart](http://chw.org/fetal-heart).



Comprehensive spine care

Focused, multidisciplinary program surrounds patients with care

A number of conditions can affect a child's spine

health and function as they develop from birth through adolescence. Fortunately, Children's Hospital of Wisconsin has a comprehensive, multidisciplinary program that can address all spine disorders, whether they are congenital, idiopathic, or the result of illness or injury.

A UNIQUE PROGRAM

Children's holistic spine program is unique in how we leverage expertise from multiple specialties. Patients and families referred to the spine program will experience a seamless coordination of care, removing the stress of finding specialists or bridging communications between physicians. Referring providers will also be kept apprised of treatment decisions.

Specialties including orthopedics, neurosurgery, physical medicine and rehabilitation, sports medicine, and physical and occupational therapy all contribute dedicated spine specialists to the program. Experienced triage nurses will assist referred families in finding the right level and type of care, while our nurse navigators will help guide patients and families through their care experience.

WHAT WE TREAT

Here are some of the common neck and spine conditions the specialists at Children's can address:

- Birth injuries of the neck, back or spine
- Congenital deformity or malformation
- Head and spine trauma
- Scoliosis
- Spina bifida
- Spondylolisthesis
- Spondylolysis
- Sprains or strains in the back, neck or spine

Learn more about the spine program and find a full list of conditions we treat at chw.org/spine. You may submit a referral to the spine program through the EHR, or call Children's directly at (414) 33-SPINE (77463).



Fracture care close to home

Same-day fracture care is available with Children's Hospital of Wisconsin's pediatric orthopedic specialists at four convenient locations with expansion to Kenosha once a week. Care is simplified and streamlined thanks to onsite services such as radiology, which allow for evaluation, imaging, treatment planning and immobilization all in one visit.

Because our orthopedists are pediatric specialists, they are able to evaluate every fracture for injury to or near the growth plate. Damage to the growth plates can cause long-term problems as the bone and joints develop, if not treated appropriately. Providers who focus on adults or in standard ERs may overlook these subtle but important differences in pediatric fracture care.

When families reach out with concern about a fracture, direct them to Children's Hospital in Milwaukee — with locations in Milwaukee, Delafield, Greenfield and Mequon — for the best in pediatric fracture care.

Learn more about our Orthopedics program and locations at chw.org/orthopedics.



INNOVATIONS

Case studies and research
for better care

To refer a patient, call (800) 266-0366.



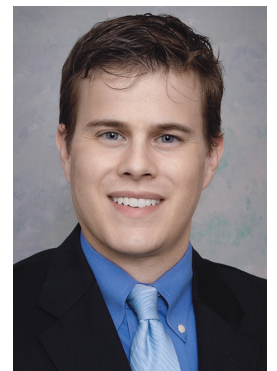
Kidney stones in children

With nephrolithiasis on the rise across all age groups, it's important to know how to manage kidney stones and prevent them from recurring

BY JONATHAN S. ELLISON, MD

Nephrolithiasis, also known as kidney stones, is the formation of crystalline material in the kidneys or the urinary tract. The incidence of nephrolithiasis has risen rapidly in the pediatric population, driven largely by an increased number of presentations in the adolescent population.² Many children will present symptomatically with flank pain, hematuria or urinary tract infections.⁶

Jonathan S. Ellison, MD, is a pediatric urologist at Children's Hospital of Wisconsin and an assistant professor of urology at the Medical College of Wisconsin.



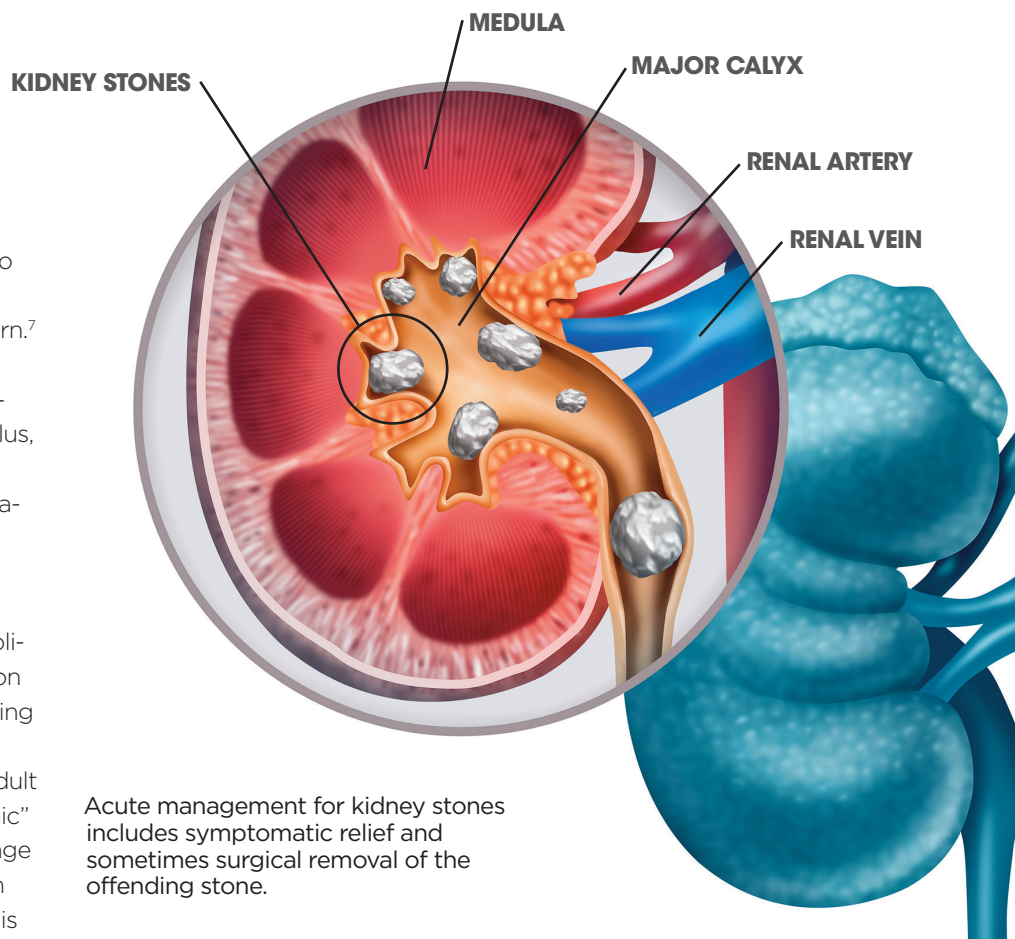
Because 1 in 10 adults will suffer from nephrolithiasis during their lifetime, the signs and symptoms of kidney stones are familiar to many families. Accordingly, the diagnosis of nephrolithiasis will generate significant concern.⁷ Acute management for kidney and ureteral calculi includes symptomatic relief and sometimes surgical removal of the offending calculus, while longer-term management focuses on evaluation for underlying causes and preventative strategies.

EPIDEMIOLOGY AND ETIOLOGY

Although not as common as in adults, nephrolithiasis has become increasingly more common in the pediatric population, with a near doubling of incidence in the past few decades.⁸

A spike in incidence of kidney stones in the adult population has been identified as an “epidemic” by some health professionals. Yet, across all age groups, the adolescent population has shown an even greater rise in new diagnoses over this timeframe.² A single unifying cause for this increased incidence has yet to be identified, likely due to the multifactorial nature of kidney stone risk. However, several risk factors for kidney stones are well identified in the pediatric population.

In general, the urine contains a multitude of filtered substrates suspended in supersaturated concentration. As concentrations of stone-forming substances, such as calcium or oxalate, surpass supersaturated concentrations due to either excess substrate within the urine or decreased overall fluid (i.e., low urine volume), these substances will fall out of solution and crystallize. Additionally, low concentrations of inhibitory substances (i.e., urinary citrate) or alterations in the urinary pH will contribute to further crystallization.⁹ Thus, the potential to form urinary calculi depends on several aspects of urine concentration, which are



Acute management for kidney stones includes symptomatic relief and sometimes surgical removal of the offending stone.

in turn influenced by diet, hydration status, genetics and underlying systemic disease.¹⁰ Many children, however, may not present with a single identifying risk factor and further assessment is warranted.

PRESENTATION AND EVALUATION

Renal colic and hematuria are common presenting symptoms of nephrolithiasis, although with the increasing use of general abdominal imaging, incidental presentations may also be seen. Less commonly, children may present with an acute febrile urinary tract infection, which in the setting of an obstructing calculus, is a medical emergency.⁶

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Kidney stone prevention

These tips can help patients reduce their risk for nephrolithiasis.

INCREASE FLUIDS

Improving fluid intake to dilute the urine is the most effective strategy at minimizing kidney stone risk irrespective of stone type or underlying cause.¹

WHAT TO DRINK:

Age	Amount per day
1-4 years	1.3 L (about 5 cups)
4-8 years	1.7 L (about 7 cups)
9-13 years	Boys: 2.4 L (about 10 cups)
9-13 years	Girls: 2.1 L (about 9 cups)
14-18 years	Boys: 3.3 L (about 14 cups)
14-18 years	Girls: 2.3 L (about 10 cups)

CHOOSE CITRATE

The addition of citrate, either naturally with lemons or limes, or as a supplement, can reduce kidney stone risk in some individuals.

Although not as potent as specific supplementation, drinking a glass of real lemonade per day, or squeezing 1/4 to 1/2 of a lemon into a glass of water daily, can improve urinary citrate.

In some individuals, targeted medical therapies such as potassium citrate (which supplements urinary stone inhibition) or thiazide-diuretics (which reduce urinary calcium excretion) may be beneficial.³

REDUCE SALT

Large randomized controlled studies in adults have shown that low-salt, moderate-calcium diets can reduce risk of future kidney stone events.^{4,5}

We recommend limiting salt intake to the recommended daily allowances:

Age	Amount per day
1-3 years	Less than 1.5 g
4-8 years	Less than 1.9 g
9-13 years	Less than 2.2 g
14-18 years	Less than 2.3 g
Older than 18	Less than 2.5 g



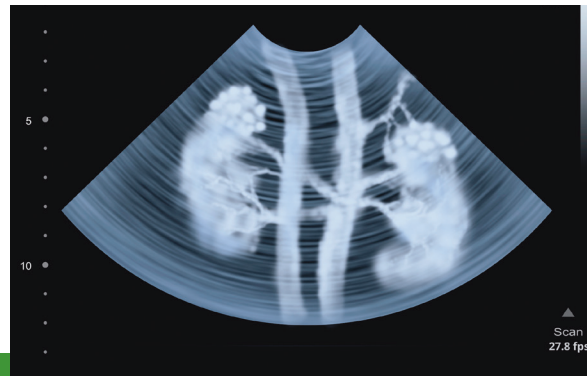
Most children presenting acutely with nephrolithiasis can be managed without hospital admission. Up to 70% of stones within the ureter will pass spontaneously, and adequate nausea and pain control are imperative to allow sufficient time for stone passage. Alpha-blockers, such as tamsulosin, have been shown in limited scenarios to improve stone passage and would be recommended for distal ureteral calculi larger than 5 mm.

Imaging choice is a major consideration for children with recurrent nephrolithiasis, especially given the high risk of ionizing radiation exposure for initial and follow-up imaging assessments as well as surgical intervention.¹¹⁻¹³ Ultrasound is the recommended first-line imaging strategy but, due to a lower sensitivity, may result in non-diagnostic findings where the clinical suspicion remains quite high. Dose-modification strategies can reduce ionizing radiation of computed tomography without compromising diagnostic quality and are preferable in situations where ultrasound was insufficient.¹⁴ Imaging not only can help with the diagnosis, but reveal size and location of the calculus, which will help determine further management options.

EVALUATION OF RISK

Up to 50% of children with an incident stone event will develop a recurrence within three years.³ Thus, identification of any modifiable risks and counseling regarding stone-prevention strategies are imperative following diagnosis.

Urinary stone risk may be assessed with urine studies evaluating for both stone promoters (i.e., calcium, oxalate) and stone inhibitors, serum studies to assess for calcium homeostasis and renal function, and select genetic evaluations. Although cumbersome to perform, 24-hour urine studies are most informative and should be offered to interested individuals.²⁰ Children who are not yet toilet-



Step-wise evaluation of suspected symptomatic nephrolithiasis

1

History and Physical: A personal history of nephrolithiasis, nausea or vomiting with renal colic, or flank pain on physical examination all increase the positive predictive likelihood of nephrolithiasis.¹⁵

2

Urinalysis: Microscopic hematuria > 2 red blood cells/high-powered field increases the likelihood of a kidney stone.¹⁵ Meanwhile, presence of infection in the setting of a kidney stone should prompt urgent urological consultation.

3

Imaging: Renal-bladder ultrasound is the first-line recommended imaging strategy for children with a suspected kidney stone, reserving CT for indeterminate cases where clinical suspicion remains high.¹⁶

4

Pain Management: Oral non-steroidal inflammatory agents are safe and effective in renal colic.^{17,18}

5

Follow-up: Urologic follow-up within 1-2 weeks of diagnosis is advisable for symptomatic (i.e., painful) kidney stones and all ureteral calculi.¹⁹

trained can submit spot urine studies for analysis as an alternative.⁶ Serum studies are lower-yield, but should be considered in higher-risk children, such as those with recurrent nephrolithiasis, a family history of stone disease, large or multiple kidney stones, or hypercalcuria on urinary evaluation.²¹ Genetic evaluations are typically limited to higher-risk populations, as well, where the yield of a monogenic cause of nephrolithiasis may be as high as 17%.²² However, because the implications of an abnormal genetic screen for nephrolithiasis are not well defined, it is advisable to undertake such endeavors with support from a genetics specialist.

FOLLOW-UP

Routine follow-up can serve several purposes. These visits serve as an opportunity to reassess adherence to fluid and dietary recommendations and discuss strategies to overcome barriers to achieving these goals. Imaging with renal ultrasound can aid in identification of new, asymptomatic kidney stones. Finally, children with rare monogenic kidney stone diseases, such as cystinuria or primary hyperoxaluria, assessments of renal function and ensuring lifelong kidney stone management strategies are paramount.

At Children's Hospital of Wisconsin, families are offered a comprehensive risk assessment and provided guidance for preventative measures. Higher-risk individuals are offered genetic evaluation through collaboration with our genetics team. Follow-up strategies are tailored to the individual, and we are typically able to triage acute stone events in established patients through our specialist nursing team in order to ensure timely assessment and intervention while minimizing additional emergency department visits.

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or call
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or toll-free
(800) 266-0366

To make an appointment

Call Central
Scheduling at
(414) 607-5280
or toll-free
(877) 607-5280

For more information

Visit chw.org/urology



SPECIALTY SPOTLIGHT

Treating a rare bladder condition with excellence

Children's Hospital of Wisconsin has been designated a Center of Excellence in the treatment of bladder and cloacal exstrophy by the Association for the Bladder Exstrophy Community (A-BE-C).

Bladder exstrophy is a rare birth defect in which the bladder has not formed correctly at birth. Treatment requires surgical reconstruction. With surgery and other treatment, children born with exstrophy can lead normal, healthy and active lives.

To receive the Center of Excellence designation, Children's demonstrated that it meets 10 criteria deemed vital to treating the complex needs of infants and children with bladder and cloacal exstrophy by A-BE-C's Medical Advisory Board.

The program at Children's is led by a team of providers from the Medical College of Wisconsin, including

John Kryger, MD; Travis Groth, MD; Elizabeth Roth, MD; and Coleen Rosen, DNP. The program is part of a larger team called the Multi Institutional Bladder Exstrophy Consortium (MIBEC). This consortium brings together the country's top pediatric urologists from Children's Hospital of Wisconsin, Children's Hospital of Philadelphia and Boston Children's. The multicenter team strives to improve surgical techniques to restore the cosmetic appearance and function of the urinary and reproductive tract, teach new physicians and colleagues worldwide, and report on improved patient outcomes and quality of life.

Learn more about the Urology Program at Children's and find our clinics and specialists at chw.org/urology.

NEW ON STAFF

Specialists in our network
ready to help

To refer a patient, call (800) 266-0366.



CME Events

Best Practices in Pediatrics

MARCH 5-7, 2020
WISCONSIN DELLS

REGISTER:

chw.org/bestpractices

Contact for
CME events:
Betsy Malten,
(414) 266-6242 or
emalten@chw.org

Emergency Medicine



Shannon Baumer-Mouradian, MD, is a pediatric emergency medicine specialist at Children's Hospital of Wisconsin and an assistant professor of pediatric hospital medicine at the Medical College of Wisconsin.

- 🎓 Medical College of Wisconsin, MD
- 🏠 University of Colorado School of Medicine, Pediatrics
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Gastroenterology/ Hepatology



Zahida Kahn, MD, PhD, is a pediatric transplant hepatologist and an assistant professor of pediatrics at the Medical College of Wisconsin.

- 🎓 University of Pittsburgh School of Medicine, MD
- 🏠 Cincinnati Children's Hospital Medical Center, Pediatrics
- 👨‍⚕️ Children's Hospital of Pittsburgh, Pediatric Gastroenterology; Texas Children's Hospital, Pediatric Transplant Hepatology
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Hematology/Oncology







Ryuma Tanaka, MD, is a pediatric hematology/oncology specialist at Children's Hospital of Wisconsin and an assistant professor of pediatric hematology and oncology at the Medical College of Wisconsin.

- 🎓 Keio University School of Medicine, MD
- 🏠 Keio University School of Medicine, Pediatrics; Michigan State University, Pediatrics
- 👨‍⚕️ Keio University School of Medicine, Hematology/Oncology; University of Texas MD Anderson Cancer Center, Hematology/Oncology; St. Jude Children's Research Hospital, Oncology
- 👨‍⚕️ Pediatrics

Hospital Medicine



Sarah Yale, MD, is a pediatric hospital medicine specialist at Children's Hospital of Wisconsin and an assistant professor of pediatric hospital medicine at the Medical College of Wisconsin.

-  Creighton University School of Medicine, MD;
-  Medical University of South Carolina, Chief Resident
-  Medical University of South Carolina, Pediatrics
-  Pediatrics

Imaging




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-  University of North Dakota, MD
-  Medical College of Wisconsin, Diagnostic Radiology
-  Medical College of Wisconsin, Pediatric Radiology

Neonatology



Kelsey Ryan, MD, is a neonatologist at Children's Hospital of Wisconsin and an assistant professor of neonatology at the Medical College of Wisconsin.

-  University of Minnesota Medical School, MD
-  University of South Florida, Pediatrics

Neonatology



Jeffrey Segar, MD, is a neonatologist at Children's Hospital of Wisconsin and a professor of neonatology at the Medical College of Wisconsin.


-  University of Wisconsin School of Medicine and Public Health, MD
-  University of Iowa Hospitals and Clinics, Pediatrics
-  University of Iowa Hospitals and Clinics, Neonatal-Perinatal Medicine
-  Neonatal-Perinatal Medicine

Pathology




Vasiliki Leventaki, MD, is a pathologist at Children's Hospital of Wisconsin and an assistant professor of pediatric pathology at the Medical College of Wisconsin.

 University of Athens, MD; MD Anderson Cancer Center, Additional Training

 University of Utah Medical Center, Anatomic/Clinical Pathology


 MD Anderson Cancer Center, Hematopathology


 Pathology-Hematology; Pathology-Anatomic/Pathology; Clinical-General


Radiology




Robert Orth, MD, is a radiologist at Children's Hospital of Wisconsin and an associate professor of pediatric radiology at the Medical College of Wisconsin.

 University of Texas Medical School at Houston, MD

 University of California, Diagnostic Radiology

 Cincinnati Children's Hospital Medical Center, Pediatric Radiology

 Pediatric Radiology; Diagnostic Radiology

Special Needs



Jessica Lander, MD, is a pediatric special needs specialist at Children's Hospital of Wisconsin and an assistant professor of special needs at the Medical College of Wisconsin.

 University of Alabama School of Medicine, MD

 University of Chicago Corner Children's Hospital, Pediatrics

Departures

Children's Hospital of Wisconsin would like to thank the following providers for their contributions. We wish them well in future endeavors.

Katherine Burrows, MD,
Child Development

Rose Campise-Luther, MD,
Anesthesiology

William Clarke, MD,
Anesthesiology

Suzie Franklin, MD,
Child Development

Kurt Hecox, MD,
Neurology

Tara Sander Lee, PhD,
Pathology

Patricia Lye, MD,
Hospital Medicine

Leah Phillippi, MD,
Hospital Medicine



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CHW-035

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chw.org/bestpractices