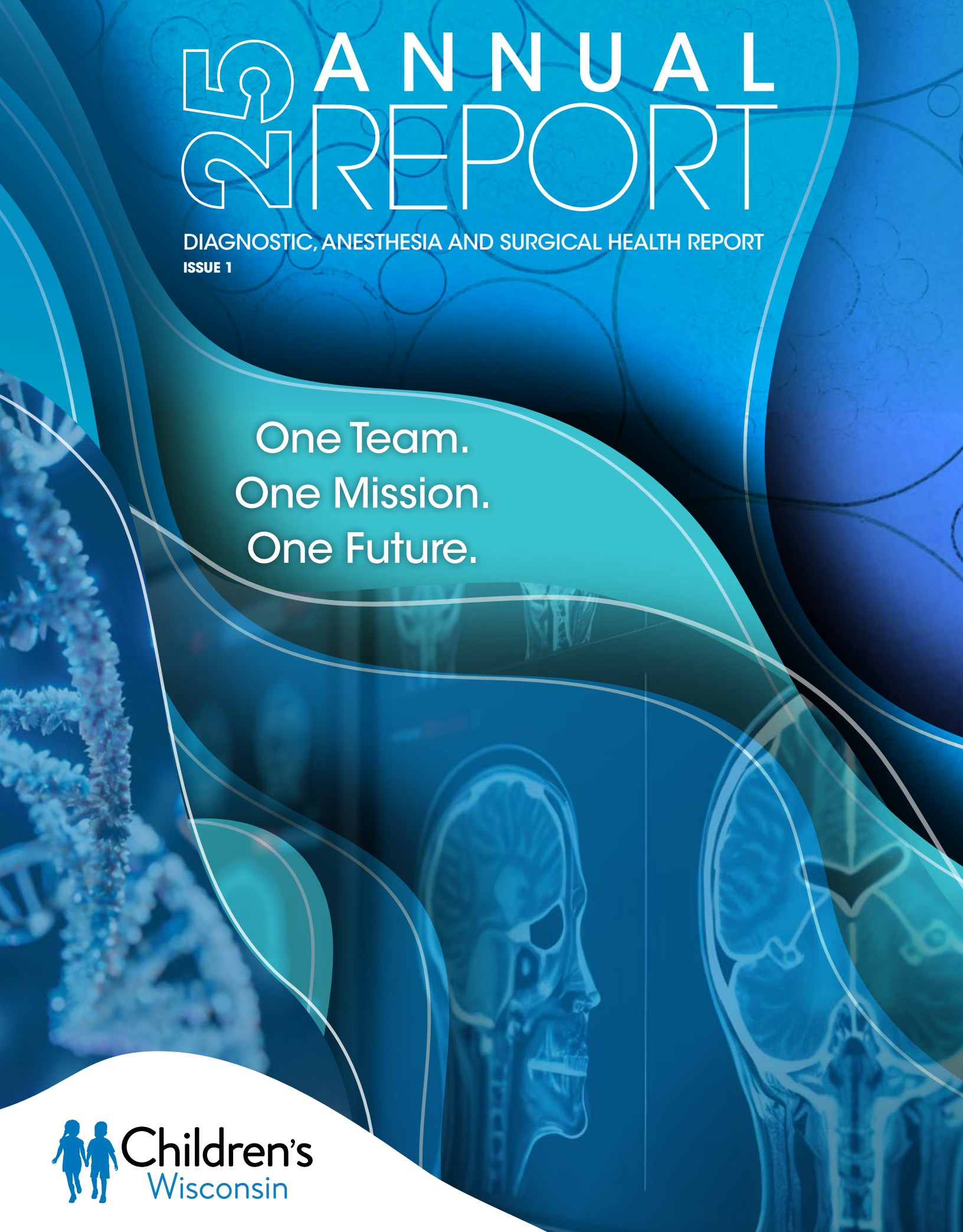
# ANNUAL REPORT

DIAGNOSTIC, ANESTHESIA AND SURGICAL HEALTH REPORT

ISSUE 1

One Team.
One Mission.
One Future.



Children's Wisconsin

Children's Wisconsin

# One Team.

More than ever, we have been inspired by what it means to be one team. In this 2025 Diagnostic, Anesthesia and Surgical Health (DASH) Report, we reflect on how every part of Children's Wisconsin has been united by a shared purpose: to provide the best possible care for children and families. While our roles may differ, the work we do is interconnected and the impact is magnified when we act as one.

We have seen this clearly in the creation of the Forward Pediatric Alliance with UW Health. By joining two nationally recognized congenital heart disease programs, we built a stronger and more integrated system of care for children born with heart defects. Families can now access expanded expertise and resources while staying closer to home. This alliance shows what is possible when we place collaboration first and focus on the well-being of the children who rely on us.

Our commitment to one team is evident in the growth of our care locations. In 2025, we expanded services in several communities, making it easier for families to reach the care they need. Urgent care in Appleton, specialty services in Ashwaubenon and a new eye clinic are already serving patients, while expanded mental health services in Green Bay began this past fall. These are more than new spaces — they are promises of care that is closer, more convenient and better aligned with the needs of families throughout Wisconsin.

We are also honored that our nurses have received Magnet designation from the American Nurses Credentialing Center for a fifth consecutive time. Achieving Magnet status is rare, and earning it five times places Children's Wisconsin among the most respected organizations in the world. This distinction reflects the knowledge, skill and compassion our nurses bring to their work every day and the culture of collaboration that allows excellence in patient care to thrive.

Together, these milestones show how much stronger we are when we work as one. The alliance with UW Health, the expansion of access points and the recognition of our nurses have all been made possible by people uniting with a common goal. Individual contributions matter, but the greatest impact comes when those efforts are woven together.

As we look back on 2025, we are grateful for what has been accomplished and even more thankful for the people who made it possible: families who trust us, partners who share our vision and colleagues whose compassion and dedication define care for children.

This DASH Report reflects more than milestones. It showcases what being one team has allowed us to achieve. It reminds us of our responsibility to keep building, improving and working together for the health and futures of children across Wisconsin and beyond.

# Elevating Trauma and Burn Care Through Multidisciplinary Practice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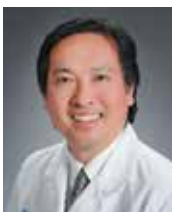

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In the Pediatric Intensive Care Unit (PICU), we work in close partnership with Pediatric Surgery to care for children with complex burn injuries. Among these patients, those with inhalational injuries present unique challenges. To date, they accounted for nearly 10% of our pediatric burn population at Children's Wisconsin in 2024 and 2025.

Recognizing an opportunity to improve consistency and outcomes, we formed a multidisciplinary group to revise our approach. Providers from Pediatric Surgery, Critical Care, Emergency Medicine, Pulmonology and Hospital Medicine came together to develop standardized care guidelines for children with suspected inhalational injuries. Finalized in April 2024, these new guidelines were implemented in the PICU and used to care for five children with significant inhalational injuries. This initiative exemplifies the value of subspecialty collaboration to strengthen care delivery for critically ill pediatric patients.

## REDUCING CERVICAL COLLAR-ASSOCIATED PRESSURE INJURIES

Hospital-acquired pressure injuries (HAPIs) have long been a focus of our quality improvement efforts, particularly in trauma patients requiring cervical spine precautions. In reviewing our HAPI data, we identified a concerning trend: an increase in injuries related to cervical collars.

To address this, clinical nurse specialists from trauma, wound and skin and the PICU partnered with stakeholders across neurosurgery, surgery, neurology and critical care. Together, we introduced a set of targeted interventions designed to improve risk detection, reduce time to prevention and standardize best practices across teams.

One key change was the development of a clinical guideline to expedite cervical spine clearance in trauma patients with isolated gunshot wounds, cases in which the risk of cervical injury is extremely low. By allowing earlier collar removal in these patients, we were able to reduce unnecessary device time and prevent skin breakdown without compromising safety.

We also enhanced our order sets to include automatic wound and skin consults for all trauma patients and created a rounding algorithm to ensure early identification of high-risk patients. PICU nurses received focused education and bedside coaching to reinforce the timely use of pressure-relieving products beneath cervical collars and in other vulnerable areas.

In partnership with device vendors, we reviewed sizing, application and maintenance procedures to reinforce optimal collar fit. These efforts have paid off. As of mid-2025, we have recorded only one collar-associated HAPI in the PICU since implementing these changes.

From early recognition to real-time prevention, this initiative represents the power of coordinated practice and nursing leadership. We continue to review and refine these practices to ensure that trauma care remains both safe and skin safe.


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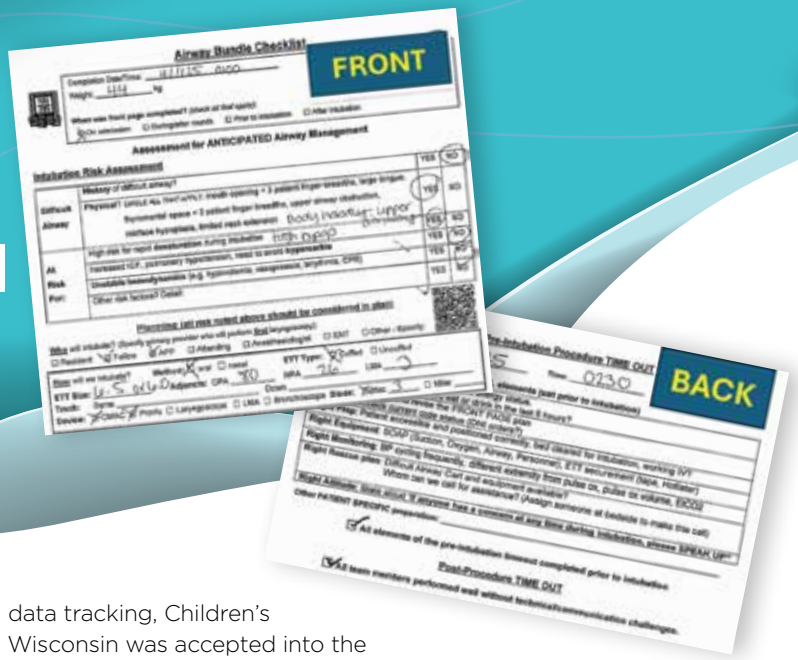
# Raising the Bar in Airway Safety: Tracheal Intubation Excellence in the PICU and CICU




Tracheal intubation is a high-stakes procedure for critically ill children. When performed in pediatric intensive care units (PICUs) and cardiac intensive care units (CICUs), the risks — including oxygen desaturation, hypotension and airway trauma — can be life-threatening. At Children's Wisconsin, our dedicated multidisciplinary team has transformed how these procedures are approached, setting new standards for safety, communication and continuous improvement.

This journey began in 2018 when our team developed a pediatric Airway Bundle, a one-page tool designed to facilitate structured planning and team alignment around every intubation. The Bundle outlines individualized plans for medications, equipment and team roles based on the child's airway history and clinical status. Using the Bundle standardizes care, reduces variability and ensures everyone is aligned before, during and after the procedure.

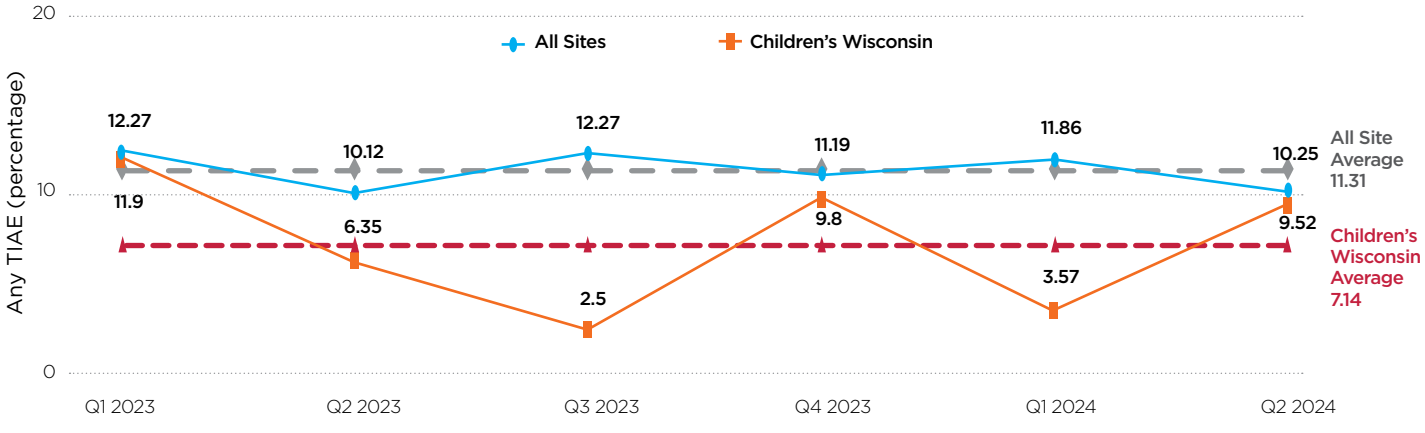
**Using the Bundle standardizes care, reduces variability and ensures everyone is aligned before, during and after the procedure.**

Introducing the Airway Bundle was a turning point in improving and standardizing intubation care. With consistent use and data tracking, Children's Wisconsin was accepted into the National Emergency Airway Registry for Children (NEAR4KIDS) collaborative, a multicenter quality improvement initiative founded at Children's Hospital of Philadelphia. This national registry tracks tracheal intubation-associated events (TIAEs) across more than 60 pediatric and cardiac ICUs globally, creating a powerful benchmarking tool to drive quality at the local level.

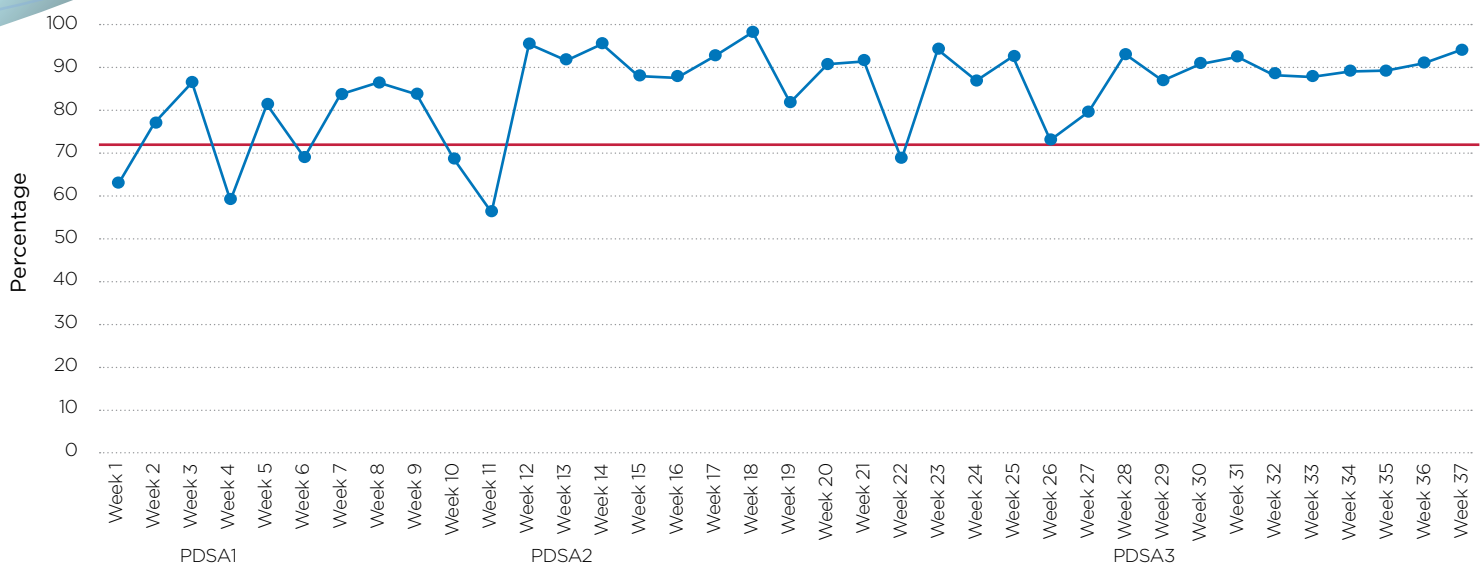
Our team's initial focus was straightforward: Ensure every eligible patient in the PICU or CICU had a completed Airway Bundle within two hours of admission. We monitored and improved compliance through multiple Plan-Do-Study-Act (PDSA) cycles, eventually achieving and maintaining rates above the 70% target. By 2024, compliance stood at 87%, demonstrating our commitment to consistent, high-quality care.

As the reliability of the process increased, our team shifted focus to outcomes. National data from NEAR4KIDS reports an average TIAE rate of 20% during pediatric intubations.[1,2] In 2018,

## Tracheal Intubation Adverse Event Rate




Data Source: NEAR4KIDS REDCap Database




the baseline rate at Children's Wisconsin mirrored this at 22%. But through Bundle-driven planning, education and post-event debriefs, we steadily reduced this rate to 13.5% over successive PDSA cycles.

In 2023, we integrated airway safety work into the electronic health record (EHR), introducing standardized documentation templates for intubations. This innovation streamlined safety data collection, reinforced best practices and improved real-time visibility into a child's airway history. The results were dramatic: TIAE rates dropped further to an average of 7.14%, significantly outperforming the NEAR4KIDS national average of 11.31% during the same period.

What makes the Children's Wisconsin airway safety initiative stand out is not just the improvement in metrics but also the culture it has fostered. Every intubation includes a structured debrief section within the Bundle, creating space for immediate team reflection on what worked and what could improve. These debriefs are not punitive — they are tools for learning, feedback and evolution.

This feedback loop has become a valuable source of insight, helping identify recurring communication gaps, equipment issues and workflow inefficiencies. Plans are underway to analyze these findings in aggregate to enhance system-level planning and training.

While our current focus remains on PICU and CICU intubations, future plans include expanding the use of the Airway Bundle to intubations occurring in other care settings, such as the Emergency Department and operating rooms. Additionally, Bundle debrief data will be used to improve equipment access and team readiness, extending the same high-reliability practices across all high-risk environments in the hospital.

Ultimately, this initiative exemplifies what's possible when data, teamwork and continuous learning converge. By leveraging clinical expertise, national benchmarking and real-time feedback, Children's Wisconsin is not only improving care for today's patients but also laying the groundwork for a safer, smarter future in pediatric critical care.

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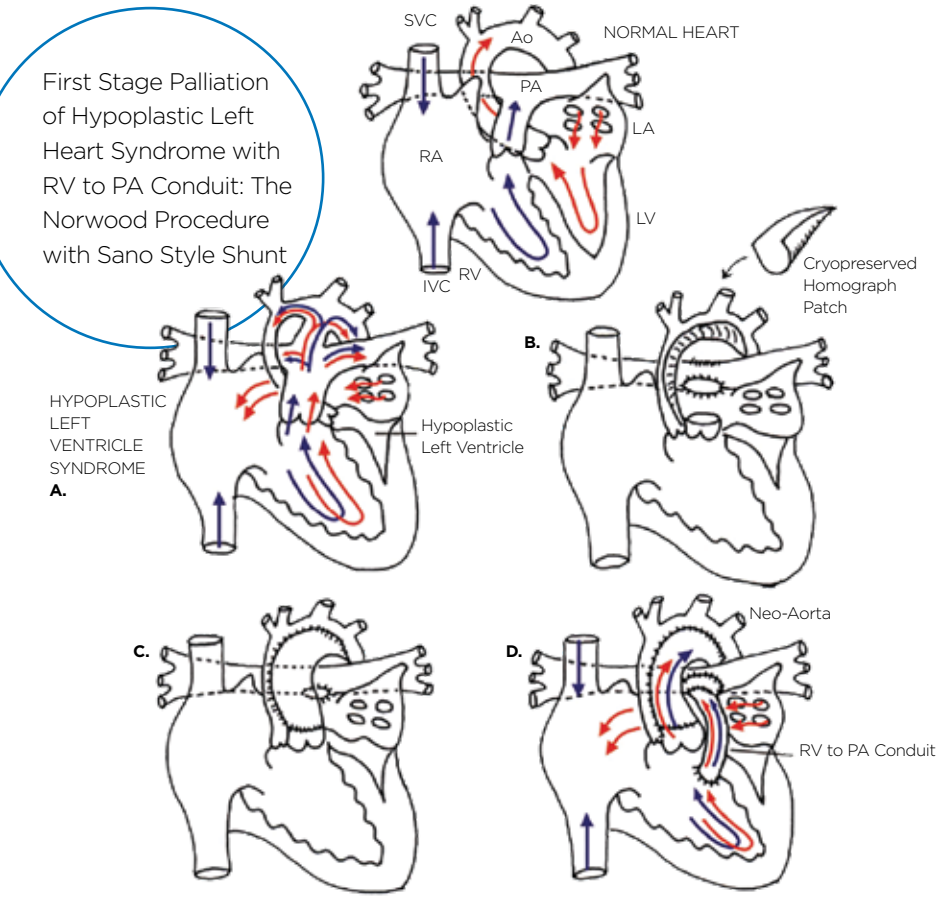
# The Norwood Pathway: Standardizing Care to Improve Outcomes




At Children's Wisconsin, we know the Norwood operation remains one of the most complex and high-risk congenital heart surgeries. This procedure is typically performed in the first week of life for infants born with hypoplastic left heart syndrome (HLHS). It is the first of three staged surgeries designed to enable the right ventricle to pump blood to the body and establish pulmonary blood flow.[1] Our team at the Herma Heart Institute has long been recognized as a leader in advancing outcomes for these critically ill children.[2,3] Still, we recently experienced a decline in survival rates, which led us to take a closer look at the procedure.

In 2023, we formed a multidisciplinary group to develop a structured pathway for the Norwood operation. Our goal was to standardize communication and care through all stages of perioperative management. The team included clinicians from pediatric cardiovascular surgery, cardiology, cardiac anesthesia, cardiac intensive care, perfusion and nursing. Over a series of collaborative meetings, we created algorithms and guidelines that became the Norwood Pathway. These were based on both published data and accepted standards of care across top pediatric surgical centers. Once it was finalized, we shared the pathway broadly throughout the Herma Heart Institute.

**The four standardized discussions for every patient undergoing a Norwood procedure**

1. The case is reviewed in our **weekly surgical conference**.
2. We hold a virtual pre-brief meeting about **24 hours before surgery** to align the surgical, anesthetic, perfusion and imaging plans.
3. **Immediately after surgery**, a bedside huddle is held during transfer from the OR to the cardiac ICU.

One of our primary aims was to improve communication. For every patient undergoing a Norwood procedure, we now conduct four standardized discussions:

1. The case is reviewed in our weekly surgical conference.
2. We hold a virtual pre-brief meeting about 24 hours before surgery to align the surgical, anesthetic, perfusion and imaging plans.
3. Immediately after surgery, a bedside huddle is held during transfer from the OR to the cardiac ICU.
4. Two to three days later, a virtual debrief reviews early postoperative care. Summaries from the pre-brief and debrief are shared with operational leaders and used to inform future improvements.

These regular touchpoints have allowed us to make data-informed changes to the pathway. In the past two years, we have adjusted aspects such as shunt characteristics, surgical techniques and inotrope management based on real-time learning.

Since implementing the pathway, we have cared for 20 Norwood patients using this model. Survival has improved from 69% to 85%. Median cardiac ICU length of stay is now 20.5 days, slightly below the national average of 21.1 days and a 50% reduction compared to our pre-pathway data. Median hospital stay is now 39 days compared to our prior local average of 80 days and the national benchmark of 36 days. We have also maintained low rates of deviation from the pathway, with 7% overall variation and just 2% classified as unintentional.

As we look to the future, we will continue to refine our approach and measure results. We plan to share the Norwood Pathway with our partners at UW Health Kids and American Family Children's Hospital through the Forward Pediatric Alliance. Our goal is not only to improve survival but to reduce the burden of morbidity and support the best possible outcomes for every child undergoing this complex surgery.

By aligning our teams and standardizing our practices, we are building a care model that is not only collaborative but also adaptable. We are proud of the progress we have made and are committed to continuing this work to improve the lives of children with HLHS and their families.

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# Multiple Procedures Under One Anesthetic: Guidance for Care

When families are told their child needs surgery or a procedure under anesthesia, one of the first questions they ask is: "Is it safe?" That concern often deepens when multiple procedures are under consideration. Understandably, many families ask us if combining procedures in one visit is a safer, more efficient option.

As pediatric anesthesiologists at Children's Wisconsin, we've explored that question through experience and data. With the increasing demand for coordinated care, we wanted to understand whether combining procedures increases risk or can be done safely under the right conditions.

Pediatric procedures carry risk from both anesthesia and the underlying surgery. These risks depend on patient complexity, age, procedure duration and other variables. Risks can become more complex when unrelated procedures, managed by different specialties, are scheduled together.

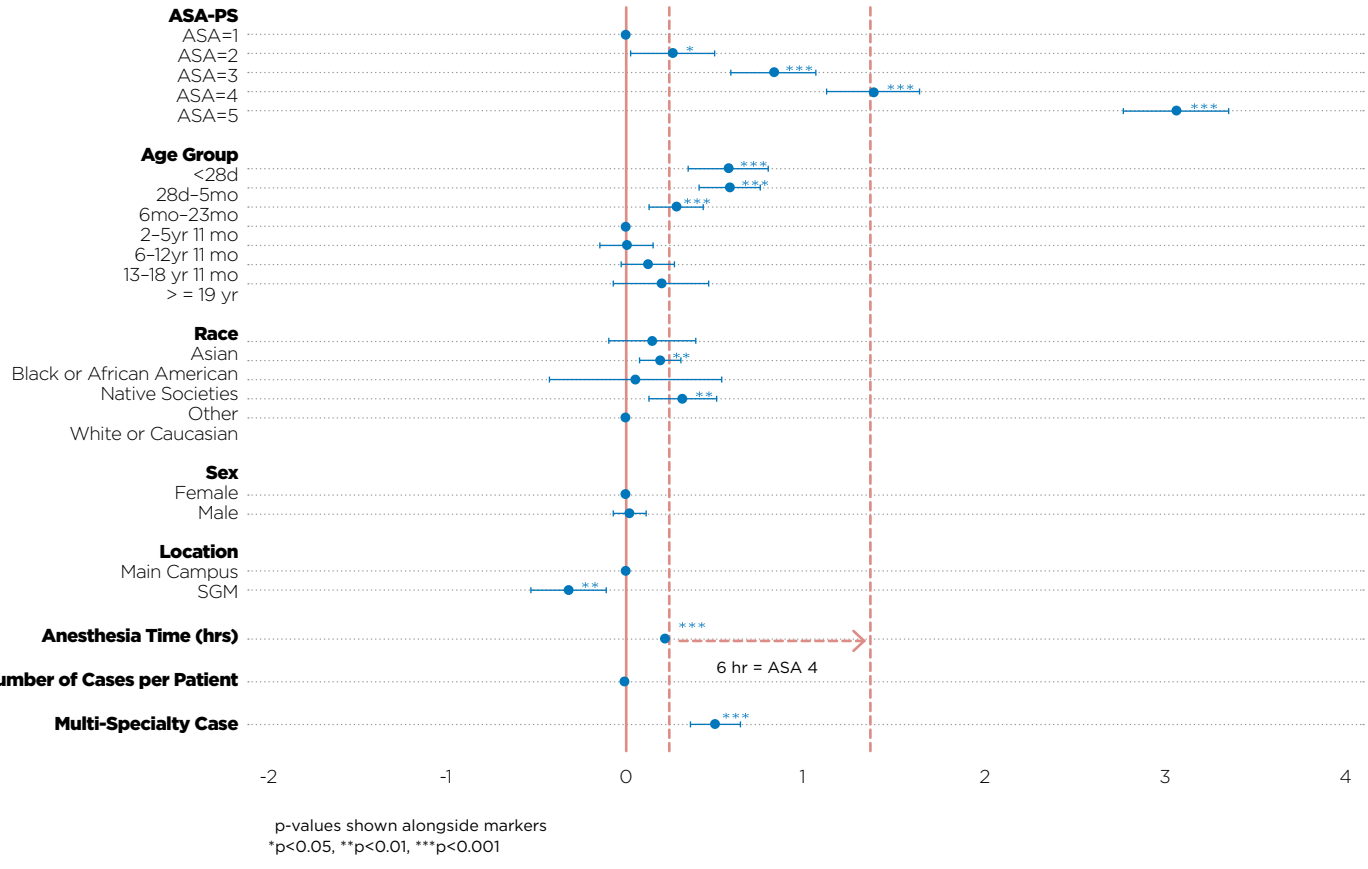
To explore this, we began analyzing perioperative outcomes in line with our participation in the American College of Surgeons Level I Children's Surgery Verification Improvement Program.

Since June 2015, our department has recorded more than 219,000 anesthetic cases involving nearly 120,000 children. We identified 2,490 perioperative

| Event Domain | n |
|---|---|
| Airway/ Respiratory | 1,193 |
| Cardiovascular | 604 |
| Hospital-Acquired Condition | 133 |
| Human Factors | 473 |
| Metabolic | 45 |
| Neurologic | 233 |
| Other | 1,977 |
| Regional Pain | 87 |

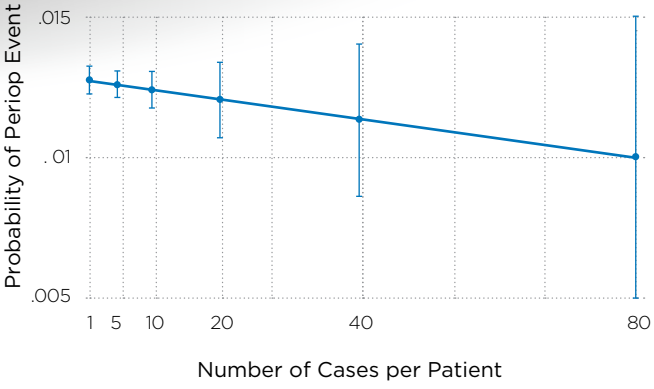
## Risk Factors for Perioperative Safety Event

Multivariable Model

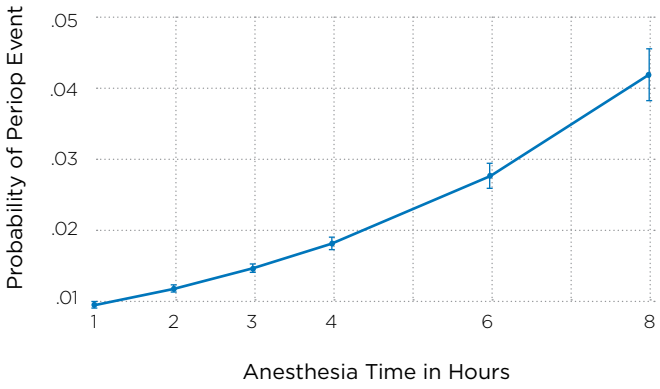



p-values shown alongside markers
*p<0.05, **p<0.01, ***p<0.001

## Perioperative Event Rate by Number of Cases per Patient




## Perioperative Event Rate by Anesthesia Time




events, categorized into eight domains: airway/respiratory, cardiovascular, hospital-acquired conditions, human factors, metabolic, neurologic, regional pain and an "other" category for access issues, drug effects, allergic reactions and unexpected returns to care areas.

We examined these outcomes against factors such as ASA physical status, age, race, anesthesia time and whether the care involved a single specialty or multiple, unrelated specialties (multi-specialty). Our multivariable analysis confirmed that higher ASA scores, younger age, Black race, longer anesthesia times and multi-specialty care were all independent predictors of perioperative events. For example, six hours of anesthesia carried a risk comparable to ASA-PS 4. Importantly, we found that multiple separate anesthetics did not increase risk, but prolonged time under a single anesthetic did.

We also recognized that not all complications carry equal weight. A mild IV infiltration isn't equivalent to a serious cardiac event. To address this, we implemented a standardized scoring system to assess the severity of each event: none, mild, moderate, severe or death. This allows us to distinguish between minor issues and serious complications and supports more precise decision-making.

To improve detection and reporting, we now use our electronic health record (EHR) to monitor and flag perioperative events. While intraoperative complications are often recorded in real time, others may occur postoperatively or be missed if not proactively identified. Our EHR-based surveillance allows us to detect these events independently of clinician self-reporting, ensuring a complete and more reliable dataset.

We're not alone in asking whether combining procedures poses additional risk. Literature from other institutions reinforces what we're finding. One study found time and cost benefits in children who had dental restorations and extractions done under a single anesthetic, with no reported increase in complications.[1] Another group examined combined dental and tonsillectomy procedures and found no difference in outcomes compared to when performed separately.[2] Lastly, a large study covering more than 1,100 cases found no increase in readmissions for multi-specialty procedures.[3]

Of course, any plan of care must also consider the broader family experience. Scheduling multiple procedures separately can mean more days off work, missed school and stress. Reducing the number of anesthetic exposures and consolidating care, when safe and feasible, can ease the burden on families and the system alike.

Ultimately, our goal is to provide data-informed guidance. With more than 200,000 cases analyzed, we now have a clearer view of what increases risk and what doesn't. We can better advise families, offer safer care and align our decisions with evidence and empathy.

We know that every child and every family situation is different. But with the right planning, communication and monitoring, we've shown that many children can safely undergo more than one procedure under a single anesthetic. The key is understanding and acting on the true risk with clarity, precision and compassion.

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# Personalizing Perfusion: Hemodynamic Management in Pediatric Anesthesia

Ensuring adequate oxygen delivery to the brain and vital organs is among the most critical responsibilities of the pediatric anesthesiologist. Hemodynamic changes are common during anesthesia and relate to the effects of medications, ventilation, positioning and the surgical procedure, including blood and fluid loss. Strategies to optimize hemodynamic parameters can be guided by theoretical or experimental models, population norms and personalized measures. Traditionally, we've relied on fuzzy logic, adjusting interventions based on population blood pressure norms and a child's pre-anesthesia baseline.[1] While this approach is adequate for low-risk patients and procedures, it does not provide enough information to guide interventions in the complex care commonly provided at Children's Wisconsin.

Near-infrared spectroscopy (NIRS) allows us to observe organ-specific hemodynamic changes in real time using continuous, noninvasive optical probes placed on the skin over vital organs. Because organs lie close to the surface in smaller bodies, NIRS is especially useful in neonates, infants and young children, in whom invasive techniques are more challenging and risky.[2] With forehead and flank probes, we can track organ-level perfusion in the brain and kidney throughout the perioperative period.

Across a range of patient populations, we've observed differential cerebral and renal control mechanisms and responses to physiologic stress not apparent with blood pressure alone. Because normal physiologic function involves dynamic changes in regional blood flow, trade-offs between organs are expected but not always desirable. In children, perfusion can drop to critical levels even when mean arterial blood pressure (MABP) appears normal. Organ-specific monitoring reveals this in real time in ways that traditional metrics cannot.[3]

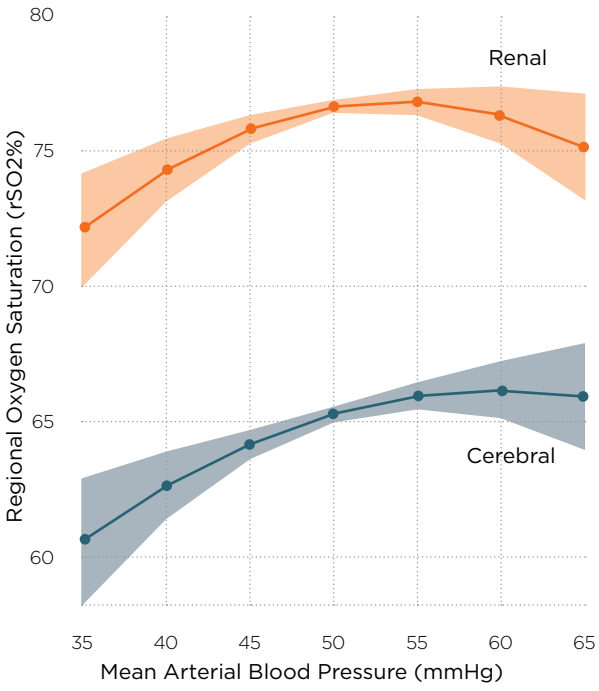
To interpret these signals meaningfully, we've built multidimensional models using hundreds of thousands of NIRS data points, many from high-risk neonates with congenital heart disease. These models now guide real-time clinical decisions, even when using noninvasive methods. We use them to determine when to give fluids, initiate vasopressors or adjust ventilatory settings.

In a study of 200 neonates, we evaluated the autoregulation relationship between MABP and oxygen saturation in the brain ($rSO_2C$) and kidneys ($rSO_2R$) over a 48-hour perioperative period.[4] Using nonlinear regression, we identified the lower limit of autoregulation (LLA) — the threshold below which the organ can no longer maintain stable perfusion. We found most LLAs in the 45–50 mmHg range for both regions, but cerebral perfusion dropped more steeply as pressure declined. Interestingly, renal saturation also decreased at pressures above 65 mmHg, suggesting that some increases in blood pressure come at the expense of organ perfusion.

These findings are clinically meaningful. In our population, MABP fell below the LLA in about 25% of patients, and 76% experienced at least one hour of hemodynamic vulnerability. Based on population data, standard reference ranges often miss these high-risk periods. Most LLAs fell near the 75th percentile of conventional anesthetized blood pressure norms, reinforcing the need for individualized thresholds.

**Neonatal Pressure Autoregulation**

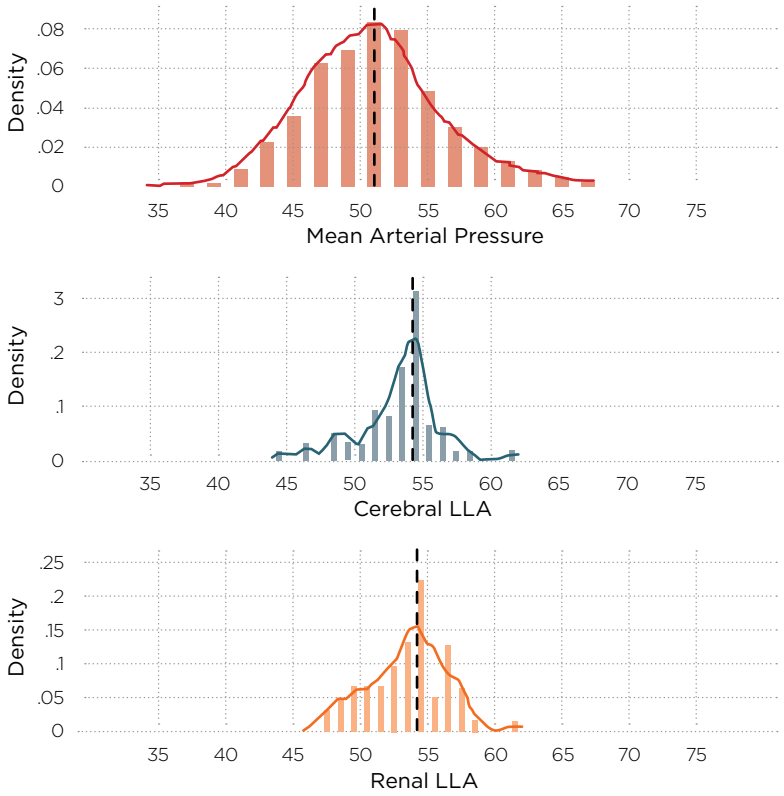
(fixed-effect multivariable adjust model)



Broad application of this noninvasive technology lets us observe hemodynamic responses otherwise invisible until the onset of organ dysfunction. NIRS provides visibility into organ-level perfusion and allows early intervention, even when traditional metrics look acceptable. At Children's Wisconsin, this two-site NIRS monitoring strategy has become standard in high-risk care.

Augmented hemodynamic monitoring with both pressure and oximetric techniques gives us a deeper understanding of how children respond to anesthesia, surgical stress and critical illness. With insights from this monitoring strategy, we can deliver personalized anesthesia care that more closely targets each patient's individual needs.

## Distributions of Observed MABP and Individual LLA





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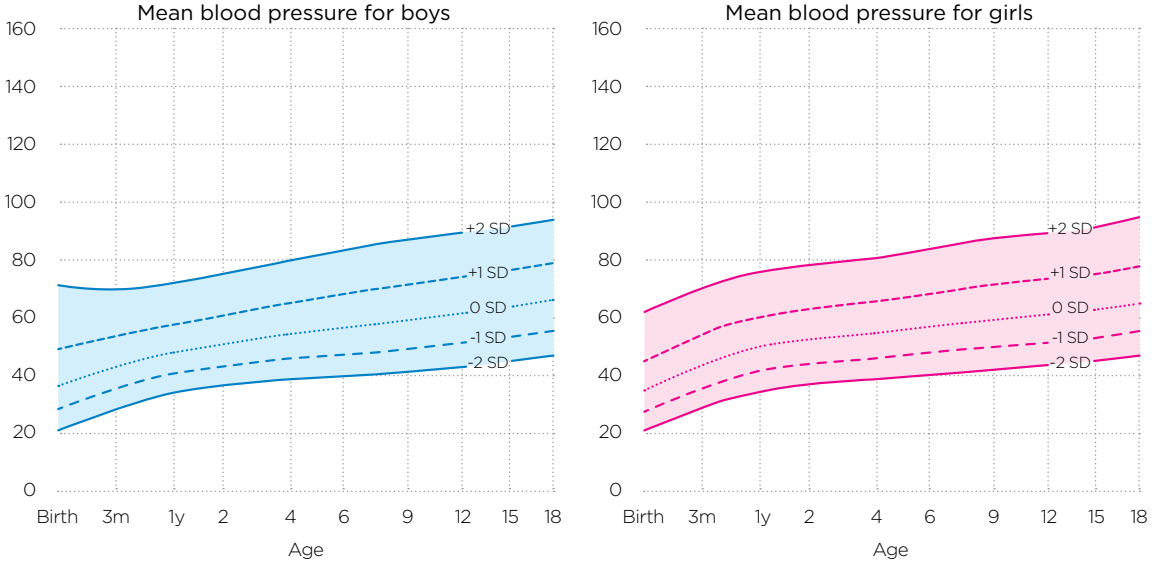
## Normative Distributions Mean Arterial Pressure - Anesthetized Children





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# Vision Screenings: Protecting Sight Through Early Detection

Amblyopia is the most common cause of vision loss in children, affecting an estimated three out of every 100 children, according to the National Eye Institute. Identifying amblyopia early is critical. Without timely detection and treatment, ideally before the age of 6, permanent visual impairment may occur. At Children's Wisconsin, a collaborative effort between the Eye Program and Primary Care is ensuring that vision problems like amblyopia are caught and treated earlier than ever before.

The Children's Wisconsin Eye Program, led by Aparna Ramasubramanian, MD, and Tracey Strombeck, OD, FAAO, has implemented a unified, data-driven approach to vision screening that centers on both innovation and access. Since December 2020, the pediatric medical group has conducted more than 84,000 vision screenings using photo screening technology, a tool that enables earlier identification of amblyogenic risk factors. Of those, nearly 4,000 children, or roughly 5%, were found to have concerning risk factors and were referred for further care. The Eye Program and Primary Care are now looking at a more targeted screening approach and improved photo screening technology, which they hope to implement next year to improve both precision and efficiency.

At the core of this initiative is a robust collaboration between the Eye Program's optometrists and ophthalmologists. Five pediatric-trained optometrists provide high-quality care for children with non-surgical conditions, including amblyopia and refractive errors. For patients requiring advanced interventions such as strabismus surgery, cataract treatment or ocular oncology care, five fellowship-trained pediatric ophthalmologists ensure timely access to surgical and subspecialty services. This "One Team" model streamlines care and ensures seamless transitions from screening to diagnosis to treatment.

Beyond the clinic walls, the Children's Wisconsin Eye Program team is influencing statewide efforts. Two of our team's optometrists, Alicia Chacon, OD, and Simran Brar, OD, serve on the board of Prevent Blindness Wisconsin, helping to shape the future of children's vision health across the state.

Access to care has also expanded significantly. In addition to three locations in the Milwaukee area, we have a full-time optometrist in the Fox Valley region who brings services closer to home in Northeast Wisconsin.

Looking ahead, our team is evaluating new photo screening technologies in partnership with Children's Wisconsin Primary Care to further optimize screening accuracy in primary care settings. This initiative reflects a commitment not only to clinical excellence but also to population health — ensuring every child has the opportunity to see their world clearly.

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**Aparna Ramasubramanian, MD**
Chief of Pediatric Ophthalmology and Director of Ocular Oncology, Children's Wisconsin

Associate Professor, Medical College of Wisconsin

**Tracey Strombeck, OD, FAAO**
Pediatric Optometrist, Children's Wisconsin

Assistant Professor and Director of Pediatric Optometry Residency Program, Medical College of Wisconsin

# Advancing Pediatric Surgical Imaging Through Interventional Collaboration

In 2025, Children's Wisconsin reached a milestone with the launch of an advanced interventional imaging suite, strategically built behind the redline on the surgical platform. This reflects a national shift in recognizing interventional radiology (IR) as a core component of surgical care rather than a separate service.

As part of a two-phase expansion, we opened a hybrid biplane suite equipped with the Philips Azurion system. This technology supports open, closed and hybrid procedures across service lines including neurosurgery, oncology, transplant, gastroenterology and otolaryngology. A second, single-plane lab will follow in the next phase.

By integrating IR within our surgical platform, we've improved access, efficiency and safety. The Azurion system delivers precise imaging with significantly reduced radiation and contrast doses. With this suite, we reintroduced on-site cerebral angiograms and launched intra-arterial chemotherapy (IAC) treatments for retinoblastoma.

Retinoblastoma is a rare pediatric cancer affecting the eye. IAC delivers chemotherapy directly to the artery feeding the tumor, lowering systemic toxicity. These procedures require a multidisciplinary team and involve two to six rounds of treatment. Performing eye exams under anesthesia and IAC in the same suite streamlines care and minimizes exposures for young patients. According to Aparna Ramasubramanian, MD, Director of the Retinoblastoma Program at the MACC Fund Center for Cancer and Blood Disorders, this colocation reduces repeat anesthesia events and hospital visits — critical for this vulnerable group.

Our hybrid suite has also expanded access for vascular malformation procedures, increased IR biopsy support for kidney transplant patients and enabled collaborative neurosurgical and neurointerventional cases with our neurosurgery team. This strengthens our ability to deliver complex, minimally invasive care without families needing to travel out of state.

John Nerva, MD, Neurosurgeon at Children's Wisconsin and Froedtert & the Medical College of Wisconsin, added, "The new hybrid OR with

a state-of-the-art biplane angiography machine dramatically improves our ability to care for patients with complex neurovascular diseases. This equipment improves patient safety and outcomes due to enhanced visualization of the vascular anatomy and reduces radiation and contrast doses, therefore improving efficiency and reducing procedural times. In particular, select patients with retinoblastoma who undergo chemotherapy infusion into the submillimeter ophthalmic artery benefit greatly from our new angiography equipment at Children's Wisconsin."


**Kevin P. Boyd, DO**
Program Director of Pediatric Body Imaging, Children's Wisconsin

Division Chief of Pediatric Radiology and Associate Professor of Radiology, Medical College of Wisconsin

**Jennifer L. Peterson, MSL, CRA, ARRT**
Imaging Manager, Children's Wisconsin

**Michael Madrzak, PA-C, MPAS**
Director of Clinical Specialties, Children's Wisconsin

**Linda Strain, BSN, RN**
Imaging Manager, Children's Wisconsin

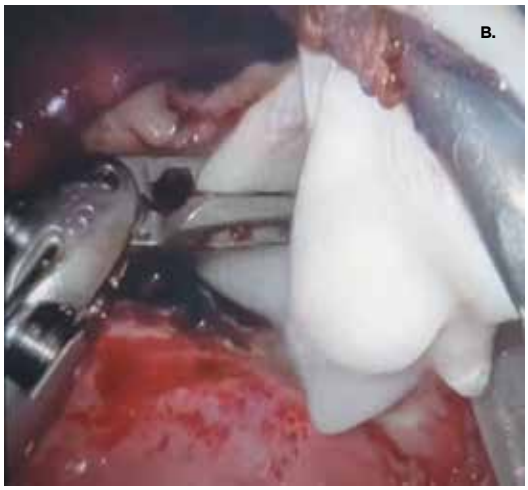
# Pushing Boundaries in Pediatric Surgery: Launching One of the Nation's First Pediatric Robotic Thoracic Programs

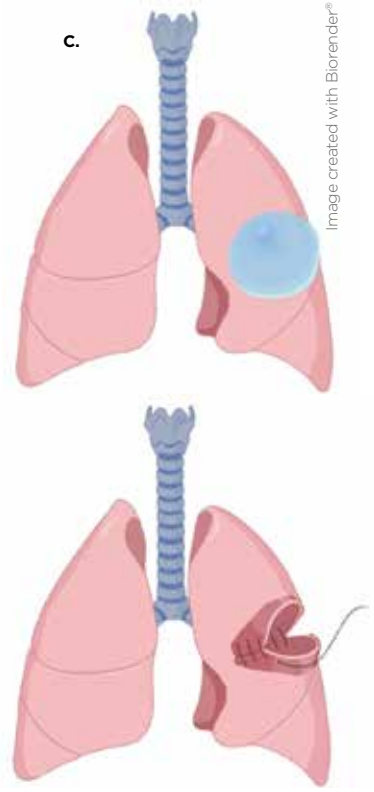

In 2023, Children's Wisconsin began a transformative initiative in partnership with Froedtert Hospital to launch one of the nation's first dedicated pediatric robotic thoracic surgery programs. This innovative effort reflects our commitment to improving outcomes and expanding care options for children with complex thoracic conditions.

Robotic surgery has redefined adult thoracic care over the last two decades, offering greater precision, smaller incisions, less postoperative pain and faster recovery.[1] Robotic technology has allowed for a minimally invasive approach even in more complex procedures such as esophagectomy or sleeve lobectomy. Extending this technology to pediatrics, however, presents challenges due to smaller anatomy, limited case volumes and the need for tailored surgical tools and training. While robotics has become common in pediatric abdominal procedures, its role in thoracic cases remains limited.[2]

Recognizing the opportunity to advance care, pediatric and adult thoracic surgeons at Children's Wisconsin and Froedtert joined forces to integrate robotic technology into pediatric thoracic surgery. Rather than build independently, the pediatric team leveraged the deep experience of adult colleagues to establish protocols and best practices. Pediatric surgeons engaged in observation and hands-on dual-console training at Froedtert to build proficiency in robotic techniques.[3]

We were focused on creating a high-performing multidisciplinary robotics team. To do so, pediatric surgeons received simulation-based training, while anesthesiologists, nurses and surgical assistants collaborated in structured practice sessions to standardize patient positioning, docking, port placement and instrumentation. We emphasized consistent protocols and strong team-wide communication to streamline care delivery.




**Coronal CT image of 5-year-old male with large bilateral pulmonary hydatid cysts from Echinococcal infection (A). Patient underwent staged robotic cyst drainage, removal and capitonnage procedures. Robotic cyst removal (B) and capitonnage where cyst cavity is oversewn (C).**

Our team deliberately chose straightforward operations as the first robotic procedures performed at Children's Wisconsin. We began with thoracoscopic procedures commonly performed in adolescents, such as peripheral lung wedge resections and apical chest wall tumor excisions. As our confidence grew, we introduced more complex operations such as lobectomies.[3] Pediatric surgeons performed initial steps, with adult thoracic surgeons assisting or demonstrating more advanced techniques.[4]

Between April 2024 and July 2025, our team completed 10 collaborative pediatric robotic thoracic surgeries, including eight performed at Children's

Wisconsin. Among them were three lung surgeries for echinococcal hydatid cysts in two children with bilateral disease, representing the youngest reported patients treated robotically for this condition.

For complex, high-risk procedures early in the program, such as a carcinoid tumor requiring sleeve lobectomy or a pulmonary arteriovenous malformation following failed embolization, our team chose to operate at Froedtert, an adult hospital which has an established robotics team. This approach ensured access to optimal resources while maintaining active involvement from the pediatric surgical team. These strategic decisions balanced patient safety with progressive skill-building for long-term program success.

This program marks a significant milestone in pediatric surgery and lays the groundwork for continued growth. As robotic systems evolve and instrumentation becomes better suited to smaller patients, the application of these techniques is expected to expand.

Our team's objective extends beyond increasing procedure volume. Our goal is to enhance the standard of care for children with complex thoracic conditions by broadening access to minimally invasive, highly precise surgical options.

This collaborative model — merging adult thoracic expertise with pediatric specialization — demonstrates how multidisciplinary partnerships can drive innovation and improve outcomes. Children's Wisconsin is establishing a new benchmark for excellence in pediatric surgical care.

As one of the first of its kind, this initiative provides a replicable framework for institutions seeking to integrate robotic techniques into pediatric thoracic surgery. It is a testament to careful planning, deep collaboration and a steadfast focus on quality and safety.

These early successes are just the beginning. As the program matures, our team remains committed to advancing pediatric innovation, refining practice and improving lives, one child at a time.

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Assistant Professor of Surgery, Medical College of Wisconsin



**Paul Linsky, MD**
Associate Professor of Surgery and Director of Cardiothoracic Surgery Fellowship Program, Medical College of Wisconsin


## Summary of Cohort of Robotic Thoracic Cases in Children

| Patient | Age (yrs) | Weight (kgs) | Diagnosis | Procedure | OR location |
|---|---|---|---|---|---|
| 1 | 18 | 55.7 | Schwannoma | Left apical chest wall mass resection | CHW |
| 2 | 18 | 96 | Metastatic osteosarcoma | Pulmonary wedge resections | CHW |
| 3 | 16 | 74.7 | Bronchial carcinoid | Left upper sleeve lobectomy | FMLH |
| 4 | 20 | 51.4 | Traumatic diaphragmatic hernia, small bowel leiomyosarcoma | Diaphragm hernia repair and small bowel resection | CHW |
| 5 | 12 | 36.1 | AVM with collaterals | Left lower lobectomy | FMLH |
| 6 | 16 | 62.3 | Endobronchial mucoepidermoid carcinoma | Left upper lobectomy, bronchoplasty | CHW |
| 7 | 16 | 55 | Spontaneous pneumothorax | Pulmonary wedge resection, pleurodesis | CHW |
| 8, 9 | 7 | 28.3 | Bilateral pulmonary hydatid cysts | Staged bilateral cyst drainage and capitonnage | CHW |
| 10 | 5 | 17 | Bilateral pulmonary hydatid cysts | Right cyst drainage and capitonnage | CHW |
| 11 | 16 | 55.7 | Mature teratoma of thymus | Excision of mediastinal mass (en bloc resection of LUL, pericardium) ligation of distal left IMA | FMLH |
| 12 | 18 | 128 | Metastatic osteosarcoma | Right lower lobe wedge resection | CHW |
| 13 | 12 | 104 | Left bronchopulmonary sequestration (BPS) | Left resection of BPS | CHW |
| 14 | 12 | 54.8 | Right intralobar BPS | Right lower lobe BPS resection with ICG | CHW |
| 15 | 18 | 51.6 | Esophageal duplication cyst | Right resection of esophageal duplication cyst | CHW |
| 16 | 15 | 67.5 | Metastatic osteosarcoma | Right pulmonary wedge resection | CHW |
| 17 | 8 | 28 | Left mediastinal bronchogenic cyst | Left cyst resection | CHW |

CHW = Children's Wisconsin  FMLH = Froedtert

# Improving the Transition From Pediatric to Adult Transplant Nephrology Care

At Children's Wisconsin, we understand how challenging the transition from pediatric to adult care can be, especially for adolescents with kidney transplants. This period, spanning from six months before to two and a half years after transition, is marked by a sharp rise in kidney allograft failure. Studies show the rate increases from 2.2 to 6.6 per 100 person-years, with failure reported in up to 42% of cases.[1]

One of the most significant challenges is the lack of standardized protocols across institutions. Without consistent transition planning, patients and families are left without preparation. Communication gaps between pediatric and adult teams result in fragmented handoffs. Limited coordination with primary care providers leaves young people without a clear guide. Adolescents are suddenly expected to self-manage medications, appointments, labs and insurance during a time of major cognitive, emotional and social development. These barriers increase the risk of medical nonadherence, unnecessary health care utilization and avoidable graft loss.

We know the incidence of medical nonadherence in chronic pediatric illness can be as high as 50%.[2] Often, families are unaware of how critical medication adherence is until a complication arises. When patients take on full responsibility during adolescence, they must juggle complex regimens along with the pressures of becoming more socially independent. Without adequate support, even highly motivated patients may struggle.

To close this gap, we developed a structured transition model in partnership with Froedtert & the Medical College of Wisconsin. Our approach is based on early, continuous education for patients and families. We introduce the idea of transition to adult care beginning at age 14. Through written and verbal communication, we create shared goals between families and the care team. We emphasize skill development over age-based milestones. Through skills-based readiness assessments, we evaluate a patient's increasing autonomy and tailor support based on their individual progress.

As post-transplant patients age, we reduce the frequency of routine visits while continuing to track transition readiness. We provide tools for self-management, including coaching on timely medication refills, scheduling, insurance navigation and communication with providers. Recognizing the turbulence around life transitions like college or work, we continue post-transplant follow-up care through age 19 or 20. This additional year or two of support helps maintain stability before the final transfer to adult nephrology care.

Our team collaborates across specialties, including adult and pediatric nephrology, pharmacy, psychology, social

**We know the incidence of medical nonadherence in chronic pediatric illness can be as high as 50%.**

work and nursing. We track skills-based competencies to measure the program's effectiveness across the population. This feedback allows us to identify gaps and strengthen areas where patients need additional support. We follow the Kidney Disease: Improving Global Outcomes transition care model[2] to structure our workflow and engage patients longitudinally across the adaptation period.

We are creating an environment in which adolescents are not only given tools but are also supported and understood. Our model gives families clarity on what to expect, builds confidence in patients and prepares both for a seamless, safe transition.

While some allograft loss may be unavoidable, we believe that loss due to nonadherence or lack of follow-up is unacceptable. A transition plan should never be left to chance. With structured communication, readiness tracking and interdisciplinary support, we can prevent complications and protect transplant outcomes during this vulnerable stage.

This model offers a blueprint for other chronic pediatric diseases. A standardized approach promotes continuity of care, improves communication across systems and keeps patients from falling through the cracks. It's a model centered on patients, grounded in evidence and focused on improving outcomes.

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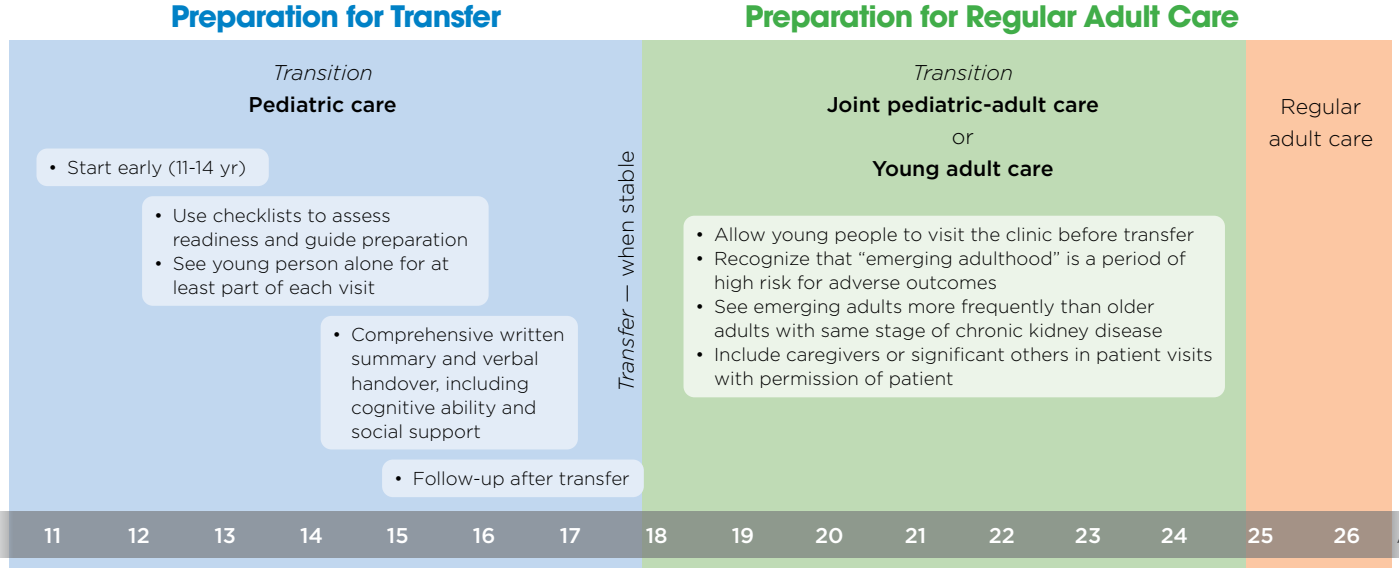

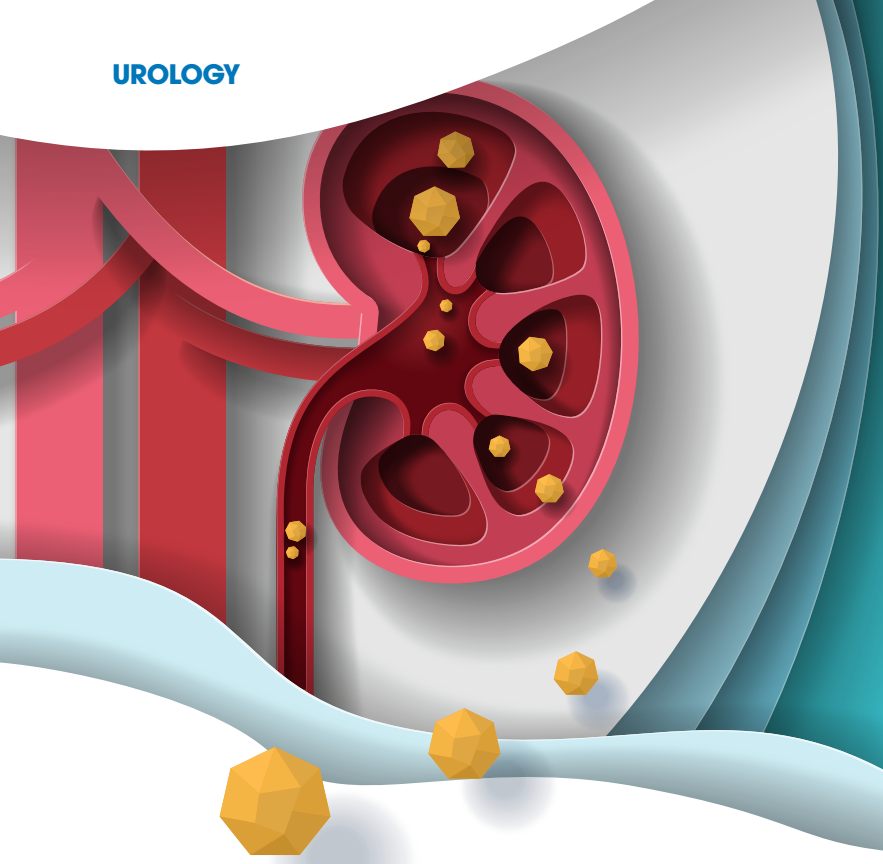

# Children's Wisconsin Opens New Multidisciplinary Pediatric Kidney Stone Clinic

In October 2024, Children's Wisconsin launched a new multidisciplinary clinic for children with kidney stone disease, bringing together pediatric urology, nephrology, nutrition, nursing and specialized services under one roof. As pediatric specialists, we are deeply invested in improving outcomes for children with this increasingly common condition. We recognized a clear need for coordinated, proactive care that addresses not just treatment, but prevention and long-term health as well.

Kidney stones do not just affect adults. Children, and especially adolescents, represent the fastest-growing demographic for kidney stone disease, with studies showing alarming increases in recurrence rates among young patients.[1] Unlike adults, children are more likely to have underlying metabolic or genetic conditions contributing to stone formation, making them vulnerable to a lifelong pattern of recurrence and intervention.[2]

In response, we designed our monthly kidney stone clinic to meet children where they are with a team that can both treat and prevent. Every patient is evaluated in terms of pediatric urology and nephrology, but also receives dietary counseling and tailored education on hydration and lifestyle factors. When needed, we also involve genetic counselors and mental and behavioral health providers, ensuring families receive a holistic, personalized care plan.

In the 10 months since we opened, more than 30 children have been evaluated, many of whom required surgical intervention or preventive pharmacologic therapy. All families received in-depth education on kidney health and lifestyle guidance, and we offered several families genetic testing that ultimately helped identify rare hereditary conditions. This integration has allowed us to deliver more precise care while reducing fragmented referrals and delays.

Looking ahead, we plan to expand referral access and launch a needs assessment in collaboration with mental and behavioral health. We're also enrolling patients into a prospective kidney stone registry and preparing for a multi-institutional study on diagnostic pathways in pediatric stone disease. Our long-term vision is to establish clinical trial capacity and lead national efforts in pediatric stone research.

At Children's Wisconsin, we are proud to pioneer a collaborative, evidence-informed approach to a rising pediatric challenge. By integrating disciplines and embracing the full patient journey, we aim to rewrite the story of kidney stone disease in childhood and for our patients and for the field.

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Associate Director, Pediatric KIDney Stone (PKIDS) Care Improvement Network



**Jennifer G. Jetton, MD**
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Division Chief of Nephrology and Professor, Medical College of Wisconsin

# Closing the Loop: Advancing the "Act" Phase in Cardiac Surgical Quality Improvement

The science of quality improvement in medicine traces back to Avedis Donabedian, who in 1966 introduced a framework for evaluating health care through structure, process and outcomes.[1] Over time, our field has drawn from industrial engineering, particularly innovations from early 20th century manufacturing.

One of the most influential models is the Plan-Do-Study-Act (PDSA) cycle, created by Walter Shewhart and W. Edwards Deming.[2,3]

The PDSA cycle emphasizes planning, implementing, evaluating and adapting. Yet in cardiac surgery, many improvement efforts stall in the Study phase. We often collect data with great care but fall short of turning those findings into meaningful change. Donald Berwick described this challenge as "quality by inspection," the false belief that measurement alone leads to progress.[4]

A creative answer to this problem came from colleagues at The Hospital for Sick Children in Toronto. Their "Flight Plan" model applies aviation safety principles[5] and uses a control chart to map each patient's journey across the perioperative continuum. This chart highlights milestones, care phases and outcomes, and each case is reviewed in near real time at a weekly multidisciplinary meeting. The process encourages broad participation, invites actionable suggestions and turns reflection into improvement by deliberately activating the Act phase.

At the Herma Heart Institute, we have built on this approach through our "Clinical Case Review." Every Tuesday we gather by teleconference to discuss each patient who had surgery the prior week. We use a summary pictograph to walk through the entire course of care, identifying what went well and where we can improve. Our team members share observations, call out breakdowns and suggest solutions. These conversations lead directly to process targets and timely adjustments in practice.

Clinical Case Review has grown into an embedded intervention that brings together voices across disciplines. Participation has steadily increased, and with it, a shared sense of ownership. Alongside other Act initiatives, this model has contributed to measurable improvements in surgical outcomes and has strengthened our culture of collaboration.

By closing the Shewhart-Deming loop, we are not just tracking outcomes, we are building a culture of responsiveness, accountability and continuous learning for every patient we serve.

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**Robert D. B. "Jake" Jaquiss, MD**
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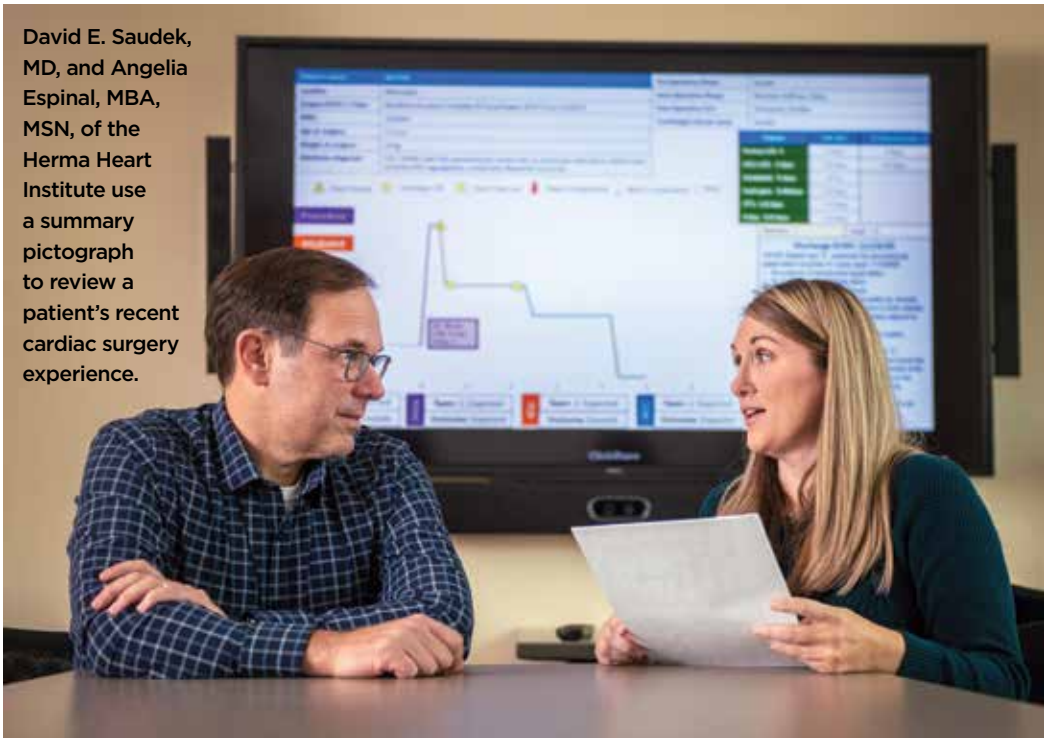
Professor, Medical College of Wisconsin

**David E. Saudek, MD, and Angelia Espinal, MBA, MSN, of the Herma Heart Institute use a summary pictograph to review a patient's recent cardiac surgery experience.**

**"Flight Plan" model applies aviation safety principles and uses a control chart to map each patient's journey across the perioperative continuum.**

## U.S. News

The *U.S. News & World Report* 2025-26 Best Children's Hospitals list ranked Children's Wisconsin No. 1 in Wisconsin and among the best in the nation in five specialties. Children's Wisconsin is the only health system in Wisconsin with the depth of services to achieve this level of recognition in *U.S. News & World Report* for pediatric specialty care.

## American College of Surgeons Surgical Quality Partner

As an American College of Surgeons (ACS) Surgical Quality Partner, Children's Wisconsin is committed to the highest standards of surgical care. This designation reflects our proven record of adhering to the most rigorous standards in surgical quality — to minimize complications, improve outcomes and save lives.

Children's Wisconsin is also an ACS-verified Level 1 Children's Surgery Center. This is the highest level of distinction for hospitals that perform complex surgical procedures in newborns, children and teens. Children's Wisconsin is the highest-rated pediatric surgical center in Wisconsin.

## Pathology

The Accreditation Committee of the College of American Pathologists (CAP) awarded accreditation to the Pathology Program at Children's Wisconsin. This accreditation is based on results of a recent on-site inspection conducted by CAP inspectors, which included practicing pathology and laboratory medicine professionals. Programs are judged on the laboratory's records and quality control of procedures, as well as staff qualifications, equipment, facilities, safety program and record and overall management.

## Radiology/Imaging

In late 2024, the Radiology Program at Children's Wisconsin was designated a Diagnostic Imaging Center of Excellence by the American College of Radiology. This designation means that Children's Wisconsin demonstrates the infrastructure, policies and procedures required to assure consistently high-quality care and service.

The Radiology Program at Children's Wisconsin was first designated in 2015, and also successfully renewed this designation in 2018 and 2021.

## Magnet

In 2025, Children's Wisconsin earned the highly coveted Magnet Recognition Program status for the fifth consecutive time from the American Nurses Credentialing Center (ANCC). Magnet designation is granted every four years to those organizations that demonstrate sustained excellence in nursing care.

What makes this fifth Magnet designation especially exciting is that it validates the quality and standards of care in all areas where nursing is practiced at Children's Wisconsin: our Milwaukee and Fox Valley hospitals, specialty and primary care clinics and community and school-based nursing environments.

Children's Wisconsin now joins the ranks of an elite group of health systems across the globe. Fewer than 3% of health systems worldwide have received Magnet designation, with just 80 organizations — less than .5% — achieving this honor five times.

Magnet status is the highest level of formal recognition for nursing excellence and is considered the gold standard for hospitals. Children's Wisconsin in Milwaukee was one of the first pediatric hospitals to achieve this status when it first achieved Magnet designation in 2004.

# One Team, One Goal: Improving First Case On-Time Starts at Children's Wisconsin

At Children's Wisconsin, the Diagnostic, Anesthesia and Surgical Health (DASH) team embodies the idea of "One Team." Every member of our surgical team — surgeons, anesthesiologists, operative services assistants, surgical technologists, nurses, schedulers, sterile processing and child life specialists — shares a mission to provide the safest, highest-quality care to patients and families. One of the most visible ways we achieve that mission is by ensuring first case on-time starts in the OR.

On-time starts are not simply about punctuality. They are a measure of how well we coordinate across disciplines, respect one another's contributions and keep the patient and family experience at the center. When the first case begins on time, the OR schedule flows smoothly. Rooms are utilized efficiently, delays are reduced and surgical teams can focus fully on patient care instead of rushing to catch up.

For patients and families, an on-time start sets the tone for the surgical experience. Families often arrive early with children who are tired, hungry and anxious. When their child is taken back to the OR as scheduled, it communicates reliability, respect and compassion. It reduces waiting and uncertainty, reinforcing the trust families place in us during vulnerable moments.

Achieving consistent first case on-time starts is a true team sport. Every role in surgical services matters, much like a pit crew at a racetrack. Schedulers ensure that case lengths are accurate so that the flow of the operating room is smooth every day. Anesthesiologists and surgeons arrive promptly to obtain consent and answer questions. Surgical technologists confirm instruments and equipment are ready. OR nurses complete pre-op checks. Sterile processing ensures instruments are sterile and available, and environmental services colleagues provide a clean, safe environment. When each part of the "pit crew" executes with precision, the team delivers on-time starts.

**For families, staff, and providers alike, punctual starts are a symbol of professionalism and teamwork.**

For families, staff and providers alike, punctual starts are a symbol of professionalism and teamwork. They require coordination, accountability and a willingness to step in for one another. A delay in one area becomes a delay for all. Conversely, a proactive handoff, a timely check-in or an extra set of hands can make all the difference.

As the DASH team, we succeed or stumble together. "One Team" means we share responsibility for every outcome. By committing to first case on-time starts, we commit to each other, to efficiency and most importantly to the children and families who rely on us.

Our goal is clear: Every child deserves an OR team that is ready when promised. When we start on time, we honor that promise.


**Channing Tassone, MD**
Director of Pediatric Orthopaedics and Clinical Vice President of Surgical Services, Children's Wisconsin

Professor of Pediatric Orthopaedics, Medical College of Wisconsin

# Forward Pediatric Alliance

In December 2024, Children's Wisconsin and UW Health Kids announced the creation of Forward Pediatric Alliance, a joint venture to advance the health of pediatric and congenital heart disease patients from fetal life through adulthood by delivering outstanding clinical outcomes, driving research and training the next generation of health care providers. By combining strengths, this collaboration expands access, elevates both organizations' already high quality of care and builds a foundation for innovation.

Forward Pediatric Alliance is a model for multi-system collaboration. Though parent organizations Children's Wisconsin and UW Health Kids remain independent, in the cardiac realm they now function as a "one program, two campus" model. Through the alliance, more than 80 pediatric specialists from cardiology, surgery, anesthesiology and critical care will work as one integrated team.

## A Unified Pediatric Cardiac Surgery Team

At the heart of Forward Pediatric Alliance is a shared culture built on trust, collaboration and a commitment to the best outcomes for patients. Jake Jaquiss, MD, Co-Medical Director of Pediatric Cardiothoracic Surgery at the Herma Heart Institute at Children's Wisconsin, emphasizes that the strength of the program lies in the concept that the whole can be greater than the sum of its parts. "This partnership is not about what each organization brings separately, but about what we become together — better, bigger and bolder — bringing truly excellent care to all of the patients in Wisconsin and the upper Midwest," said Dr. Jaquiss.

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Children's Wisconsin | Herma Heart Institute UWHealthKids

# New Faculty

## Anesthesiology

**Brittany Brandt, CAA**
Anesthesia Assistant,
Children's Wisconsin

Anesthesia Assistant,
Medical College of Wisconsin

**Mark Durand, CAA**
Anesthesia Assistant,
Children's Wisconsin

Anesthesia Assistant,
Medical College of Wisconsin

**Sarah Pullos, MD**
Anesthesiologist,
Children's Wisconsin

Assistant Professor,
Medical College of Wisconsin

## Cardiovascular Surgery

**Lydia LaBarbera, PAC**
Physician's Assistant,
Children's Wisconsin

Advanced Practice Provider,
Medical College of Wisconsin

## Dental

**Pollyana Marques de Moura, DDS**
Craniofacial Orthodontist,
Children's Wisconsin

## Ophthalmology

**McKenna Scott, OD**
Pediatric Optometrist,
Children's Wisconsin

Assistant Professor,
Medical College of Wisconsin

## Mental & Behavioral Health

**Charlie Shanaver, PhD**
Pediatric Psychologist, Children's Wisconsin

Assistant Professor, Medical College of Wisconsin

## Pediatric Surgery

**Susan Cronn, APNP**
Pediatric Nurse Practitioner, Children's Wisconsin

Advanced Practice Provider, Medical College of Wisconsin

**Isabelle St. John, APNP**
Pediatric Nurse Practitioner, Children's Wisconsin

Advanced Practice Provider, Medical College of Wisconsin

## Plastic Surgery

**Katherine Daigle, PAC**
Advanced Practice Provider, Children's Wisconsin

Assistant Professor, Medical College of Wisconsin

**Megan Pencek, MD**
Pediatric Plastic Surgeon, Children's Wisconsin

Assistant Professor, Medical College of Wisconsin

## Radiology

**Dylan Applin, MD**
Pediatric Radiologist, Children's Wisconsin

Assistant Professor, Medical College of Wisconsin

**Rachel Wantz, APNP**
Pediatric Nurse Practitioner, Children's Wisconsin

Advanced Practice Provider, Medical College of Wisconsin

## Urology

**Claire Froman, APNP**
Pediatric Nurse Practitioner, Children's Wisconsin

Advanced Practice Provider, Medical College of Wisconsin

# New Appointments

## Aparna Ramasubramanian, MD

Aparna Ramasubramanian, MD, accepted the role of Division Chief of Pediatric Ophthalmology after serving as Interim Division Chief since March 2025. She joined Children's Wisconsin in 2023, bringing expertise in pediatric ophthalmology and ocular oncology along with a strong commitment to mentoring residents. Her background includes medical training in India, residencies at Indiana University and Drexel University and fellowships at Wills Eye Institute and Boston Children's Hospital. Her leadership continues to strengthen clinical care, education and research within the division.

## Robert (Jake) Jaquiss, MD

Robert (Jake) Jaquiss, MD, joined Children's Wisconsin as Co-Director of the Herma Heart Institute (HHI) and Children's Specialty Group Specialty Practice Unit Leader for Cardiovascular Surgery. Selected after a rigorous national search, he brings distinguished experience in congenital cardiac surgery, program leadership and collaboration.

Dr. Jaquiss previously served at UT Southwestern as Professor and Co-Director of the Heart Center, and earlier partnered with Children's Wisconsin physicians to help build HHI into a leading program. His arrival strengthens our ongoing work in quality, innovation and pediatric heart care.

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CHW-97492

# Keeping you informed

**CONNECT WITH PHYSICIAN LIAISONS IN PERSON OR VIRTUALLY**

The Children's Wisconsin physician liaison team is here for referring physicians whenever and wherever you need us.

In addition to serving as a link between Children's Wisconsin and referring physicians, your liaisons can:

- Provide information about services and programs offered by Children's Wisconsin
- Direct you to continuing education opportunities
- Facilitate solutions to referral issues

## PHYSICIAN LIAISONS

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