

KidneyBee
Summit 2026

KidneyBee Summit 2026

July 14-16, 2026

Children's Hospital Colorado

Anschutz Medical Campus | Medical Conference and Education Center
13123 East 16th Avenue, Aurora, Colorado 80045

Provided by

Children's Hospital Colorado, Continuous Renal Replacement Therapy Program

In collaboration with

Children's of Alabama, Cincinnati Children's Hospital Medical Center, and University of Iowa, Stead Family Children's Hospital



Children's Hospital Colorado



Affiliated with
University of Colorado
Anschutz Medical Campus

Children's Hospital Colorado complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex. • ATENCIÓN: si habla español, tiene a su disposición servicios gratuitos de asistencia lingüística. Llame al 1-720-777-1234. • CHÚ Ý: Nếu bạn nói Tiếng Việt, có các dịch vụ hỗ trợ ngôn ngữ miễn phí dành cho bạn. Gọi số 1-720-777-1234.

KidneyBee Summit 2026

Overview, Target Audience and Learner Outcomes

The KidneyBee Summit is a dynamic, interdisciplinary conference dedicated to advancing the science and practice of pediatric continuous renal replacement therapy (CRRT). Designed for nurses, advanced practice providers, and physicians, the program blends practical application, emerging therapies, and collaborative strategy to improve outcomes for critically ill children. Attendees will engage in case-based discussion and expert-led sessions that strengthen clinical decision-making, technical proficiency, and team-based care.

After participating in this two-day conference, learners will demonstrate increased knowledge, and clinical reasoning related to pediatric acute kidney injury (AKI) and continuous renal replacement therapy (CRRT), as evidenced by self-reported ability to apply evidence-based practices, troubleshoot therapy challenges, and collaborate effectively within multidisciplinary teams.

Objectives

- Evaluate and apply key principles of pediatric acute kidney injury (AKI), including pathophysiology, risk factors, high-risk populations, and emerging therapies to inform CRRT-related clinical decision-making.
- Apply evidence-based strategies for CRRT delivery, including technology selection, vascular access, anticoagulation, individualized prescription, integration with adjunct therapies, and bedside management to optimize patient outcomes.
- Analyze and implement best practices in multidisciplinary CRRT care, including team-based decision-making, program development, education, and quality improvement to advance pediatric CRRT delivery.

Agenda

Tuesday, July 14, 2026

Base Camp - Pre-Conference

Spend the morning building a practical foundation in pediatric CRRT, including machine fundamentals, alarm troubleshooting, prescription design, and integration with ECMO and other extracorporeal therapies. In the afternoon, apply those concepts during an interactive, team-based case study workshop spanning initiation through liberation. Designed for both newer and experienced clinicians, this pre-conference emphasizes hands-on learning, clinical reasoning, and interdisciplinary collaboration.

7:00 a.m. **Registration, Check-in and Breakfast**

8:00 – 11:35 **Rotating Breakouts**

Basecamp Equipment Check: CRRT Machine Fundamentals

Location: Mt. Princeton

Amanda Snyder MSN, APRN-CNP, CNL | David Zolezzi, MSPAS, PA-C

Trail Hazards: Navigating Alarms and Troubleshooting

Location: Mt. Columbia

Sarah Franz, BSN, RN | Katie Plomaritas, BSN, RN

Designing the Trail Map: Crafting CRRT Prescriptions

Location: Mt. Oxford

Theresa Mottes, MSN, APRN, CDN | Brynna Van Wyk, ARNP, MSN

Crossing Terrain Types: Integrating Tandem Therapies

Location: Mt. Yale

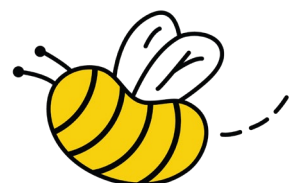
Jolyn Morgan, DNP, APRN-CNP, CDN | Kara Short, MSN, CRNP, CPNP-PC

Suzan Stephens, BSN, RN, CNN | Sara M. Sullivan, BSN, RNC-NIC, CCRN

11:35 a.m. –

12:30 p.m.

Lunch – provided



12:30 – 3:00

CRRT Track and Field

[Location: Mts. Yale and Princeton](#)

KidneyBee Founders

The CRRT Track and Field Challenge is a fast-paced, hands-on team event designed to combine critical thinking, technical CRRT skills, and a little friendly competition through a series of interactive CRRT-focused clinical challenges!

3:25 – 4:25

Concurrent Sessions

Workshop: Interactive CRRT Case Studies

[Location: Mt. Oxford](#)

Jolyn Morgan, DNP, APRN-CNP, CDN | Kara Short, MSN, CRNP, CPNP-PC

Amanda Snyder MSN, APRN-CNP, CNL | Brynna Van Wyk, ARNP, MSN

David Zolezzi, MSPAS, PA-C

CRRT Procedures | Prime Lab (limited to 30 learners)

[Location: Mts. Yale and Princeton](#)

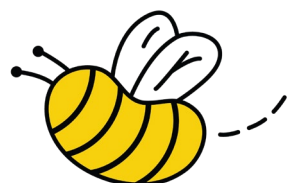
Katherine Lewandowski, MSN, RN, CCRN | Calette Thomas, BSN, RN, CPN, CCRN

Sarah Franz, BSN, RN | Katie Plomaritas, BSN, RN | Alyssa Umberger, MSN, CRNP

This interactive session provides participants with hands-on experience using major CRRT platforms. Content will focus on circuit priming, recirculation, and circuit-to-circuit priming, with an emphasis on practical application and skill development.

4:25

Adjourn Base Camp Pre-Conference



Tuesday, July 14, 2026

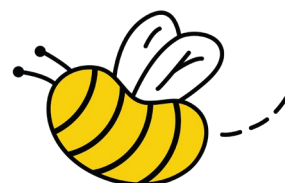
KidneyBee Summit 2026 Opening Ceremony

Location: Mt. Oxford

- 4:35 – 4:45 p.m. **Opening remarks: Welcome to the Summit**
Michele Pietras MS, MBA, RN, NEA-BC
- 4:45 – 4:55 **"The Flight of the KidneyBee"**
Sarah Franz, BSN, RN
- 4:55 – 5:10 **Building the Hive: Nursing-Provider Partnerships in CRRT Programs**
Stuart Goldstein, MD, FAAP, FNKF
- 5:10 – 6:00 **Keynote**
Theresa Mottes, MSN, APRN, CDN
- 6:00 **Welcome Reception with the Exhibitors**
Location: Lobby

Wednesday, July 15, 2026

- 7:00 a.m. **Registration, Check-in, and Breakfast**
- 8:00 – 10:10 **Main Plenary 1 Sessions**
Location: Mt. Oxford
- The Expedition Team: Care Models, Communication, and Collaboration**
Amanda Snyder, MSN, APRN-CNP, CNL
- Building the Basecamp: Program Infrastructure and the CRRT Clinician Journey**
Sarah Franz, BSN, RN
- AKI Fundamentals: Understanding the Landscape**
Weiwen Vivian Shih, MD
- The Altitude Guide: Physiology and Modalities in CRRT**
Amanda Snyder, MSN, APRN-CNP, CNL
- Gear Check: Devices, Filters, and What's in the Pack**
Kara Short, MSN, CRNP, CPNP-PC
- Setting Your Anchor: Mastering Vascular Access**
Sarah Franz, BSN, RN
- Safe Launch from Basecamp: Best Practices for Initiating CRRT**
Katie Plomaritas, BSN, RN
- 10:00 – 10:10 **Main Plenary 1 Questions and Answers**
- 10:10 – 10:25 **Coffee Break**
- 10:25 – 12:00 **Main Plenary 2 Sessions**
Location: Mt. Oxford
- The Smallest Climbers: Neonatal AKI and Outcomes**
Cara Slagle, MD, MS
- Climbing with Caution: CRRT in the Cardiac Patient**
Katja (Kat) Gist, DO, MSc, FAHA
Amelia Wirth, MSN, RN, CCRN



Storms on the Ridge: Understanding Sepsis-Related AKI

Aadil Kakajiwala, MD, MSCI

Finding Your Footing: Biomarkers and Fluid Balance on Unstable Ground

Kyle Merrill, MD, MS

When the pack gets too heavy: Understanding Fluid Overload

Stuart Goldstein, MD, FAAP, FNKF

Customizing the Route: Personalized CRRT Prescription Strategies

Brynna Van Wyk, ARNP, MSN

12:00 – 12:10 p.m. **Main Plenary 2 Questions and Answers**

12:10 – 1:00 **Lunch** – provided

12:10 – 12:40 **From Trail Guide to Expedition Leader: Nursing Pathways in CRRT**

[Location: Mts. Yale and Princeton](#)

KidneyBee Founders

1:00 – 2:45 **Main Plenary 3 Sessions**

[Location: Mt. Oxford](#)

Abstract Presentations

Tracing the Old Trail: The Evolution of Pediatric CRRT

Brynna Van Wyk, ARNP, MSN

Smoother Trails Ahead: Anticoagulation Principles in CRRT

Jolyn Morgan DNP, APRN-CNP, CDN

Fueling the Climb: Nutrition Strategies During CRRT

Kara Short, MSN, CRNP, CPNP-PC

Beyond the Bedside: Intraoperative CRRT in Pediatric Care

Sarah Franz, BSN, RN | David Zolezzi, MSPAS, PA-C

2:45 – 2:55 **Main Plenary 3 Questions and Answers**

2:55 – 3:10 **Break**

3:10 – 3:45 **Main Plenary 4 Session**

[Location: Mt. Oxford](#)

Climbing Higher: Continuous Quality Improvement in Pediatric CRRT

Theresa Mottes, MSN, APRN, CDN

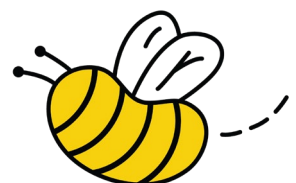
Building New Trails: Research & Collaborative Pathways to Better Outcomes

Katja (Kat) Gist, DO, MSc, FAHA

3:45 – 3:55 **Main Plenary 4 Questions and Answers**

3:55 – 4:10 **Closing Remarks and Adjourn**

Sarah Franz, BSN, RN | Kara Short, MSN, CRNP, CPNP-PC



Thursday, July 16, 2026

Simulation Day

Calette Thomas BSN, RN, CPN, CCRN | Katherine Lewandowski, MSN, RN, CCRN | Sarah Franz, BSN, RN
Manuela Wilde, BSN, RN, CCRN, TNCC | Samantha Curoe, BSN, RN, CPN

Learners will have the opportunity to engage in hands-on high-fidelity simulation sessions designed to reflect real-world CRRT practice across care environments. Each simulation block is 3.5 hours in length and begins with a 30-minute hosted light breakfast or light lunch, followed by two immersive 90-minute patient simulations.

Each session will include both an Operating Room (OR) scenario and an Intensive Care Unit (ICU) scenario, each structured with a prebrief, high-fidelity simulation, and facilitated debrief to promote deliberate practice, critical thinking, and team-based learning.

Upon completion of this multi-modal simulation experience, participants will be able to integrate evidence-based assessment, clinical reasoning, and technical skills to safely manage patients with acute kidney injury requiring Continuous Renal Replacement Therapy (CRRT), as measured by post-simulation evaluation.

Session 1

7:30 – 8:00 a.m. Breakfast and check-in
[Location: Mt. Harvard](#)
8:00 – 11:00 Simulation Lab

Session 2

10:30 – 11:00 Breakfast and check-in
[Location: Mt. Harvard](#)
11:00 a.m.
– 2:00 p.m. Simulation Lab

KidneyBee's Commercial Partnerships and Exhibitors

We would like to sincerely thank our industry partners for their generous support of KidneyBee Summit 2026. Their generosity helped make this conference possible and provided the equipment and resources that bring our hands-on learning experiences to life. We are sincerely grateful for their commitment to advancing pediatric CRRT education.

Silver Level

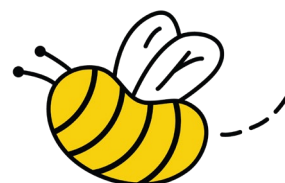
Mozarc Medical
Vantive

Bronze Level

SeaStar Medical
Nuwellis

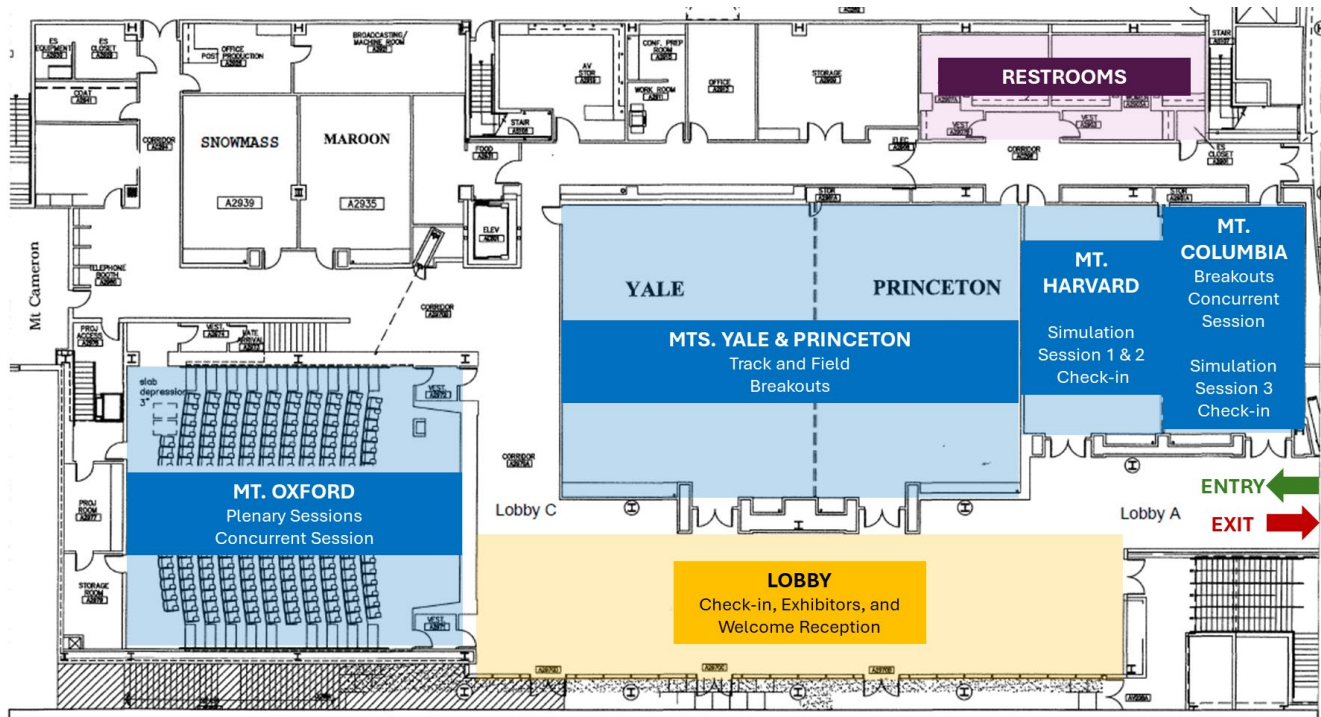
Track and Field Event Partner

BioPorto



Summit Location

Children's Hospital Colorado – Medical Conference and Education Center, 2nd floor
13123 East 16th Avenue, Aurora, CO 80045



Mark Your Attendance

Please visit the check-in tables to mark your attendance. You only need to do this once for the Base Camp and Summit. Separate attendance will be required for the Simulation sessions.

Evaluation

To obtain your continuing education credit certificate, the on-line evaluation must be completed by midnight, Wednesday, July 29, 2026.

After completing the evaluation, you will be prompted to claim your continuing education credits. Any questions or concerns with access should be directed to ce@childrenscolorado.org.

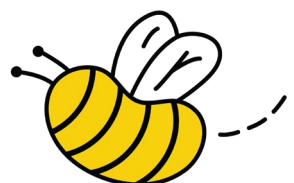
Continuing Education Credit

Registration, attendance, and submission of the **evaluation,** including a written response to questions related to any change in practice that you may make as a result of learning that took place at this activity, are required for successful completion and receipt of the certificate of attendance. Claim only those hours you attend.

Medical: Children's Hospital Colorado is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Children's Hospital Colorado designates this live activity for a maximum of 15.25 *AMA PRA Category 1 Credit(s)*[™]. Physicians should only claim credit commensurate with the extent of their participation in the activity.

- Base Camp – Pre-Conference, 7/14: **6.75 hours**
- The Summit, 7/14-15: **8.5 hours**



Nursing: Children's Hospital Colorado is approved with distinction as a provider of nursing continuing professional development by Colorado Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation. This educational activity for a maximum of 18.25 nursing contact hour(s) is provided by Children's Hospital Colorado.

- Base Camp – Pre-Conference, 7/14: **6.75 hours**
- The Summit, 7/14-15: **8.5 hours**
- The Simulation Day, 7/16: **3 hours**

Others: Will receive a general certificate of attendance

Faculty

Samantha Curoe, BSN, RN, CPN
Pediatric Intensive Care Unit CES
Children's Hospital Colorado

Sarah Franz, BSN, RN
Clinical Program Manager
CRRT Program
Children's Hospital Colorado

Katja (Kat) Gist, DO, MSc, FAHA
Assistant Professor, Pediatrics
University of Colorado School of Medicine
Pediatric Intensivist
Children's Hospital Colorado

Stuart Goldstein, MD, FAAP, FNKF
Professor, Department of Pediatrics
University of Cincinnati College of Medicine
Director, Center for Acute Care Nephrology
Medical Director, Pheresis Service
Co-Director, Heart Institute Research Core
Cincinnati Children's Hospital Medical Center

Aadil Kakajiwala, MD, MSCI
Associate Professor, George Washington University
Faculty, Children's National Hospital
Department of Pediatric Critical Care Medicine and
Nephrology

Katherine Lewandowski, MSN, RN, CCRN
Clinical Education Specialist
CRRT Program
Children's Hospital Colorado

Kyle Merrill, MD, MS
Clinical Assistant Professor
Associate Medical Director Pediatric Dialysis
Director of Acute/Inpatient Dialysis
Division of Nephrology, Dialysis and Transplantation
Stead Family Department of Pediatrics
University of Iowa Health Care

Jolyn Morgan, DNP, APRN-CNP, CDN
Clinical Manager, The Heart Institute and the Center
for Acute Care Nephrology
Certified Acute Care Pediatric Nurse Practitioner,

Division of Nephrology and Hypertension
Cincinnati Children's Hospital Medical Center

Theresa Mottes, MSN, APRN, CDN
Pediatric Nurse Practitioner
Operations Director of Acute Dialysis & Pheresis
Ann & Robert Lurie Children's Hospital

Michele Pietras, MS, MBA, RN, NEA-BC
Director, Patient Care Services, North Metro Region,
Network of Care
North Campus | Uptown | Wheat Ridge
Children's Hospital Colorado North Campus

Katie Plomaritas, BSN, RN
Pediatric CRRT and TPE Clinical Care Coordinator
Mott Children's Hospital, Michigan Medicine
University of Michigan, Ann Arbor MI

Calette Thomas, BSN, RN, CPN, CCRN
Clinical Practice Specialist
CRRT Program
Children's Hospital Colorado

Weiwen Vivian Shih, MD
Associate Professor of Pediatric-Nephrology
University of Colorado School of Medicine
Clinical Medical Director
Attending Physician, Pediatric Nephrology
Children's Hospital Colorado

Kara Short, MSN, CRNP, CPNP-PC
Co-Director, NICKS
Clinical Practice Coordinator, PICAN
Pediatric Nurse Practitioner, Acute Dialysis and
Pheresis Team (ADAPT)
Children's of Alabama

Cara Slagle, MD, MS
Associate Professor of Clinical Pediatrics
Indiana University School of Medicine
Neonatologist and Associate Medical Director -
Simon Family Tower Level IV NICU
Riley Hospital for Children



Suzan Stephens, BSN, RN, CNN

Clinical Level IV Staff Nurse
Therapeutic Apheresis
Children's Hospital Colorado

Sara M. Sullivan, BSN, RNC-NIC, CCRN

ECMO clinical Supervisor / VAD Coordinator
Children's Hospital Colorado

Amanda Snyder, MSN, APRN-CNP, CNL

Nurse Practitioner, Division of Nephrology and
Hypertension
Cincinnati Children's

Alyssa Umberger, MSN, CRNP

Acute Dialysis Nurse Practitioner
Children's of Alabama

Brynna Van Wyk, ARNP, MSN

Nurse Practitioner
Stead Family Children's Hospital

Manuela Wilde, BSN, RN, CCRN, TNCC

Pediatric Intensive Care Unit CES
Children's Hospital Colorado

Amelia Wirth, MSN, RN, CCRN

Clinical Practice Specialist
Cardiac Intensive Care Unit
Children's Hospital Colorado

David Zolezzi, MSPAS, PA-C

Physician Assistant
Department of Pediatric Nephrology
Children's Medical Center Dallas

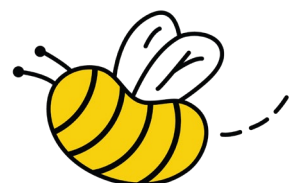
Financial Disclosure

The following planners, faculty, and individuals in control of educational content have disclosed relevant financial relationships with ineligible companies.

In accordance with Children's Hospital Colorado Nursing Continuing Professional Development (NCPD) and ACCME accreditation requirements, all relevant financial relationships for individuals in a position to control the content of this educational activity have been identified, reviewed, and appropriately mitigated prior to the activity through independent peer review and evaluation for commercial bias. No unresolved relevant financial relationships remain that could influence the content of this activity.

Individual	Relevant Financial Relationship(s)
Cara L. Slagle, MD, MS	Consultant – Mozarc Medical
Katja Gist, DO, MSc	Consultant – BioPorto Diagnostics
Stuart L. Goldstein, MD	Consultant – BioPorto Diagnostics Educational Grant – BioPorto Diagnostics Consultant – Vantive
Kara Short, MSN, CRNP	Consultant – SeaStar Medical
Amanda Snyder, APRN, CNL	Consultant – Mozarc Medical
David Zolezzi, PA-C	Consultant – SeaStar Medical
Jolyn Morgan, APRN	Consultant – Mozarc Medical
Kyle Merrill, MD, MS	Consultant – BioPorto Diagnostics LLC

All other planners, faculty, reviewers, and individuals in control of educational content have disclosed no relevant financial relationships with ineligible companies.



Content Disclosure

This document/presentation was created by Children's Hospital Colorado and is intended for the internal use of Children's Hospital Colorado team members only. This document/presentation and the information it contains may not be distributed externally or reproduced for external distribution in any form without express written permission of Children's Hospital Colorado. The information presented is intended for informational and educational purposes only and is provided for use solely at your own risk on an "as-is" basis. No representations are made that the content is error-free. Any person or entity viewing this information should conduct their own review of the specified topic(s) and customize the information to meet their specific needs and/or specific patient needs. Children's Hospital Colorado accepts no liability for the content, or for the consequences of any actions taken on the basis of the information provided, and all liability is hereby expressly disclaimed.



Abstracts



Children's Hospital Colorado



Affiliated with
University of Colorado
Anschutz Medical Campus

Children's Hospital Colorado complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex. • ATENCIÓN: si habla español, tiene a su disposición servicios gratuitos de asistencia lingüística. Llame al 1-720-777-1234. • CHÚ Ý: Nếu bạn nói Tiếng Việt, có các dịch vụ hỗ trợ ngôn ngữ miễn phí dành cho bạn. Gọi số 1-720-777-1234.

Evaluating the Role of a Specialized Team in Neonatal Continuous Renal Replacement Therapy

Caroline Maloney

Children's Hospital Colorado

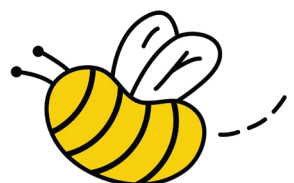
caroline.maloney@childrenscolorado.org

The Children's Hospital Colorado NICU saw a sharp increase in Continuous Renal Replacement Therapy (CRRT) in 2024 due to utilization of the Carpediem machine. By May of 2024, four patients needed CRRT, compared to three in 2023 and two in 2022.

With this significant increase in volume, a multidisciplinary stakeholder group assembled to evaluate opportunities for consistency in care as well as education for provider groups. With current successful structures in place for specialized care teams, the NICU determined that a dedicated team of bedside nurses should be created. This team would have specialized education and training to partner with the CRRT pump specialists and support this complex patient population.

An evidence-based practice project framework was utilized, and in October 2024, the team was created with a total of 32 nurses evenly distributed between both shifts. By receiving additional education and training, the goal was for the nurses on this team to report an increase in knowledge, competency, and confidence.

Since its development, this team has cared for eight patients, totaling 170 patient days. At 18 months, the team is just below the initial goal of patients being cared for by a CRRT team nurse for 90% of their treatment course. This is an improvement from continuity of care being provided 50% of the time prior to implementation. While CRRT has seen periods of infrequency in the NICU, initial data supports the development of a specialized team for consistency in care and improving nursing comfort in caring for these patients.



Advanced CRRT Expert (ACE) RN Role: Development and Pilot Implementation of a Structured Staffing and Support Model in a Pediatric Critical Care Program

Sarah Franz, BSN, RN, Calette Thomas, BSN, RN, CCRN

Purpose:

Continuous Renal Replacement Therapy (CRRT) is a high-risk extracorporeal therapy requiring advanced nursing competency. Growth in CRRT volume and program scope has not been matched by increased around-the-clock expert support, and variability in experience and skill mix can create gaps in troubleshooting and clinical decision making. We developed and piloted an Advanced CRRT Expert (ACE) RN role to provide structured, real-time support to CRRT specialists, enhance nursing competency, and improve consistency in CRRT delivery.

Methods:

A three-month ACE RN pilot was implemented in all areas where CRRT is performed to support a PICU-based CRRT specialist team (approximately 50 trained RNs) managing CRRT devices across those areas. Candidates underwent a structured selection process, with 9 of 15 selected following review by CRRT and PICU leadership.

A CRRT census and acuity-driven staffing model guided role activation. When criteria were met, the ACE RN was removed from patient assignments to provide dedicated support to CRRT specialists; otherwise, they remained in unit staffing. Responsibilities included real-time troubleshooting, support for CRRT initiation and maintenance, and just-in-time education. A daily tracking tool captured utilization and staff feedback.

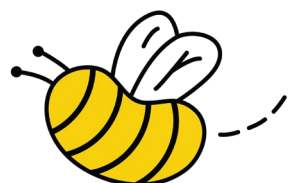
Of 92 pilot shifts, 21 (22.8%) met criteria; of these, full role deployment occurred in 6 shifts (29%) due to PICU staffing limitations. During the pilot, CRRT volume was lower than the prior year (42% decrease), providing limited high-volume conditions for role utilization.

Results:

The ACE RN was integrated into staffing workflows and utilized during high-demand periods. Specialist feedback identified improved access to real-time expertise, particularly for CRRT initiation, troubleshooting, and procedural support, and highlighted ongoing unmet need during shifts when the ACE RN was unavailable.

Conclusion:

Sustaining an expert-level role within existing staffing structures presents challenges related to scheduling complexity, workforce experience variability, and role standardization. A criteria-driven ACE RN model remains promising, with future efforts focused on dedicated staffing models to support sustainability.



Creating Sustainable Practices in Renal Replacement Therapy: A Waste Reduction Project

Boh Song, PharmD, BCPPS; Sarah Belz, PharmD, BCPPS; Aadil Kakajiwala, MD

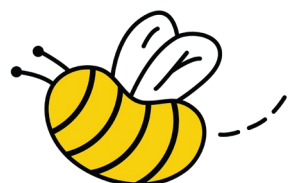
Background: Continuous renal replacement therapy (CRRT) provides continuous solute clearance and fluid removal in patients with severe acute kidney injury (AKI). CRRT is resource-intensive and expensive for both healthcare facilities and patients due to the need for specialized equipment, supplies, and intensive care/monitoring.

Objective: The objective of this quality improvement (QI) project was to reduce waste and preserve resources ultimately to promote healthcare sustainability related to renal replacement therapy.

Methods: Premade dialysate solutions come in dual-chamber bags where the internal seal separating the two chambers must be broken and mixed immediately prior to use. Once the internal seal is broken, the dialysate must be used within 24 hours. Previously, at Children's National Hospital (CNH), pharmacy use to mix prior to delivering the dialysate bags regardless of the need for pharmacy-compounded additives, such as potassium, phosphate, and sodium, however this often resulted in waste when the dialysate bags were no longer needed for the patient, as it could not be returned to inventory due to the broken seal and beyond-use-date. Phase

1 of this QI project involved the dialysis nurse mixing at bedside immediately prior to use for dialysate bags that did not require pharmacy-compounded additives. Phase 2 involved adding additional dialysate bags to formulary so that no dialysate bags required potassium phosphate additives.

Results: Dialysate bag return waste decreased from 100% to 13%.



Stopping the Titration Cycle: Standardizing Heparin Management in Pediatric CRRT

April Lederman, Lawrence Copelovitch, Bridget Blowley

Background: Variabilities in the point of care activated clotting time (ACT)-based monitoring anticoagulation assay and management practice during continuous renal replacement therapy (CRRT), contribute to inconsistent heparin dosing, the need for frequent titration, and increased nursing workload. A standardized lab-based protocol may improve consistency and workflow efficiency.

Methods: We conducted a detailed retrospective analysis of our first patient who was initially on CRRT using the ACT-based anticoagulation protocol and crossed over to the PTT-based protocol after implementation was initiated at our institution. Outcomes included heparin dosing, titration frequency, and laboratory monitoring frequency.

Results: On the ACT-based management protocol, heparin increased from 5 to 68 units/kg/hr. over two months, requiring frequent dose titrations to maintain therapeutic targets. Following transition to the PTT-based protocol, the patient initiated therapy at 10 units/kg/hr. and stabilized at 25 units/kg/hr. over five months, a greater than 60% reduction in peak heparin exposure. Monitoring standardized to q4h regardless of dose changes, streamlining nursing workflow. PTT frequency was reduced to q12h once the patient remained stable for 48 hours, with no filter failures or therapy interruptions throughout. Prior to CRRT reinitiation, the protocol algorithm identified an out-of-range PTT, prompting the care team to administer a heparin bolus before starting therapy, ensuring appropriate anticoagulation coverage from initiation and supporting circuit stability.

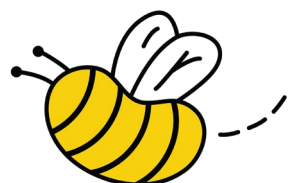
Conclusion: Implementation of a standardized PTT-based anticoagulation protocol reduced variability in heparin dosing, total heparin exposure, and titration frequency while simultaneously improving workflow efficiency. Early findings demonstrate improved consistency in CRRT anticoagulation management and support ongoing evaluation.

References

Deep, A., & Brophy, P. (2018). Anticoagulation in continuous renal replacement therapy (CRRT). In *Critical care nephrology and renal replacement therapy in children*. Springer Nature.

Legrand, M., & Tolwani, A. (2021). Anticoagulation strategies in continuous renal replacement therapy. *Seminars in Dialysis*, 34(6), 416–422. <https://doi.org/10.1111/sdi.12959>.

Liu, Y., Yuan, Z., Han, X., Song, K., & Xing, J. (2022). A comparison of activated partial thromboplastin time and activated coagulation time for anticoagulation monitoring during extracorporeal membrane oxygenation therapy. *Hamostaseologie*, 43(3), 171–178. <https://doi.org/10.1055/a-1796-8652>.



The 4 W's of Continuous Renal Replacement Therapy (CRRT) Simulation

Lainey Segovia, RN, CCRN, Lexy Valtierra, RN, Taelor Pena, RN

Our team launched a Continuous Renal Replacement Therapy (CRRT) program with the goal of developing a standardized education model for nurses delivering CRRT at the bedside. Our standard CRRT education was a half-day of didactic instruction, followed by hands-on priming and troubleshooting. At the bedside, we observed growing variation in practice, errors, and a lack of knowledge among our staff. This highlighted why our current education model was ineffective.

We turned to simulation-based learning. What began as a solution to improve practice evolved into a comprehensive simulation program, facilitated by CRRT nurse coordinators and a CRRT physician assistant, who underwent formal training through our hospital's simulation instructor program. Those who participated in the simulation were our CRRT trained staff, who eagerly signed up for 2-hour blocks over three days in March 2026.

An ICU simulation room, where we held the training, allowed for a dynamic environment with hands-on experience. Pre- and post-tests were administered, measuring participants' knowledge and confidence. The results were striking: the average pre-test score was 46%, and the post-test score rose to 73%.

34 participant's feedback showed "major improvement" in six key areas: patient assessment, teamwork, technical skills, patient safety, providing safe care, and confidence in the learning environment.

In conclusion, incorporating simulation into our CRRT education has drastically improved both the confidence and competence of our clinical staff. Results emphasize the value of hands-on learning and the need for ongoing innovation in healthcare education.



Smarter Nutrition: Right-Sizing Nutritional Monitoring in Patients on CRRT

David Zolezzi, PA-C; Elizabeth Journey, MS, RD, LD, CNSC;
Jayne Walters, RD, CSPCC, LD

Background

- Continuous renal replacement therapy (CRRT) non-selectively clears solutes, leading to unintended micronutrient losses
- Nutritional monitoring practices for patients on CRRT vary across institutions, with leading centers adopting symptom-driven testing
- At our institution, a monthly nine-lab micronutrient panel is standard practice: carnitine, vitamin C, vitamin B1, vitamin B6, vitamin B12, selenium, copper, zinc, and folate

Local Problem

- Retrospective review of patients on CRRT for ≥ 2 weeks within the past two years demonstrated low rates of deficiency, with most results normal or elevated, yielding limited clinical actionability
- 7 out of 9 labs are send-out assays with a 7–10 day turnaround time, limiting real-time decision-making
- Routine testing increases healthcare costs and downstream resource utilization
- High-volume lab ordering contributes to provider cognitive burden, requiring review, interpretation, documentation, and follow-up of largely non-actionable results
- The current monthly panel fails to differentiate high-yield from low-yield micronutrient tests

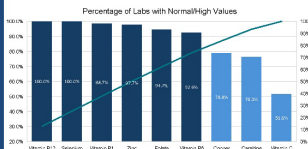


Figure 1. Pareto analysis of micronutrient results in pediatric CRRT patients. Analyses with 280% normal/high values demonstrate low deficiency yield, while copper, carnitine, and vitamin C fall below the 80% threshold, indicating higher deficiency rates.

Aim

By March 1, 2026, we aim to reduce low-yield micronutrient laboratory testing by 20% and associated costs by 20% among pediatric patients receiving CRRT at our institution, while maintaining patient safety and nutritional adequacy.

Scope

- Includes micronutrient monitoring, laboratory ordering, and provider decision making for pediatric patients receiving CRRT.
- Includes associated costs, electronic medical record documentation and order sets, and provider satisfaction with workload.
- Includes patients admitted to the Neonatal, Cardiac, or Pediatric Intensive Care Unit (PICU, NICU, CVICU) and receiving CRRT at Children's Medical Center Dallas.
- Excludes empiric micronutrient supplementation, non-CRRT related laboratory testing, patients not receiving CRRT, outpatient micronutrient monitoring, long-term management of micronutrients following CRRT discontinuation.

Methodology



Figure 2. PDSA Cycle 1

Measures	Goal	Definition
Outcome	20% reduction in micronutrient lab testing and cost	Total number of CRRT-related vitamin and trace element labs ordered and total monthly cost per patient per month
Process	> 90% adherence to updated CRRT nutrition monitoring protocol	Percentage of CRRT patients whose micronutrient labs align with the new guideline
Balancing	No increase in incidence of clinically significant micronutrient deficiency	New signs or symptoms consistent with vitamin or trace element deficiency
	Neutral or improved staff satisfaction or perceived workload	Survey responses regarding clarity and efficiency of the new workflow

Figure 3. Process, outcome, and balancing measures to evaluate progress toward the project aim

Intervention

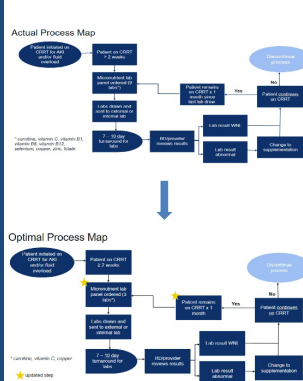


Figure 4. Actual versus optimal process maps for micronutrient monitoring in patients receiving CRRT. The actual process (top) demonstrates a broad, time-intensive micronutrient testing workflow, while the optimized process (bottom) highlights targeted testing and standardized reassessment to improve efficiency and support timely clinical decision-making.

Results

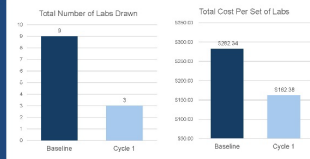


Figure 11. Impact of targeted micronutrient monitoring on laboratory utilization. Implementation of a streamlined testing strategy reduced micronutrient laboratory orders from 9 to 3 tests per month (67% reduction).

Figure 12. Impact of targeted micronutrient monitoring on cost. Implementation of a streamlined testing strategy decreased associated monthly costs from \$282.34 to \$162.38 (42% reduction).

Discussion & Conclusion

- Value-based impact:** Targeted micronutrient monitoring in pediatric CRRT reduces low-value testing, cost, and cognitive burden while maintaining patient safety.
- Standardized practice implemented:** Obtain the "Three C's" (copper, carnitine, vitamin C) at 2 weeks after RRT initiation, at 1 month, and monthly thereafter while patients remain on RRT, with additional testing as clinically indicated by dietitians, ICU teams, or nephrology providers.
- Clinical flexibility preserved:** Providers may order micronutrient testing earlier, later, or selectively based on individual patient needs and clinical judgment.
- Additional testing considerations:** Consider expanded micronutrient testing every 2 months while on RRT, particularly for patients receiving total parenteral nutrition (TPN), with limited nutrition provision, symptoms of deficiency or toxicity on high-dose CRRT, or prolonged RRT duration.

Next Steps

- Collect and analyze data at 3-months post PDSA Cycle 1 completion
- Monitor for balancing and process measures
- Complete PDSA Cycle 2
- Scale practice across all ICUs
- Pursue formal institutional guideline adoption
- Pilot empiric micronutrient supplementation protocols and assess effects on laboratory utilization, clinical outcomes, and patient safety.

References

- Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. (2012). KDIGO clinical practice guideline for acute kidney injury. 2(1), 1-138. <https://kdigo.org/guidelines/acute-kidney-injury/>
- Raina, R., Suchan, A., Sethi, S. K., et al. (2024). Nutrition in critically ill children with AKI on continuous RRT: Consensus recommendations. Kidney360, 5, 285–309. <https://doi.org/10.34067/KID.0000000000000033>

Acknowledgements

Molly Wong Vega, PhD, RD, ACSM-EP, Assistant Professor, Division of Pediatric Nephrology Department of Pediatrics, Baylor College of Medicine Clinical Dietitian, Texas Children's Hospital

QI Tools

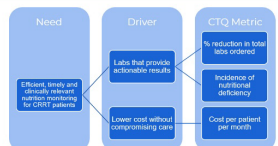


Figure 5. Critical to Quality tree demonstrating the customer need, driver, and metric.

Suppliers	Input	Process	Output	Customers
Acute Care Nephrology	Monthly CRRT monitoring orders (8 labs)	1. Provider writes monthly micronutrient panel	Micronutrient lab results	Patient
Clinical Nutrition	Patient CRRT status	2. Labs chosen and sent to internal or reference lab	Cost and resource utilization data	Nephrology and ICU providers
Internal care units (CVICU, NICU, PICU)	Lab supplies	3. Results return after ~7-10 days		Clinical Dietitians
Pharmacy	None	4. Dispenser receives results		Pharmacy
Laboratory	Blood	5. Lab received monthly		Quality and Safety teams
Electronic Health Record (EHR)				Cost and resources

Figure 7. SIPOC diagram outlining the current-state process for micronutrient monitoring in pediatric CRRT patients

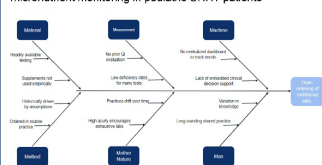


Figure 9. Fishbone diagram illustrating factors contributing to over-ordering of micronutrient laboratory values.

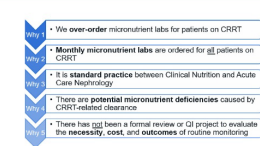


Figure 6. Five Whys analysis identifying root causes of low-value micronutrient laboratory testing in pediatric CRRT.



Figure 8. Stakeholder management plan outlining engagement strategies.

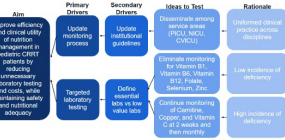
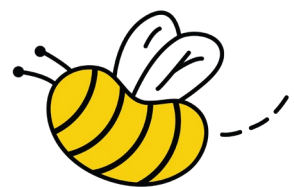


Figure 10. Driver diagram illustrating primary drivers and change ideas to reduce low-value micronutrient testing in pediatric CRRT.



Rebuilding Confidence in Prismaflex Use Through Simulation Based Skill Refreshers

Katie Tomaselli, BSN, RN, Elena Feldhaus, BSN, RN, Christina Salisbury, BSN, RN

Background: Continuous Renal Replacement Therapy (CRRT) is a slow continuous dialysis treatment for critically ill pediatric patients. At Phoenix Children's CRRT is performed in the PICU, NICU, and CVICU using both Prismaflex and Prismaflex machines. While Prismaflex is the preferred machine amongst staff, the Prismaflex is still needed at times due to regular preventative maintenance, technical issues, and high patient volume. Infrequent use of Prismaflex has led to a decrease in staff familiarity and comfort levels with this machine.

Objective: To increase CRRT specialists' familiarity and confidence with the Prismaflex machine. Including developing skills related to priming filters, initiating therapy, and troubleshooting alarms.

Method: We arranged one-hour Prismaflex skill refreshers for our CRRT specialists to attend. During these sessions they could come into a low stress non-patient care environment to practice. Two experienced CRRT specialists facilitated each session. Participants practiced machine set up, filter priming, simulated blood priming, line connection to a test patient, alarm troubleshooting, and treatment termination with blood return.

Results: Participants completed pre and post activity surveys rating confidence levels on a 1-5 scale. Post-intervention results showed an approximate 52% increase in confidence levels. Facilitators also improved session efficiency by developing streamlined set up and reset processes. Impact: These refreshers significantly improved staff confidence with Prismaflex use. This intervention will better prepare our specialists to provide safe care to our patients. Additionally, this provided team bonding in a supportive learning environment. Ongoing skill development through a simulation is expected to further improve competency and safe patient outcomes.



Advancing Clinical Confidence in ECMO-CRRT Interventions Through Structured High-Fidelity Simulation (2024–2025)

Andrew Frankowiak BSN, RN, CCRN; Christina Madrigal BSN, RN; Katie Plomaritas BSN, RN;
Sara Hoatlin BSN, RN; Spencer Hanson MA, RRT, RRT-NPS, RRT-ACCS;
Denise McCaskey BSN, RN, CCRN

Introduction: Managing concurrent Extracorporeal Membrane Oxygenation (ECMO) and Continuous Renal Replacement Therapy (CRRT) circuits presents significant technical and physiological challenges in pediatric critical care. Nurses in pediatric ICUs often receive limited training in managing tandem therapies simultaneously. High-fidelity simulation (HFS) provides safe, immersive preparation for high-risk scenarios involving circuit pressures, anticoagulation management, and ECMO flow transitions.

Methods: A three-scenario HFS curriculum was developed targeting high-risk ECMO-CRRT interactions: (1) incorrect circuit setup with elevated circuit pressures, (2) extremely positive access pressure with subtherapeutic anti-Xa requiring anticoagulation management changes, and (3) VA ECMO trial-off with connected CRRT assessing flow redistribution. CRRT trained nurses from two pediatric ICUs completed pre and posttraining confidence surveys across several ECMO-CRRT domains. Mean scores, standard deviations, p-values, and effect sizes (Cohen's d) were calculated for two consecutive training years.

Results: Both training years demonstrated statistically significant improvements in overall nursing confidence. In 2024, mean confidence increased from 4.114 (SD 0.716) to 4.442 (SD 0.596), yielding a gain of +0.328 ($p=0.00031$, Cohen's $d=0.447$). In 2025, participants showed greater improvement, increasing from 3.608 (SD 0.780) to 4.161 (SD 0.524), a gain of +0.553 ($p<0.001$, Cohen's $d=0.675$). The 2025 cohort began with lower baseline confidence but achieved the largest absolute improvement. Decreased standard deviations in both years reflected more uniform post-training confidence levels.

Conclusion: High-fidelity ECMO-CRRT simulation significantly improves nurse confidence in managing tandem extracorporeal therapies across diverse pediatric critical care teams. Integration of ECMO-CRRT simulation into routine competency training enhances interdisciplinary communication and strengthens high-acuity care readiness.

