CHILDREN'S HOSPITAL ASSOCIATION
Champions for Children's Health

SCOPE Collaborative Hemodialysis Clinical Charter
S*tandardizing* ***C****are to improve* ***O****utcomes in* ***P****ediatric* ***E****SRD*
A National Quality Improvement Initiative

Background

In, June 2009 the Pediatric Nephrology Quality Assurance Performance Improvement Workgroup and the Children's Hospital Association (CHA) (then known as the National Association of Children's Hospitals and Related Institutions (NACHRI)) held a Pediatric Nephrology Quality Improvement Webinar. Following the webinar, the SCOPE collaborative was formed and the initial work since this time has been focused on reducing exit-site infection and peritonitis rates (peritoneal dialysis-associated infections/PDI's) in pediatric chronic peritoneal dialysis patients. The results have been encouraging as peritonitis rates have dropped 27%. This is important as a recent study demonstrates that the second most common cause of death in children on dialysis is infection.[1] Anchored on our success with peritoneal dialysis and the now established ability in performing quality improvement, the SCOPE collaborative is expanding to reduce/eliminate infections associated with hemodialysis.

Data from the Centers for Disease Control and Prevention (CDC) evaluating outpatient hemodialysis in 2008 estimated 23,000-57,000 central line associated bloodstream infections (CLABSIs) occurred during this year.[2] The point estimate of 37,000 HD associated CLABSIs was twice as many occurring in intensive care units when comparing the most recent years of infections. A recent adult collaborative effort to reduce HD related infections observed a decrease in access-related bloodstream infections from 0.73 per 100 patient-months to 042 per 100 patient-months.[3]

Less data exists on infections in children on hemodialysis. Data from the United States Renal Data System, demonstrated that from 2005 to 2010, 59% of children with ESRD were initiated on hemodialysis and 93% of these children were 5 years of age or older.[1] A recent pediatric study from Brazil found a vascular access infection rate of 21.1 infection per 100 patient-months utilizing CDC definitions.[4] A study from Europe found the infection rate of central venous catheters in children receiving HD was 1.9 per 1000 catheter-days.[5] Little information exists on HD access infection rates in children treated in the US.

The SCOPE collaborative effort described in this charter will be modeled after the work performed in preventing PD catheter associated infections. In the first 2 years of this project the collaborative has decreased the rate of PD associated peritonitis by almost 30%.

This project is approved by the American Board of Pediatrics (ABP) for HD associated infection reduction to serve as a model for practitioner involvement in collaborative performance improvement activities which can be used as part of the ABP's Maintenance of Certification (MOC) requirements.

This project is being offered to pediatric nephrology centers that seek to improve the health care of children by reducing HD related infection. This project will be another aspect of the SCOPE collaborative with the goal of improving the care of children with ESRD.

Initiative Aim

The aim of the project is to minimize hemodialysis-associated infections. This project is part of a broader effort to assist Pediatric Nephrology teams in using quality improvement methods to develop and implement evidence-based practices. In addition, the design of this project allows for targeted research that builds on high quality, ongoing data collection. Finally, the project, while focused on reducing hemodialysis-associated infections, will build upon the current work eliminating peritoneal dialysis associated peritonitis and facilitate physician maintenance of board certification.

Project Goals

The long-term goal of the project is to build the foundation of a sustainable collaborative network to improve the outcomes of children cared for in the more than 100 Pediatric Nephrology centers in the United States. The shorter-term goals of the project are to:

1. Engage Pediatric Nephrology physicians, infection control practitioners, and other physicians and clinicians currently implementing quality improvement efforts in their own institutions and involve them in collaborative activities focused on minimizing hemodialysis-associated infections especially as this project is expanded across the country.

2. Build on the existing SCOPE collaborative effort of Pediatric Nephrology centers currently engaged in eliminated peritoneal dialysis catheter associated infections and implement changes that can significantly reduce hemodialysis access associated infections.

3. Develop and sustain a program that enables physicians involved in reducing hemodialysis access associated infection to develop competencies in performance improvement and systems-based thinking, thereby enabling them to meet the ABP Part IV MOC requirements and become quality improvement leaders and resources within their institution. What is learned in this project about methods of ensuring that physicians become competent in performance improvement and systems-based thinking may be applied to other pediatric sub-specialties.

4. Generate new knowledge and evidence-based clinical practices in the Pediatric Nephrology population by involving Nephrology physicians, physicians and clinicians in related specialties and disciplines, and their teams and families in a performance improvement collaborative that brings together clinical research and improvement methods.
    - Build upon the data generated from previous observational databases to further refine and define, test and spread best care practices using improvement science methodologies to clearly codify an evidence-based catheter and exit site care bundles. These bundles will serve as evidence-based “best hemodialysis practices” for children maintained on hemodialysis. These bundles can also serve as a platform for future evidence-based research in our subspecialty.
    - Gather data about all hemodialysis access associated infections in pediatric patients in order to develop a framework for future quality improvement collaboratives.

5. Rely on and improve physician and nurse team functionality to implement changes needed to eradicate hemodialysis access infections and improve overall Pediatric Nephrology team’s safety culture and team function.

6. Identify strategies and methods to spread the new and most efficacious best practice changes to all physicians and nurses involved in reducing exit site and peritonitis rates in US Pediatric Nephrology centers.

Specific Goals for Participating Organizations

1. Reduce mortality and morbidity of patients on hemodialysis.
2. While working on the global aim, meet the following secondary aim by July 2021:
   - Reduce hemodialysis CLABSIs in SCOPE by 5%
3. By July 2021, meet the following goals:
   - Maintain >90% compliance with the AV Fistula/Graft care bundle
   - Maintain >70% compliance with catheter maintenance bundle (with dressing change)
   - Maintain >90% compliance with catheter maintenance bundle (without dressing change)
   - Reach a goal of 75% compliance with the blood pressure management bundle

To accomplish these goals this project has engaged the resources of:

- The American Board of Pediatrics, to certify that the project meets MOC requirements
- EMMES/NAPRTCS to provide a pre-established collaborative network of Pediatric Nephrology Centers currently engaged in data collection and dissemination for the purpose of quality assurance

Hemodialysis Care Bundles

The collaborative improvement effort will have six areas of emphasis for hemodialysis access care and maintenance. These areas of focus further codify and define best care approaches which may lead to infection rate reduction.

I. General Care and Maintenance of Tunneled Hemodialysis Catheter

- The HD site should be visually assessed through the transparent dressing at least daily for signs and symptoms of infection or complications.
- Do not expose or submerge the dressing, catheter, or cap in water. Precautions should be taken to cover when bathing or showering.

II. HD Catheter Connection/Entry Procedure

- Proper hand hygiene per WHO guidelines
- Use Personal Protective Equipment (PPE) including new, clean exam gloves and proper face protection
- Disinfect closed luer connector/hub
- Hub/cap is prepped with Alcohol (15 second scrub, 15 second dry); CHG (30 second scrub, 30-60 second dry); Povidone-iodine (apply according to manufacturer's recommendations and let dry); FDA Approved disinfection device
- Connect catheter to blood lines using aseptic technique

- Remove gloves and perform hand hygiene per WHO guidelines

III. Disconnection/Cap Change Procedure

- Proper hand hygiene per WHO guidelines
- Use Personal Protective Equipment (PPE) including new, Sterile or clean exam gloves and proper face protection
- Disconnect using aseptic technique
- Cap changed on a schedule specified by manufacturer (every treatment for standard caps, every 7 days for closed connector luer access cap)
- Hub scrubbed with Alcohol (15 second scrub, 15 second dry); CHG (30 second scrub, 30-
- 60 second dry); Povidone-iodine (apply according to manufacturer's recommendations and let dry)
- Remove gloves and perform hand hygiene per WHO guidelines

IV. HD Exit Site Care and Dressing Change Procedure

- Proper hand hygiene per WHO guidelines
- Use Personal Protective Equipment (PPE) including new**,** sterile or clean exam gloves and proper face protection
- Mask for patient's face or trach
- Site is prepped with CHG (per manufacture recommendations); or 70% Alcohol (15 second scrub, 15 second dry); Povidone-iodine (apply and let dry for 2-3 minutes when used on skin)
- Appropriate antibiotic ointment/cream at insertion site (bacitracin/neomycin/polymixin B, gentamicin, povidone-iodine) OR use chlorhexidine-impregnated dressing
- Sterile transparent, semi-permeable dressing: change every 7 days and PRN if soiled, damp or loose
- Gauze dressing change every 2 days PRN if soiled, saturated or loose
- Documentation of date of dressing change
- Remove gloves and perform hand hygiene per WHO guidelines

V. Fistula /Graft Cannulation Procedure

- Patient site washed/cleansed
- Proper hand hygiene per WHO guidelines
- Use Personal Protective Equipment (PPE) including new, clean exam gloves and proper face protection (not applicable for self-cannulation)
- Site is prepped with Alcohol (1 minute rubbing motion); CHG (per manufacture recommendations); Povidone-iodine (apply and let dry for 2-3 minutes when used on skin)
- Needles inserted using aseptic technique
- Remove gloves and perform hand hygiene per WHO guidelines

VI. Fistula/Graft Decannulation

- Proper hand hygiene per WHO guidelines
- New, clean exam gloves
- Proper face protection
- Remove needles using aseptic technique

- Apply clean gauze/bandage to site
- Compress the site with clean gloves
- Remove gloves and perform hand hygiene per WHO guidelines

Hemodialysis Initiative Core measures:

Patient Outcome Measures

- Access-site infection rates defined as:
  - Number of infections for a time period, divided by dialysis-years time at risk and expressed as episodes per year (e.g. 0.43 episodes per year)
  - For the purposes of the project, an access site infection will be comprised of a CDC defined local access site infection. The CDC defines a local access site infection as pus, redness, or swelling of the vascular access site and an access-related bloodstream infection is not present.

- Hemodialysis catheter bloodstream infection rates defined as:
  - Number of infections for a time period, divided by dialysis-years time at risk and expressed as episodes per year
  - Number of infections per 1000 HD line days
  - For the purposes of the project, an HD bloodstream infection will be considered for any
  - positive blood culture that is considered NOT to be a contaminant and is associated with
  - a graft/fistula access site or the site of infection is uncertain.
  - An overall bacteremia rate will also be determined and this will included all positive blood cultures including contaminants.

* Contaminants are bacteria determined as such by the physician, nurse or infection preventionists. These bacteria are generally only present on one blood culture and are common commensals such as coagulase negative *Staphylococcus sp.*, *Bacillus sp.* and *Propionobacterium sp.*[6]

Uncertain is when a bloodstream infection cannot be attributed to another source. Another source could be a clinically infected site that clinicians feel could explain the positive blood culture or a positive culture from another infected sites (eg. wound, urine) that is the same as the positive blood culture.[6]

Process Measures

- Percent compliance with each bundle component in the dialysis unit
- Safety culture score at beginning of collaborative and annually thereafter

Additional Measures: Clinical and Demographic Data

For risk stratification exploration, the following additional variables will be captured for all patients experiencing an access-site infection or HD related CLABSI: Also capture data (with exceptions noted below) on all patients at time of catheter placement.

- Age
- Cause of ESRD
- Date access first used for chronic dialysis
- History of previous kidney transplant
- Type of HD catheter
- Site of HD access
- Hospital location of HD access placement (OR vs Interventional Radiology)

- Follow up care-Agents used for scrubbing access site, type of dressing if applicable, frequency of dressing change, use of antibiotic ointment and type, type of catheter used, antibiotic lock used and if yes what
- Access Site Infection: Culture result (include negative)/access site score/interventions (catheter rewired, temporary removal, revision of graft/fistula)/ outcome (resolution, permanent removal of catheter/graft/fistula, other)
- For HD related bloodstream infections: Blood Culture results (include negative)/ other site(s) of infection at the time of blood culture)/Interventions (re-wire, temporary removal, permanent removal, revision of graft/fistula, permanent removal of graft/fistula). Outcome of episode (resolution/death, other)

Participants

All hospital Pediatric Nephrology teams who perform hemodialysis are invited to participate in this project. Participants will include clinicians specializing in Pediatric Nephrology and quality improvement, and infection control professionals from across the country. Teams of all sizes are encouraged to participate. Institutional membership in CHA is not required.

Clinicians who participate will:

- Receive the most current pediatric recommendations for the management of hemodialysis related infections in children (pediatric specific vs. extrapolated from adult data)
- Receive materials for use in clinical practice
- Learn early the results of collaborative studies and quality improvement projects
- Establish and implement best practices
- Contribute to the advancement of science and clinical practice
- Learn improvement science methods that can be applied to other topics
- Become a member of an esteemed collaborative
- Satisfy a requirement for Part IV maintenance of certification by the American Board of Pediatrics

The project requires Pediatric Nephrology clinical leadership and principal investigator roles that will gain experience in hemodialysis associated infection reduction and elimination; a passion for achieving results; the ability to communicate with and engage physicians across the country; and the willingness to be visible and/or vocal at project related workshops and meetings. The Planning Committee was crucial in the development of the proposal and charter and includes key leaders in moving this national collaborative forward.

Planning Committee

- Brandy Begin RN
- Nancy McAfee MN, RN, CCN
- Marlene Miller MD, MSc
- Jason Newland MD
- Alicia M Neu MD
- Bradley A Warady MD
- Jayne Stuart
- Carol Rosenberg

SCOPE Faculty

SCOPE is now led by a national faculty including clinical leaders, infectious diseases specialist, and quality improvement experts.

- Brandy Begin,RN
- Rebecca Same, MD
- Alicia M Neu MD
- Jennifer Ehrlich, RN
- Bradley A Warady MD

Expectations and Boundaries

For the length of time of this project, the SCOPE Clinical Faculty Steering committee and CHA will:

1. Provide an opportunity to participate in a collaborative that we believe can substantially reduce hemodialysis related infections your patients
2. Provide evidence-based information on HD infections
3. Teach participating centers how to apply a care model for reducing HD infections
4. Teach the Model for Improvement
5. Offer coaching to Pediatric Nephrology teams on implementing and evaluating changes
6. Coordinate communication activities to keep participants connected to the steering committee and to colleagues during the improvement collaborative
7. Develop a framework for testing changes in care delivery
8. Provide tools, forms, and other aids to help with implementation of key areas of care for reducing HD infections
9. Commit to writing multiple peer-review manuscripts with rigorous data analysis on collaborative efforts.

Participating organizations and teams are expected to:

1. Commit a senior leader – this may be the same person as the physician champion – to support and promote the team working on the collaborative improvement project
2. Send one (required) or two(recommended) team members who have the authority to drive change, including the physician champion and, ideally, a nurse and/or infection control professional, to two-three one-and-one-half-day learning workshops per year (travel costs to be covered by participating hospital)
3. Provide resources and support to the hospital's team (includes attending workshops, devoting time to data entry, testing and implementing changes, and promoting active senior leadership)
4. Collect and submit data every month to the collaborative database
5. Provide staff to accommodate the approximately 40 hours of data collection required per month
6. Implement the standardized database collection tool to track patients and their care and submit monthly data
7. Commit to be transparent with all data to all other teams within the collaborative group
8. Work to involve all hospital staff as appropriate with the aim of helping the multidisciplinary clinical team become competent in safety and quality improvement
9. Perform pre-work activities to prepare for workshops

10. Connect project goals to the broader patient safety work in the hospital
11. Participate in collaborative group webinars and conference calls and a collaborative discussion listserv to share with and learn from others
12. Make well-defined measurements at least monthly, plot them over time for the duration of the collaborative improvement project and share them with the other teams in the collaborative
13. Maintain responsibility for IRB requirements for a quality improvement project (with option to publish aggregate data)

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