Standardizing Care to improve Outcomes in Pediatric End stage renal disease (SCOPE) Collaborative

SCOPE Participants
Disclosures

Dr. Neu receives research funding from Retrophin, Inc; Amgen, Inc; Luitpold, Inc; and Genzyme, Inc.
Background
Peritonitis

• Peritonitis is the leading cause for hospitalization in pediatric PD patients worldwide
• Recurrent peritonitis is a leading cause for PD failure
• Infection is a leading cause of mortality in pediatric PD patients
Peritonitis Variability In US
(Pt months between episodes)

Each value represents mean peritonitis rate at single pediatric peritoneal dialysis facility between 2003-2008
SCOPE Collaborative: Standardizing Care to Improve Outcomes in Pediatric ESRD

A Quality Transformation Collaborative
Quality Transformation Collaborative

- **STANDARDIZE** care
- Ensure **RELIABLE** performance of standardized care
- **TEACH** clinical teams to change their behaviors and *how to engage patients/families to implement best practices*
- **SUPPORT** teams with monthly transparent **DATA** and networking sessions
- Scientifically **ASSESS** impact of effort
SCOPE Collaborative Structure

• **Children’s Hospital Association Structure & Support**
  – Experience facilitating national quality improvement collaborative programs
  – Model includes multi-disciplinary, multi-institutional faculty

• **NAPRTCS**
  – 25 years experience with data collection in pediatric CKD/Dialysis/Transplant from over 140 pediatric nephrology centers

• **Site Teams**
  – Include *at least* 1 pediatric nephrologist, 1 pediatric dialysis nurse
  – Pediatric nurse educators, dialysis unit administrators, quality improvement specialists, infection control specialists, infectious diseases specialist

• **Patient/Families**
  – Perform daily catheter care and access the PD catheter twice daily to perform the dialysis procedure
  – Integral part of the health care team
SCOPE Peritonitis Project

• Increase implementation of standardized peritoneal dialysis catheter practices
  ▪ PD catheter insertion
  ▪ Pt/caregiver training
  ▪ Follow up care

• Lower rates of PD catheter related infections
  ▪ Peritonitis
  ▪ Exit Site/Tunnel Infection
Objective

• Describe the results of the first 3 years of the SCOPE Collaborative
  ▪ October 1, 2011-September 30, 2014
  ▪ Rates of compliance with care bundles
  ▪ Peritonitis rates
Methods

• Enrollment criteria
  ▪ Any pediatric (≤ 21 years) patient maintained on chronic PD at a participating center
• Patient demographics collected at enrollment
• Monthly reporting of compliance with care bundles
• Monthly reporting of infection events
• Historical demographic and infection data submitted for 13 months prior to launch

Neu AM, et al; Design of the standardizing care to improve outcomes in pediatric end stage renal disease collaborative. Pediatr Nephrol. 2014 Sep;29(9):1477-84
Methods

• Monthly Compliance scoring all or none
• Infection rates for each center were calculated as an annualized rate =

  Number of infections during time period
  Peritoneal dialysis patient-years at risk

• Collaborative rates were calculated as the mean of the center rates

Neu AM, et al; Design of the standardizing care to improve outcomes in pediatric end stage renal disease collaborative. Pediatr Nephrol. 2014 Sep;29(9):1477-84
Methods

• Generalized Linear Mixed Models (GLMM’s) used to assess
  ▪ Changes in bundle compliance over time
  ▪ Changes in peritonitis rates over time
  ▪ Pre-launch vs post-launch peritonitis rates
• Models included a random center effect to account for center specific variability
Results

Current SCOPE Participants

37 Centers

Participating at Collaborative Launch October 2011

29 Centers

Provided pre-launch patient and infection data

644 enrollments
751 catheter insertions
319 training sessions
7977 follow up forms
## Demographics (644 Enrollments)

<table>
<thead>
<tr>
<th>Demographic Characteristic</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age at Enrollment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1 years</td>
<td>184</td>
<td>28.5</td>
</tr>
<tr>
<td>2-5 years</td>
<td>79</td>
<td>12.3</td>
</tr>
<tr>
<td>6-12 years</td>
<td>130</td>
<td>20.2</td>
</tr>
<tr>
<td>13-17 years</td>
<td>206</td>
<td>32</td>
</tr>
<tr>
<td>18+ years</td>
<td>45</td>
<td>7</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>345</td>
<td>53.6</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>297</td>
<td>46.1</td>
</tr>
<tr>
<td>Black</td>
<td>115</td>
<td>17.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>167</td>
<td>25.9</td>
</tr>
<tr>
<td><strong>Cause of end stage kidney disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAKUT</td>
<td>246</td>
<td>38.2</td>
</tr>
<tr>
<td>Glomerulonephritis</td>
<td>82</td>
<td>12.7</td>
</tr>
<tr>
<td>Polycystic Kidney Disease</td>
<td>37</td>
<td>5.8</td>
</tr>
<tr>
<td>Focal and Segmental Glomerulosclerosis</td>
<td>85</td>
<td>13.2</td>
</tr>
</tbody>
</table>
SCOPE Care Bundle Compliance

Monthly Percent Compliance

- PD Cath Insertion Bundle
- Training Bundle
- Followup Bundle

Champions for Children’s Health
# SCOPE Care Bundle Compliance

<table>
<thead>
<tr>
<th>Care Bundle Compliance</th>
<th>OR</th>
<th>95% CI</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion</td>
<td>1.02</td>
<td>(0.99, 1.04)</td>
<td>0.064</td>
</tr>
<tr>
<td>Training</td>
<td>1.02</td>
<td>(0.99, 1.05)</td>
<td>0.105</td>
</tr>
<tr>
<td>Follow up</td>
<td>1.10</td>
<td>(1.10, 1.11)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Follow up (w/ random Hosp Effect)</td>
<td>1.15</td>
<td>(1.11, 1.19)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
SCOPE Care Bundle Compliance

Monthly Percent Compliance

- PD Cath Insertion Bundle
- Training Bundle
- Followup Bundle

Champions for Children's Health
PD Catheter/Exit Site Follow-Up Care Bundle

• Monthly visit
  - Exit site scored by RN (IPPN scoring)
  - Key aspects of hand hygiene, exit site care and aseptic technique reviewed
• Every 6 month demo test and concept test
• Re-training after peritonitis episode
• Prophylactic antibiotics with touch contamination or other break in aseptic technique according to ISPD guidelines

Monitored at EACH monthly follow up visit for EVERY patient
Follow up Bundle Compliance

- Exit site scored
- Handwash reviewed
- Exit site care reviewed
- Aseptic technique reviewed
- Demonstration/concept test performed
- Overall follow up bundle compliance

Date Month/Year

Percent Compliance

0.0% 10.0% 20.0% 30.0% 40.0% 50.0% 60.0% 70.0% 80.0% 90.0% 100.0%
Techniques to increase FU compliance

• Dedicated nurse educator to review topics between visits with other providers
• Use of posters/other visual aids
• Have patient perform ES care in clinic
Examples of techniques to increase FU compliance/reduce “review” fatigue

• Have patient monitor provider hand washing
• Glo Germ™ to assess patient/caregiver hand washing technique
• Use of video games
  • http://lizneu.github.io/cycler-video/
  • https://youtu.be/-8j5d-W8Sdc
Patient Home Video “Audits”
Follow up Bundle Compliance

Compliance Deep Dive and Center specific compliance At Spring Workshop

Champions for Children's Health
Peritonitis Rates

• Pre-launch (13 mo)
  – 206 peritonitis episodes/3778 pt months

• Post-launch (36 mo)
  – 320 peritonitis episodes/8853 pt months
## Mean Monthly Peritonitis Rates

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>95% CI</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Launch</td>
<td>0.63</td>
<td>(0.43, 0.92)</td>
<td>0.026</td>
</tr>
<tr>
<td>Post-Launch</td>
<td>0.42</td>
<td>(0.31, 0.57)</td>
<td></td>
</tr>
</tbody>
</table>
Mean Monthly Peritonitis Rates

- Monthly annualized peritonitis rates
- Average pre-launch monthly annualized peritonitis rate
- Average post-launch monthly annualized peritonitis rate
- Aggregate monthly follow-up bundle compliance

Collaborative Launch
## Sensitivity Analysis

<table>
<thead>
<tr>
<th>Follow Up Compliance %</th>
<th>Month/Year Mean Compliance Achieved</th>
<th># Months to Mean Collaborative Compliance</th>
<th>Ratio of Peritonitis Rates (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>65%</td>
<td>November 2012</td>
<td>13</td>
<td>1.23 (0.86, 1.77)</td>
<td>0.311</td>
</tr>
<tr>
<td>70%</td>
<td>March 2013</td>
<td>17</td>
<td>1.27 (0.89, 1.78)</td>
<td>0.168</td>
</tr>
<tr>
<td>75%</td>
<td>July 2013</td>
<td>21</td>
<td>1.37 (0.95, 1.96)</td>
<td>0.086</td>
</tr>
<tr>
<td>80%</td>
<td>November 2013</td>
<td>25</td>
<td>1.42 (1.01, 1.99)</td>
<td>0.045</td>
</tr>
<tr>
<td>85%</td>
<td>March 2014</td>
<td>29</td>
<td>1.65 (1.17, 2.34)</td>
<td>0.007</td>
</tr>
</tbody>
</table>
Conclusions

• SCOPE centers significantly increased implementation of standardized follow up care practices and demonstrated a significant reduction in monthly peritonitis rates

• Ongoing efforts focus on increasing compliance with PD Catheter Insertion and Training bundles, refining care practices included in the bundles, and identifying other modifiable risk factors for peritonitis
PD Catheter-Related Infection Project
Moving Forward

• Ideal Home Visit workgroup:
  • *Identifying core elements required to minimize risk for infection in this home therapy*
  • *Increase patient/family engagement using focus groups*
  • *Test innovative formats to augment/optimize home visit (eg Skype)*

• Catheter Insertion Workgroup:
  • *Evaluate risk factors for early catheter use*
  • *Engage surgeons*
  • *Evaluate associations between early catheter use and infections in the first 3 months following catheter insertion*
Patient Level Data

- **Patient** factors that associated with higher peritonitis rates
  - Age $\leq 2$ yrs (annualized rate of 0.8/pt year)
  - Black Race (28% vs 17%, $p=0.002$)
  - Use of plastic adapter (45% vs 32%, $p=0.004$)
  - History of touch contamination (37% vs 16%, $p < 0.001$)

- Lower **Patient-level** compliance associated with higher peritonitis rates:
  - Insertion bundle (39% vs 57%, $p=0.04$)
  - Training bundle (52% vs 64%, $p =0.008$)
  - Follow up bundle (54 % vs 64%, $p <0.001$)
PD Catheter-Related Infection Project Moving Forward

- Infant workgroup:
  - Supplemental data collection to identify risk factors for infection

- Touch contamination workgroup:
  - Increase patient education/understanding AND reporting of touch contaminations and other breaks in aseptic technique
  - Increase patient/family engagement using social media, online tutorials and educational materials, focus groups

- Health literacy workgroup:
  - Testing measures of HL, developing HL-sensitive education materials
  - Increase patient/family engagement using focus groups

- Financial Impact:
  - Prospective data from centers
  - PHIS

Champions for Children’s Health
# SCOPE Participating Centers

<table>
<thead>
<tr>
<th>Participating Centers</th>
<th>Participating Centers</th>
<th>Participating Centers</th>
<th>Participating Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. DuPont Hospital for Children: Joshua Zaristky, Susan Kieffner</td>
<td>Children’s Hospital of Wisconsin: Cynthia Pan, Jackie Dake</td>
<td>Johns Hopkins Children’s Center: Alicia Neu, Barbara Case</td>
<td>Children’s Hospital Los Angeles: Rachel Lestz, Alice Sanchez</td>
</tr>
<tr>
<td>American Family Children's Hospital: Allison Redpath Mahon, Dawn Foster</td>
<td>Children's Medical Center Dallas: Dorothy Foglia, Raymond Quigley, Haridas Thankappan</td>
<td>Kosair Children’s Hospital: Sushil Gupta, Janice Sullivan</td>
<td>UCSF Benioff Children's Hospital: Paul Brakeman</td>
</tr>
<tr>
<td>Lurie Children’s Hospital of Chicago: Mahima Keswani, Nancy Majkowski</td>
<td>Children's Mercy Hospital: Bradley Warady, JoLynn Grimes</td>
<td>Levine Children’s Hospital: Jack Weaver</td>
<td>University of Iowa Children's Hospital: Jennifer Jetton, Jennifer Ehrlich</td>
</tr>
<tr>
<td>Arkansas Children’s Hospital: Richard Blaszak, Christine Blaszak</td>
<td>Cincinnati Children's Hospital Medical Center: Rene VanDeVoorde</td>
<td>Lucile Packard Children’s Hospital at Stanford: Steven Alexander, Cynthia Wong</td>
<td>Cohen Children’s Medical Center of New York: Christine Sethna</td>
</tr>
<tr>
<td>Boston Children’s Hospital: Michael Somers, Theresa Pak</td>
<td>Children’s National Medical Center: Kirtida Mistry, Jennifer Carver</td>
<td>Mattel Children’s Hospital UCLA: Isidro Salusky</td>
<td>Maynard Children’s Hospital: Guillermo Hidalgo, Malinda Harrington</td>
</tr>
<tr>
<td>Driscoll Children's Hospital: Samhar Al-Akash, Britt Stone</td>
<td>The Children’s Hospital of Philadelphia: Madhura Pradhan, Christine Breen</td>
<td>Nationwide Children’s Hospital: Hiren Patel, Beth Smith</td>
<td>Texas Children’s Hospital: Sarah Swartz, Helen Currier</td>
</tr>
<tr>
<td>Children’s Hospital Colorado: Elizabeth Salvia</td>
<td>Dell Children’s Medical Center of Austin: Lauren Clements, Kartik Pillutla</td>
<td>Children’s Hospital at OU Medical Center: Martin Turman</td>
<td>The Children's Hospital at Montefiore: Maureen Eisele</td>
</tr>
<tr>
<td>Connecticut Children’s Medical Center: Samriti Dogra</td>
<td>Primary Children’s Hospital: Dan Hansgen</td>
<td>Yale-New Haven Children’s Hospital: Linda Anderson, Olivia Couloures</td>
<td>Arnold Palmer Hospital for Children: Barbara Cometti, Jorge Ramirez</td>
</tr>
<tr>
<td>Children’s Hospital at OU Medical Center: Martin Turman</td>
<td>Children’s Hospital at Montefiore: Maureen Eisele</td>
<td>MUSC Children’s Hospital of Charleston: Karen Hiott, Katherine Twombly</td>
<td>Cook Children’s Medical Center of Ft. Worth: Badreldin Bedri, Antoinette Thomas</td>
</tr>
</tbody>
</table>
CHILDREN’S HOSPITAL ASSOCIATION

Champions for Children’s Health