Cardiac Surgery Jan–June 2017
The International Quality Improvement Collaborative (IQIC) experience.

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International Quality Improvement Collaborative
for Congenital Heart Surgery

2017 Semiannual Data Summary #1

Red Cross War Memorial Children’s Hospital
Cape Town, South Africa
Patient pictures with permission
Introduction:

- The International Quality improvement collaborative for Cardiac surgery in developing surgery (IQIC) was established to improve quality in cardiac surgery programs in developing countries.
- The vision of the IQIC is to facilitate a collaborative comprised of healthcare teams from around the world working to create a culture of patient safety and sustainable quality improvement infrastructures for children receiving congenital heart surgery in developing world programs.
Aims:

• The collaborative aims to create tailored quality improvement strategies to reduce mortality and major complications for developing world programs. In addition it aims to populate a database to track clinical outcomes of in-hospital and 30-day mortality, surgical site and blood stream infections, as well as other critical indicators for congenital heart surgery.

• Currently there are over 75,000 surgical cases from 56 sites in 24 countries entered in the IQIC database.
The mission of the IQIC is to reduce mortality and major complications for children undergoing congenital heart surgery in developing world programs.
Results:
A total of 164 children were operated in the first half of 2017, 8 children had two operations while 3 had three operations in this six month period. Median age at surgery was 1 year.
Co-morbidities n=164

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major non-cardiac structural anomaly</td>
<td>161</td>
<td>3</td>
</tr>
<tr>
<td>Major chromosomal anomaly</td>
<td>128</td>
<td>36</td>
</tr>
<tr>
<td>Major medical illness</td>
<td>155</td>
<td>9</td>
</tr>
</tbody>
</table>

Weight: 9.1 [1.6-81]
Height: 79.5 [37-156]
Hematocrit: 37 [21.2-75.1]

RACHS-1 Classification

- 1: 35%
- 2: 13%
- 3: 5%
- 4: 47%
- 5: 13%
- 6: 5%
Learning Modules

Level 1 Core Content

Introduction to Quality Improvement - 27 September
Creating a Culture of Safety and Hand Hygiene - 15 February
Preventing Bloodstream Infections and Performing Root Cause Analysis - 1 March
Preventing Ventilator Associated Pneumonia and Developing a Dental Prevention Program - 21 June
Preventing Surgical Site Infections and Urinary Tract Infections - 9 August
Implementation of a Surgical Safety Checklist for Congenital Cardiac Surgery and Hand-off - 23 August
Clear Communication and Effective Teamwork - 31 May

Level 2 Core Content

Pediatric Cardiac Postoperative Care: Important Nursing Considerations - 5 April
Crisis Resource Management in the Cardiac Intensive Care Unit - 25 October
# Congenital Heart Surgery Check List

## Before Induction

**SIGN IN**

- **HAVE THE CIRCULATOR AND ANESTHESIOLOGIST TOGETHER CONFIRMED:**
  - Patient Identity?
  - Operative Site(s)?
  - Procedure(s) to be performed?
  - Medication Allergies?
  - Plan for keeping patient warm?
  - Need for blood products
    - If yes, has the blood bank been notified?

- **HAS THE ANESTHESIOLOGIST CONFIRMED:**
  - IV access is adequate for anticipated procedure(s)?
  - Possibility of difficult airway/aspiration?
    - If yes, has a plan been discussed to address this possibility?

## Before Skin Incision

**TIME OUT**

- **HAVE ALL TEAM MEMBERS INTRODUCED THEMSELVES BY NAME AND ROLE?**

- **HAS THE SURGEON VERBALLY CONFIRMED TO TEAM:**
  - Correct patient, site, and procedure(s)?
  - Relevant imaging and studies reviewed?
  - Equipment settings appropriate?
  - Anticipated length of procedure(s)?
  - Need for implants or other prosthetics?

- **HAS THE PERFUSIONIST VERBALLY CONFIRMED:**
  - Relevant details regarding cannulae?
  - Targeted core temperature?
  - Need for selective cerebral perfusion and/or cerebral cooling with ice?
  - Need for cardioplegia, circulatory arrest, left ventricular venting
  - Presence of significant shunts, collaterals or aortic regurgitation

- **HAS THE ANESTHESIOLOGIST VERBALLY CONFIRMED:**
  - Antibiotics given within 60 minutes of incision?
  - Plan for redosing antibiotics during case?

- **HAS THE CIRCULATING NURSE VERBALLY CONFIRMED:**
  - Consent matches procedure(s) verbalized above?
  - Availability of implants/prosthetics (if needed)?

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**EACH TEAM MEMBER MUST VERBALIZE THEY HAVE NO CONCERNS WITH PROCEEDING**

**STOP**

## Before Patient Leaves OR

**SIGN OUT**

- **HAVE THE SURGEON AND CIRCULATOR TOGETHER CONFIRMED:**
  - Surgical procedure(s) performed?
  - Instrument, sponge, and needle counts?

- **HAS THE SURGEON DISCUSSED:**
  - The nature of the repair/procedure(s)?
  - Complications & risk for further bleeding?

- **HAS THE ANESTHESIOLOGIST DISCUSSED:**
  - Concerns regarding airway management?
  - Hemodynamic stability and pressor support?
  - Plan for ventilation management?
  - TEE findings & saturation data during case?
  - Availability of blood products if needed?

- **HAS THE ANESTHESIOLOGIST, SURGEON AND ACCEPTING CRITICAL CARE PHYSICIAN DISCUSSED THE NEED FOR LABS/IMAGING OVER THE NEXT 24 HOURS?**

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### SAFE HANDOVER TO ICU

**SIGN OUT**

- **HAVE THE SURGEON DISCUSSED:**
  - The nature of the repair/procedure(s)?
  - Complications & risk for further bleeding?

- **HAS THE ANESTHESIOLOGIST DISCUSSED:**
  - Concerns regarding airway management?
  - Hemodynamic stability and pressor support?
  - Plan for ventilation management?
  - TEE findings & saturation data during case?
  - Availability of blood products if needed?

- **HAS THE ANESTHESIOLOGIST, SURGEON AND ACCEPTING CRITICAL CARE PHYSICIAN DISCUSSED THE NEED FOR LABS/IMAGING OVER THE NEXT 24 HOURS?**

---

**TIME OUT**

- **HAVE THE SURGEON VERBALLY CONFIRMED TO TEAM:**
  - Correct patient, site, and procedure(s)?
  - Relevant imaging and studies reviewed?
  - Equipment settings appropriate?
  - Anticipated length of procedure(s)?
  - Need for implants or other prosthetics?

- **HAS THE PERFUSIONIST VERBALLY CONFIRMED:**
  - Relevant details regarding cannulae?
  - Targeted core temperature?
  - Need for selective cerebral perfusion and/or cerebral cooling with ice?
  - Need for cardioplegia, circulatory arrest, left ventricular venting
  - Presence of significant shunts, collaterals or aortic regurgitation

- **HAS THE ANESTHESIOLOGIST VERBALLY CONFIRMED:**
  - Antibiotics given within 60 minutes of incision?
  - Plan for redosing antibiotics during case?

- **HAS THE CIRCULATING NURSE VERBALLY CONFIRMED:**
  - Consent matches procedure(s) verbalized above?
  - Availability of implants/prosthetics (if needed)?

---

**EACH TEAM MEMBER MUST VERBALIZE THEY HAVE NO CONCERNS WITH PROCEEDING**

**STOP**
Original Article

Postoperative Infection in Developing World Congenital Heart Surgery Programs

Data From the International Quality Improvement Collaborative

Amitabh Chanchal Sen, MBBS, DNB; Debrai Xinwei Du, MD; Kimberlee Gauvre Raman Krishna Kumar, DM; Jennifer Ko Nguyen Tran Chau, MD, MS; Gail Potter-B Kathy J. Jenk

Transposition of the Great Arteries in the Developing World

Surgery and Outcomes

David N. Schildow, MD, MMSc, Kathy J. Jenkins, MD, MPH, Kimberly Gauvreau, ScD, Ulises A. Croft, MD, PhD, Do Thi Cam Giang, MD, Rama K. Konda, DCH, William M. Novick, MD, MS, Nestor F. Sandoval, MD, Aldo Castañeda, MD, PhD
### Table 3. Multivariable Associations With Major Infection

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>P Value</th>
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</thead>
<tbody>
<tr>
<td><strong>Age at surgery</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤30 d</td>
<td>5.0</td>
<td>2.5–10.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>31 d to &lt;1 y</td>
<td>2.0</td>
<td>1.4–2.8</td>
<td>&lt;0.001</td>
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<tr>
<td>1–17 y</td>
<td>1.0</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td><strong>RACHS-1 Risk Category</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.0</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td>1.4–3.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>3</td>
<td>3.2</td>
<td>1.9–5.3</td>
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<tr>
<td>4</td>
<td>4.1</td>
<td>2.7–6.3</td>
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<tr>
<td>5+6</td>
<td>6.0</td>
<td>2.7–13.4</td>
<td>&lt;0.001</td>
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<td>0.2–1.5</td>
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<tr>
<td>Yes</td>
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<td>1.5–2.7</td>
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<tr>
<td>No</td>
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<td>1.3–3.0</td>
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<td>1.3–3.0</td>
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<td><strong>Major chromosomal abnormality</strong></td>
<td>2.0</td>
<td>1.2–3.2</td>
<td>0.007</td>
</tr>
<tr>
<td><strong>Major medical illness</strong></td>
<td>2.1</td>
<td>1.5–2.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Oxygen saturation &lt;85%</strong></td>
<td>1.5</td>
<td>1.2–1.9</td>
<td>&lt;0.001</td>
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<tr>
<td><strong>WHO weight or BMI for age percentile</strong></td>
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<td></td>
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<tr>
<td>&lt;5th</td>
<td>1.7</td>
<td>0.9–2.9</td>
<td>0.07</td>
</tr>
<tr>
<td>≥5th, &lt;15th</td>
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<td>0.08</td>
</tr>
<tr>
<td>≥15th</td>
<td>1.0</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

*Preoperative procedures include: resuscitation, 122 inotropic therapy, mechanical ventilation.*

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### Figure

**Risk Adjustment for RACHS-1 Risk Categories and Corresponding Odds Ratios**

- **Number of Cases**
  - <5th: 1437 (97.2%), 862 (6.0%)
  - ≥5th, <15th: 13256 (93.9%), 906 (6.8%)
  - ≥15th: 3212 (22.7%), 373 (11.6%)

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*Preoperative procedures include: resuscitation, 122 inotropic therapy.*
We anticipate that we will use our involvement to improve quality, teach and train and consider new hypotheses and quality improvement strategies in an emerging country congenital heart disease surgery program.

Currently, our results are on par with a higher than usual mortality rate in the first half of 2017.
Thank you to the IQIC team
Roxi Vergotine, Lenise Swanson
Alexia Joachim, Lisa Telford, Inge Smit