Annual BACTS Meeting 2018

Report of the Database Committee
DBC Activities 2018

- **Evening Symposium (Dec 5th, 2017)**

- **Several meetings on:**
  - GDPR legislation
  - Outcome project 2018
    - 9 participating centers
    - 5842 pt. (Jan-Dec 2017)
BACTS Outcome Project 2018

- **9 participating centers**
  - AZ St.Jan, Brugge
  - Imelda ZH, Bonheiden
  - Maria Middelares ZH, Gent
  - OLV-ZH, Aalst
  - UCL
  - UZA
  - UZ Gent
  - UZ Gent
  - ZOL, Genk

- **5842 patients** (operated on between January and December 2017)
1. Demographics

• **Age:** mean 67.6 ± 12.1 y (min 17- max 94)

• **Gender:**
  - Male: 71%
  - Female: 29%

• **Preop. parameters:**
1. Demographics

- Operative parameters:

  - CABG & valve & other: 2%
  - Valve & other: 2%
  - CABG & other: 11%
  - CABG & valve: 13%
  - CABG alone: 25%
  - Valve alone: 41%
  - Other: 6%
1. Demographics

- Operative parameters:
  - Other Cardiac

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Count</th>
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<tbody>
<tr>
<td>Left ventricular aneurysm repair</td>
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<tr>
<td>Ventricular septal defect</td>
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<td>Surgical Ventricular Restoration</td>
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<td>Cardiac trauma</td>
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<td>Permanent pacemaker</td>
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<td>AICD</td>
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<td>Epicardial lead</td>
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<td>AF Ablation surgery</td>
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<td>Surgical Maze</td>
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<td>Septal Myectomy</td>
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<tr>
<td>Cardiac tumor</td>
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<tr>
<td>Acute pulmonary embolectomy</td>
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<tr>
<td>Pulmonary endarterectomy</td>
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<tr>
<td>Pulmonary transplant</td>
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<td>Ventricular septal rupture (post-infarction VSD)</td>
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<td>Free wall rupture (post-infarction)</td>
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<td>BIVAD</td>
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<tr>
<td>LVAD</td>
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<tr>
<td>RVAD</td>
<td>0</td>
</tr>
<tr>
<td>ECMO</td>
<td>14</td>
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<tr>
<td>ECLS</td>
<td>36</td>
</tr>
<tr>
<td>Pericardectomy</td>
<td>32</td>
</tr>
</tbody>
</table>
1. Demographics

• Operative parameters:
  • Other Cardiac
  • Other Non-Cardiac
1. Demographics

- **Operative parameters:**
  - Other Cardiac
  - Other Non-Cardiac
  - Cardioprotection
1. Demographics

- **Operative parameters:**
  - Other Cardiac
  - Other Non-Cardiac
  - Cardioprotection
  - IABP
    - Pre-operatively 54 (1%)
    - Intra-operatively 40 (0.7%)
    - Post-operatively 14 (0.3%)
1. Demographics

**Postop. Parameters / Outcome:**

- **Reoperation:** 5%
  - Reoperation for graft problems 7
  - Reoperation for valve problems 9
  - Reoperation for bleeding / tamponade 180 (3.5%)
  - Sternal resuturing for any reason 23
  - Reoperation for other cardiac problems 41

- **Stroke:**
  - Transient 21 (0.4%)
  - Permanent 34 (0.6%)  1%

- **Dialysis:** 2%

- **Deep sternal wound infection/mediastinitis:** 1%
1. Demographics

- **Postop. Parameters / Outcome:**
  - LOS: mean 11.7 ± 14.4 d - median 8 days
  - In-hospital mortality: 4.5%
  - EuroSCORE II: mean 3.98 ± 6.73

Group ES II
- 0-4: 76.1%
- 4-10: 15.3%
- >10: 8.6%
2. Isolated CABG (n=2102)

- **Demographics**

  ![Bar Chart]

  - Mean EuroSCORE 2.11 ± 3.6
2. Isolated CABG (n=2102)

- Risk Factors

<table>
<thead>
<tr>
<th>Condition</th>
<th>Isolated CABG</th>
<th>All</th>
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</thead>
<tbody>
<tr>
<td>Hypercholesterolemia</td>
<td>81%</td>
<td>67%</td>
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<tr>
<td>Hypertension</td>
<td>74%</td>
<td>74%</td>
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<tr>
<td>Diabetes</td>
<td>66%</td>
<td>66%</td>
</tr>
<tr>
<td>Ex Smoker</td>
<td>41%</td>
<td>39%</td>
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<tr>
<td>Obesity</td>
<td>23%</td>
<td>36%</td>
</tr>
<tr>
<td>Obesitas</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td>Active smoking</td>
<td>19%</td>
<td>14%</td>
</tr>
</tbody>
</table>
2. Isolated CABG (n=2102)

- Risk Factors
- **Operative Urgency**

![Pie chart showing Operative Urgency:]

- Elective, 66.3%
- Urgent, 28.9%
- Emergency, 4.5%
- Salvage, 7.0.3%
2. Isolated CABG (n=2102)

- Risk Factors
- Operative Urgency
- **Grafts used**
  - Nº of anastomoses: 3,25 ± 1,12
    (60% arterial)
  - Total arterial revasc.:
    - Overall: 30%
    - <65y: 45%
2. Isolated CABG (n=2102)

- Risk Factors
- Operative Urgency
- Grafts used

CABG ↔ OPCAB ↔ MIDCAB

- MIDCAB: 49/1071 (4.6%)
  - Hybrid: n=8

Conversion: n=9, 2%

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2. Isolated CABG (n=2102)

- **Length of Stay:** 7d

- **Morbidity:**
  - Stroke: 0,6% (n=13, 50% TIA)
  - Sternitis: 1% (BIMA in 4/18)
  - Dialysis: 1,1%
  - Reop.: → graft problems 0,3% (n=7)
    → Bleeding/tamponade 1,2%
The Society of Thoracic Surgeons
2018 Adult Cardiac Surgery Risk Models: Part 2—Statistical Methods and Results

Sean M. O’Brien, PhD
David M. Shahian, MD
Vinod H. Thourani, MD, J. Scott Rankin, MD, James R. Edgerton, MD, Jeffrey P. Jacobs, MD, Vinay Badhwar, MD, Paul A. Kurlansky, MD, Anthony P. Furnary, MD, Joseph C. Cleveland, Jr, MD, Kevin W. Lobdell, MD, Christa Avellino, MD, Elizabeth E. Garza, MD, PhD, Christina Vassileva, MD, Robert A. Brown, MD, PhD, Vinod H. Thourani, MD, Richard S. D’Agostino Jr, PhD, David M. Shahian, MD

105:1419

Background.

Using July 2011 to June 2014 ACSD data, risk models were developed for each procedure and endpoint. Subsequently, in 2016, the STS implemented more stringent requirements for all data and the capture of the remaining 30-day deaths occurring after December 31, 2016, as the goal was to assess model performance and clinical face validity.

Methods.

Final Model Assessment

Two separate combined models were developed for each procedure and endpoint except for the composite endpoint mortality and mortality (All). These models included the selection of linear predictors. In the final model, all covariates were included that had a p value < 0.05 from the backward selection and sequential inclusion analyses. Missing data were imputed using a multiple imputation strategy described above. Regression coefficients and intercepts were derived for each model.

Statistical Methods

A separate multivariable regression model was developed for each procedure and endpoint, and the endpoint events included operative mortality, stroke, renal failure, reoperation, dialysis, short postoperative length of stay (PLOS), and deep sternal wound infection (DSWI) after CABG (n = 439,092) or valve surgery (n = 150,150). Additionally, a combined CABG + valve model was developed. Table 2 and Figure 1 show the percentage and number of endpoint events by model population in development sample and the number of patients who underwent isolated coronary artery bypass surgery (Isol CABG) and all procedures.

Table 2. Percentage and Number of Endpoint Events by Model Population in Development Sample

<table>
<thead>
<tr>
<th>Endpoint Events</th>
<th>All (n = 670,830)</th>
<th>CABG (n = 439,092)</th>
<th>Valve (n = 150,150)</th>
<th>Valve + CABG (n = 81,588)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative mortality</td>
<td>2.9%</td>
<td>2.4%</td>
<td>3.2%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Dialysis</td>
<td>48.3%</td>
<td>47.5%</td>
<td>48.3%</td>
<td>47.5%</td>
</tr>
<tr>
<td>DSWI</td>
<td>0.2%</td>
<td>0.3%</td>
<td>0.2%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Stroke</td>
<td>15.0%</td>
<td>15.0%</td>
<td>15.0%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Prolonged ventilation</td>
<td>10.9%</td>
<td>9.3%</td>
<td>10.9%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Reoperation</td>
<td>3.1%</td>
<td>2.4%</td>
<td>3.1%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Composite morbidity and mortality</td>
<td>17.4%</td>
<td>15.0%</td>
<td>17.4%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Prolonged PLOS</td>
<td>6.6%</td>
<td>5.0%</td>
<td>6.6%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Short PLOS</td>
<td>42.7%</td>
<td>48.3%</td>
<td>42.7%</td>
<td>48.3%</td>
</tr>
<tr>
<td>Valve</td>
<td>72,984/670,830</td>
<td>40,974/439,092</td>
<td>18,412/81,024</td>
<td>22,6%</td>
</tr>
<tr>
<td>CABG</td>
<td>17,202/648,808</td>
<td>9,581/424,888</td>
<td>5,921/132,985</td>
<td>3,936/70,111</td>
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<tr>
<td>Valve + CABG</td>
<td>20,872/670,778</td>
<td>10,327/439,060</td>
<td>7,671/150,137</td>
<td>6,371/150,137</td>
</tr>
</tbody>
</table>

CABG = coronary artery bypass grafting surgery; DSWI = mediastinitis/deep sternal wound infection; PLOS = postoperative length of stay.

Results.

Table 2 and Figure 1 show the percentage and number of endpoint events by model population in development sample and the number of patients who underwent isolated coronary artery bypass surgery (Isol CABG) and all procedures.
2. Isolated CABG

- Hospital Mortality

⇒ All CABG: 2.23 %
  ( = EuroSCORE II)
2. Isolated CABG

- **Hospital Mortality**

  - **All CABG:** 2.2 %
    
    ( = EuroSCORE II)
  
  - **Elective CABG:** 1.2 %

    (EuroSCORE II: 1.4%)

Elective Isolated CABG (n=1413)
## 2. AV surgery (n=1966/5842, 34%)

<table>
<thead>
<tr>
<th>All AV</th>
<th>n</th>
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<tr>
<td>A</td>
<td>761</td>
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<tr>
<td>A+M</td>
<td>140</td>
</tr>
<tr>
<td>A+T</td>
<td>16</td>
</tr>
<tr>
<td>A+M+T</td>
<td>60</td>
</tr>
<tr>
<td>A+cor</td>
<td>487</td>
</tr>
<tr>
<td>A+M+cor</td>
<td>60</td>
</tr>
<tr>
<td>A+T+cor</td>
<td>8</td>
</tr>
<tr>
<td>A+M+T+cor</td>
<td>19</td>
</tr>
<tr>
<td>A+other</td>
<td>415</td>
</tr>
</tbody>
</table>

- Isolated Av-Replacement : n=643
- Isolated Av-Repair : n=36
- Redo’s Av : n= 82
- + aorta: n=295
- + AF surg: n=19
- + Myectomy: n=30
- + Other: n= 71
2a. Isolated AV Replace (n=643/5842, 11%)

- **Demographics**
  - Age distribution:
    - AvR: 71, All: 68
  - % Male distribution:
    - AvR: 60, All: 71

- **Type of prosthesis**
  - Mechanical: 10%
  - Sutureless: 20%
  - Biologic: 70%

- **Approach**
  - Sternotomy: 46%
  - MAS: 54%
  - Biologic: 70%
2a. Isolated Av Replace (n=643/5842, 11%)

- **Morbidity**
  - No ECMO, no aortic dissections
  - Stroke: 1,6% (n=10, 50% TIA)
  - Wound: 0,6% : 3 deep sternal infections (all MAS), 1 sternitis
  - Dialysis: 0,5%
  - Reop.: ⇒ Bleeding/tamponade 6%
    - MAS: 1,9%
    - Full sternotomy: 7,5%

- **Mortality**
  - In-hospital: **1,4%**
  - EuroSCORE II: **2%**
2a. Isolated Av Replace

> 80 y (n=143, 22% of all isolated Av Replace)

- **Morbidity**
  - Stroke: n=1 (CVA)
  - Dialysis: n=1
  - Reoperation for bleeding: n=7 (4.9%)

- **Mortality**
  - In-hospital 3.5%
  - EuroSCORE II: 2.8%
2a. Isolated Av Replace

In High Risk patients (ES II >4%, n=63)

- Mean EuroSCORE II 8,5% ± 9,05 (4,0 % – 64,7%)
- Mortality
  - In-hospital 1,6%
  - Predicted (EuroSCORE II): 7,9%
2b. Av Repair (n=161)

- **Demographics:**
  - Mean EuroSCORE: 2.35%

- **Type of repair:**
  - Repair with ring: 4%
  - Repair without ring: 54%
  - Not applicable (David-proc ??): 58%
  - Isolated valve repair: 32%
  - Valve sparing root: 51%
  - Asc. Ao replacement: 17%
2b. Av Repair (n=161)

- **Type of procedure**

<table>
<thead>
<tr>
<th>All AV</th>
<th>n</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>36</td>
</tr>
<tr>
<td>A+M</td>
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<tr>
<td>A+T</td>
<td>1</td>
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<tr>
<td>A+M+T</td>
<td>9</td>
</tr>
<tr>
<td>A+cor</td>
<td>12</td>
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<tr>
<td>A+M+cor</td>
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<tr>
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</tr>
<tr>
<td>A+other</td>
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</table>

- Redo surgery: 12/161 - 7.4%
- Acute dissection: 10/161 - 6.2%
- Acute endocarditis: n=2

+Aorta: n=77 (n=58 Root surgery)
2b. Av Repair (n=161)

• **Outcome**

  • Discharge TTE

  ![Discharge TTE (108/161)]

• Isolated AV repair (n=36)

  • Morbidity :
    • Stroke : n=1
    • Dialysis: n=0
    • Reop f/ bleeding: n=1

  • Mortality : n=0
3. Aorta (n=331)

- **Demographics**

  ![Bar Chart](Image)

  - Age: 50, 60, 70, 80
  - % Male: 61, 68, 73, 71

- **Pathology**

  ![Pie Chart](Image)

  - Aneurysm: 277, 84%
  - Acute Dissection: 54, 16%
3. Aorta (n=331)

- **Type of procedure**

  - Root + Ascendens: n= 116 - 35%
  - Root: n= 70 - 21%
  - Arch: n= 6 - 1.8%
  - Ascendens: n= 6 - 1.8%
  - Descendens: n= 15 - 4.5%
  - Ascendens + Arch: n= 29 - 8.7%
  - Root + Ascendens + Arch + Abdominal Ao: n= 88 - 26.5%
3. Aorta (n=331)

- **Type of procedure**
- **Root surgery:**
  - Bentall/Freestyle: 42%
  - David/Yacoub: 39%
  - Ross: 16%
  - Patch/sinus repair: 3%
3. Aorta (n=331)

- **Outcome**
  - **Morbidity**
  - Stroke: n=7 - 2.2% (TIA 4, CVA 3)
  - Dialysis: n=12 - 3.7%
  - Reoperation for bleeding: n=20 - 9.3%
3. Aorta (n=331)

- **Outcome**
  - **Morbidity**
  - **Mortality**
    - In-hospital **5.7%**
4. Mitral valve (n=1193, 20%)

- Repair vs replacement

- Repair 71%
  - With ring 97%
  - Without ring 3%

- Replacement 29%
  - Biological 74%
  - Mechanical 26%
4. Mitral valve (n=1193, 20%)

• Repair vs replacement (% of repair)
4. Mitral valve (n=1193, 20%)

- **Type of procedure**
  - Concom. Tri-rep: 27%
  - Concom. Ablation: 14.5%
  - **Isolated MV (n=381)**

  ![Approach (n=190)]

<table>
<thead>
<tr>
<th>Type</th>
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<th>n + ablation</th>
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<tr>
<td>M</td>
<td>381</td>
<td>69</td>
</tr>
<tr>
<td>M+T</td>
<td>129</td>
<td>62</td>
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<tr>
<td>M+A</td>
<td>125</td>
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<td>55</td>
<td>5</td>
</tr>
<tr>
<td>M+cor</td>
<td>163</td>
<td>13</td>
</tr>
<tr>
<td>M+T+cor</td>
<td>45</td>
<td>6</td>
</tr>
<tr>
<td>M+A+cor</td>
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<tr>
<td>M+T+A+cor</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>M+other</td>
<td>46</td>
<td></td>
</tr>
</tbody>
</table>

= 14.5%

![Bar chart demographics]

n=641, 54%

Concom. Tri-rep: 27%
Concom. Ablation: 14.5%
4. Mitral valve (n=1193, 20%)

- **Outcome**: M ± T ± ablation (n=641, 54%)
  - **Morbidity**
    - Stroke: 1.5% (all CVA)
    - Dialysis: 2.9%
    - Reoperation for bleeding: 4%
4. Mitral valve (n=1193, 20%)

- **Outcome**: M ± T ± ablation (n=641, 54%)
  - Morbidity
  - Mortality
    - In-hospital: 2.4%
    - EuroSCORE II: 2.7%
4. Mitral valve (n=1193, 20%)

- **Outcome: ALL mitral repair**

- **Discharge TTE (471/837)**
5. Tricuspid valve (n=396)

- **Type of procedure**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>n</th>
</tr>
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<tbody>
<tr>
<td>Single T</td>
<td>21</td>
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<tr>
<td>A + T</td>
<td>16</td>
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<tr>
<td>P + T</td>
<td>2</td>
</tr>
<tr>
<td>T + cor</td>
<td>9</td>
</tr>
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<td>8</td>
</tr>
<tr>
<td>M + T</td>
<td>191</td>
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<tr>
<td>A + M + T</td>
<td>60</td>
</tr>
<tr>
<td>M + T + cor</td>
<td>51</td>
</tr>
<tr>
<td>A + M + T + cor</td>
<td>19</td>
</tr>
</tbody>
</table>

**Single T + other**

- Cardiac tumor: 2
- VSD: 1
- ASD: 4
- Epicardial lead: 3
- PTEA: 1
- LVAD: 5
- Post-infarct VSD: 1
- Pericardectomy: 2

Isolated (5.3%)

In combination with mitral (n=321, 81%)

n=19 - 4.8%
5. Tricuspid valve (n=396)

- **Type of procedure**
  
  - Ring-annuloplasty: n=346
  - No ring: n=22
  
  - Replacement: n=28
    - Bioprosthesis: n=28

- Repair: 368 (93%)

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5. Tricuspid valve (n=396)

• **Outcome:**
  - Discharge TTE:
    - Mortality:
      - Isolated Tv surgery: 0% (n=21)
      - All group: 6.8%

    ![Discharge TTE of Tv Repair (178/368)]

    Euroscore II deceased patients:
    24.6 +/- 18.3%
6. Outcome overview

- **Morbidity**

![Morbidity Chart]

- Stroke: 0.6, 1.6, 1.5, 1, 1.1, 0.5, 3, 1.5
- Dialysis: 0.7, 1.1, 2.9, 2, 3, 1.2, 4, 3.5
- Revision for bleeding: 1, 8, 6, 4

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6. Outcome overview

- In-hospital mortality

<table>
<thead>
<tr>
<th>In-hospital Mortality</th>
<th>Euroscores II</th>
<th>Observed Mortality</th>
<th>Predicted Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective CABG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated CABG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-acute Ao Aneurysm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M ± T ± Abl</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DBC Active Members

• Koen Cathenis
• Erik de Worm
• Herbert Gutermann
• Steven Jacobs
• Steven Laga

• Tine Philipsen
• Marc Schepens
• Bernard Stockman
• Yves Van Belleghem
• Dries Gaerdelen
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<th>Last Name:</th>
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</thead>
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<tr>
<td>First Name:</td>
<td>Jan</td>
</tr>
<tr>
<td>ID number:</td>
<td></td>
</tr>
</tbody>
</table>

**Preoperative data**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age: 45 years</td>
<td>Gender: M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.68 %</td>
</tr>
<tr>
<td>Weight: 75 kg</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Last preop creat: 80 µmol/l, 0.9 mg/dl</td>
<td>Creat clearance: 109.95 ml/min</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Renal Euroscore 2: Normal (CC &gt; 85ml/min)</td>
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</tr>
</tbody>
</table>

**Operative data**

- Active endocarditis: No
- Critical condition: None
- Diabetes: Diet
- NYHA: NYHA 1 (Asymptomatic)
- Angina Status: CCS 0
- LV Function: Moderate (31-50%)
- Recent myocardial infarction: < 90 days
- Pulmonary hypertension: Moderate (30-55)
- Operative urgency: Elective
- Weight of Intervention: Single non CABG
- Surgery of the thoracic aorta: No

**Postoperative data**

<table>
<thead>
<tr>
<th>Surgeon 1:</th>
<th>Gutermann</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon 2:</td>
<td></td>
</tr>
</tbody>
</table>

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BACTS Registry

- Uploaded data 2017
- AZ St.Jan, Brugge
- Imelda ZH, Bonheiden
- Maria Middelares ZH, Gent
- OLV-ZH, Aalst
- UCL
- UZA
- UZ Gent
- UZ Leuven
- ZOL, Genk
- ZNA Middelheim
- CHU St-Pierre
BACTS Registry

2018 data

3 datasets options

1. Minimal dataset
2. EACTS/QUIP dataset
3. BACTS Outcome project

Incorporated in FM Pro app.
<table>
<thead>
<tr>
<th>Dataset Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal dataset</td>
<td>• Limited data</td>
</tr>
<tr>
<td></td>
<td>• Overview of Belgian activities</td>
</tr>
<tr>
<td>EACTS/QUIP dataset</td>
<td>• Limited data + QUIP-data</td>
</tr>
<tr>
<td></td>
<td>• (limited) Analysis of center data</td>
</tr>
<tr>
<td></td>
<td>• QUIP Benchmarking-tool against European centers</td>
</tr>
<tr>
<td>BACTS Outcome dataset</td>
<td>• Limited data + QUIP-data + additional (outcome) data</td>
</tr>
<tr>
<td></td>
<td>• Anonymous analysis of outcome :</td>
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<tr>
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<td>• Benchmarking</td>
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<tr>
<td></td>
<td>• Data available for scientific purposes</td>
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<td>• <strong>Annual report:</strong></td>
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<td>• BACTS Website</td>
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<td>• RIZIV/INAMI</td>
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<td>• FOD/SPF</td>
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