Report of the database committee
“Improving the quality of care through better data registration”.

May 12th, 2011

BACTS Database Committee
Belgian Surgical Week, Oostende
# Database Roster

BACTS Home » BACTS Committees » Database

<table>
<thead>
<tr>
<th>OFFICE</th>
<th>NAME</th>
<th>TERM OF OFFICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair</td>
<td>Bernard A. Stockman</td>
<td></td>
</tr>
<tr>
<td>Member</td>
<td>Liesbath Bruckers</td>
<td></td>
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<tr>
<td>Member</td>
<td>Erik de Worm</td>
<td></td>
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<tr>
<td>Member</td>
<td>David Glineur</td>
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<tr>
<td>Member</td>
<td>Herbert Gutermann</td>
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<td>Member</td>
<td>Marc A. Radermecker</td>
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<tr>
<td>Member</td>
<td>Paul T. Sergeant</td>
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<tr>
<td>Member</td>
<td>Constantin Stefanidis</td>
<td></td>
</tr>
<tr>
<td>Member</td>
<td>Yves Victor Van Belleghem</td>
<td></td>
</tr>
<tr>
<td>Member</td>
<td>Carine M. Vandeweyer</td>
<td></td>
</tr>
</tbody>
</table>
Overview activity 2001-2009

Number of cardiac operations
28 centres
2008: 1 centre missing
Overview activity 2001-2009

Cardiac Operations - female

Year: 2001-2009

Values:
- 2001: 30.74%
- 2002: 31.02%
- 2003: 31.01%
- 2004: 31.29%
- 2005: 31.02%
- 2006: 31.42%
- 2007: 31.90%
- 2008: 31.95%
- 2009: 31.76%
<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<tr>
<td>isolated CABG</td>
<td>7012</td>
<td>7582</td>
<td>7795</td>
<td>7432</td>
<td>6665</td>
<td>6369</td>
<td>6209</td>
<td>5760</td>
<td>5196</td>
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<tr>
<td>CABG + other</td>
<td>257</td>
<td>309</td>
<td>301</td>
<td>312</td>
<td>330</td>
<td>358</td>
<td>341</td>
<td>304</td>
<td>276</td>
</tr>
<tr>
<td>valve only</td>
<td>1673</td>
<td>1914</td>
<td>2120</td>
<td>2244</td>
<td>2127</td>
<td>2118</td>
<td>2273</td>
<td>2388</td>
<td>2249</td>
</tr>
<tr>
<td>Valve + other</td>
<td>209</td>
<td>300</td>
<td>273</td>
<td>403</td>
<td>427</td>
<td>441</td>
<td>514</td>
<td>550</td>
<td>509</td>
</tr>
<tr>
<td>valve + CABG</td>
<td>859</td>
<td>1068</td>
<td>1299</td>
<td>1341</td>
<td>1322</td>
<td>1325</td>
<td>1417</td>
<td>1267</td>
<td>1285</td>
</tr>
<tr>
<td>valve + CABG + other</td>
<td>66</td>
<td>120</td>
<td>137</td>
<td>153</td>
<td>174</td>
<td>177</td>
<td>217</td>
<td>206</td>
<td>180</td>
</tr>
<tr>
<td>thoracic aorta</td>
<td>304</td>
<td>368</td>
<td>439</td>
<td>468</td>
<td>445</td>
<td>593</td>
<td>542</td>
<td>544</td>
<td>544</td>
</tr>
</tbody>
</table>
Overview activity 2001-2009

Isolated CABG
Overview activity 2001-2009

CABG: on-pump / opcab
2008 report

www.bacts.org
MEMORY OF UNDERSTANDING

The purpose of the Database Committee is

- To create, maintain and analyse a registry of the cardio-thoracic surgical activity in Belgium.

- To create therapeutic or epidemiological studies involving the cardio-thoracic therapy, with the intention to improve the quality of care.

- The database will never serve to rank centres or surgeons, will never participate in malpractice investigation or conformity checking with legal requirements of centres and surgeons.
MEMORY OF UNDERSTANDING

Confidentiality

- All members of the committee, including the data manager and the data analyst are under the medical secret. The database is protected by secret entry-codes. In addition the names of the centres and the RIZIV/INAMI numbers are recoded into secret codes. The password and codes are kept in a sealed envelope with the chairman of the database committee. No database committee chairman or member has access to the actual identification of the centre or the surgeon. The Law on the Medical Secret: data cannot and should not be transferred to any third party, e.g. council of BACTS, Health authorities, industry. There are two exceptions: (1) there is a database-specific law ordering the transfer of these data; (2) all parties or centres give their written permission for each specific output.
MEMORY OF UNDERSTANDING

Confidentiality

• No centre- or surgeon-specific information can be given to any third part outside the database committee without the written permission of the chair. No centre-, nor surgeon-identified information of the centre or the individual surgeon can be looked into by the members of the database committee.
MEMORY OF UNDERSTANDING

The access to the data

• The access to the data has three levels. The first two levels concern the Database Committee members.
  – The first level is unrestricted. This access is given to the chairman of the database committee, the data-analyst and the data manager.
  – The second level is restricted to a “need to know level”, defined by the committee and this access is given to all the members of the committee.
  – The third level is restricted to the centre's own data. This access is given to the Chairman of the center. This access is unrestricted in time but limited to the data of the center.
Data access

- **Data manager**
  - Full access center id, data

- **Chairman**
  - Data access

- **Database committee members**
  - Limited data access

- **Board and bacts members**
  - Aggregated report
Memory of understanding

Confidentiality

Patient anonymity is guaranteed
Center/surgeon anonymity is guaranteed
In practice: BACTS - College - DBC
Quality control

1. Measuring risk
2. Prediction of outcome
3. Risk adjusted analysis
Risk-adjustment algorithm

- Risk factors
- Weighting of factors
- Validation of risk model
  - EuroSCORE
  - STS-score
EACTS
Adult Cardiac Surgery Database
Version 1.0

- Hospitalization
- Cardiac History
- Previous Interventions
- Pre-operative risk factors
- Pre-operative hemodynamics and catheterization
- Pre-operative status and support
- Operation – procedural factors
- Perfusion and myocardial protection
- Post-operative complications
- Discharge details
EACTS
Adult Cardiac Surgery Database
Version 1.0

• 86 fields
• Postoperative complications
  – Re-operation
  – New post-operative stroke
  – New post-operative dialysis
  – Multi-system failure
• Discharge details
  – Date of discharge/death
  – Destination on discharge
  – Patient status at discharge
  – Primary cause of death
BACTS 2012 Registry

• Based on EACTS version 1.0
  – No update announced
  – limitations
• Euroscore 2010 modifications not incorporated yet
• Software: datafile in Filemaker Pro
The new BACTS-2012 Registry is a copy of the EACTS’s Adult Cardiac Surgery Database (Version 1.0). No update of the EACTS-dataset has been announced for the near future.

There are some minor modifications of the original EACTS-dataset.

The BACTS 2012-Dataset will be a significant improvement compared to the BACTS-CPT registration.

However, we realize that this dataset has limitations and cannot fulfill the data-needs for every cardiac surgeon.

We provide a FileMaker Pro application for the BACTS 2012 Registry. With this application the Excel-file for data-submission can be generated.

The FileMaker Pro application has some extra fields, that are not included in the BACTS 2012 Registry Dataset but that have been added for convenience.

Centres are free to use the FileMaker Pro application. Also other software can be used to generate the Excel-file.

The EuroSCORE 2010 changes or not incorporated yet. The BACTS 2012 registry is designed for adult cardiac surgery. All congenital cardiac surgery should be reported in the EACTS Congenital Database: [www.eactscongenitaldb.org](http://www.eactscongenitaldb.org)

Here you will find the beta-versions of the dataset, data-specifications and the FP-application. You also will find an example of a Data Collection Form (DCF). Please contact the data-manager for the login and password of the FP-application. You can download a trial-version of Filemaker Pro at [http://www.filemaker.com/be/](http://www.filemaker.com/be/) to evaluate this software. This beta-version is for evaluation only, it will be impossible to export/import the data from this version into the final version.

- Data Collection Form (DCF)  [word / pdf]
- Data Specifications
- FilemakerPro-application (beta-version)
- Registry Concept
- Improving the quality of care through better data-registrations

The new BACTS 2012 Registry will go live the 1st of January 2012.

The BACTS Database Committee
BACTS 2012 Registry concept
process of data merging and analysing

BACTS-file (file-maker) → Excel
Access → Excel
Excel → Excel
Dendrite (PATS) → Excel
other → Excel

BACTS 2012 Registry

Web based
BACTS 2012 Registry software

- Filemaker Pro 11
  - Empty database
  - Export function to Excel
  - Expandable with TAVI, Afib, ...
- Stand alone version
- Hospital network
  - Filemaker server and Filemaker Pro licenses
- External IT company support
Belgian Association for CardioThoracic Surgery

BACTS Cardiac Database

Patient:
Surname: Brad
Name: Pitt
ID number: 22041965M123
Gender: M
Date of birth: 22/04/1965
Date of admission: 21/02/2011
Date of operation: 22/02/2011
Date of discharge/death: 24/02/2011

Surgeon 1:
1/09434/79/140

Surgeon 2:
1/06255/57/140

BACTS-data, TAVI-data, Afib-data, Personal data

Preoperative data, Operative data, Postoperative data

Cardiac History, Previous Intervention, Risk Factors for CAD, Comorbidity, Haemodynam. and Catheterisation, Preop Status and Support, EuroSCORE

Angina Status
CSS 0

Dyspnoea
NYHA 3

Most recent myocardial infarction
No MI

Number of previous myocardial infarctions
unknown

Congestive heart failure
Yes

(A low EF alone, without clinical evidence of heart failure does not qualify as heart failure.)

Myocardial infarction

- Two of the following four criteria are necessary:
  1. Prolonged (>20min) typical chest pain not relieved by rest and/or nitrates
  2. Enzyme level elevation: either - CK-MB > 5% of total CPK - CK greater than twice normal - LDH subtype 1 > LDH subtype 2 - Troponin > 0.2 μg/ml
  3. Any wall motion abnormalities as documented by LV Gram, Echo and/or EF < 45%
  4. Serial ECG (at least 2) showing changes from baseline or serially in ST-T and/or Q waves that are 0.03 s. in width and/or ≥ 1/3 of the total QRS complex in 2 or more contiguous leads.

© BACTS database committee 2011 (version 1.2)
Belgian Association for CardioThoracic Surgery

BACTS Cardiac Database

Patient:
- Surname: Brad
- Name: Pitt
- ID number: 22041965M123
- Gender: M
- Date of birth: 22/04/1965
- Date of admission: 21/02/2011
- Date of operation: 22/02/2011
- Date of discharge/death: 24/02/2011

Surgeon 1:
- Code: 1/09434/79/140

Surgeon 2:
- Code: 1/06255/57/140

BACTS-data TAVI-data AFib-data Personal data

Preoperative data Operative data Postoperative data

Cardiac History Previous Intervention Risk Factors for CAD Comorbidty Haemodynam. and Catheterisation Preop Status and Support EuroSCORE

Age: 46 years
- Gender: M
- Logistic EuroSCORE: 19.59%

COPD
- Longterm use of bronchodilators/steroids
- Claudication, stenotic carotid artery >50%, surgery of abdominal aorta or peripheral arteries

Peripheral vascular disease
- Disabled in walking or daily life functioning

Neurologic dysfunction

Previous heart surgery

Serum creat. > 2,2 mg/dl

Active endocarditis
- Patient still under antibiotic treatment for endocarditis at time of surgery

Critical condition
- Ventricular tachycardia/fibrillation, reanimation, ventilation, inotropic support, IABP, acute renal failure

Unstable angina
- Requiring IV nitrates

Recent myocard. infarction
- < 90 days

Pulmonary hypertension
- syst. PAP > 60 mmHg

LVEF 30-50%

LVEF <30%

Emergency (< 24h after admission)

Other than isolated CABG

Surgery of the thoracic aorta

Postinfarction VSD

© BACTS database committee 2011 (version 1.2)
### Patient Information

**Surname:** Brad  
**Name:** Pitt  
**ID number:** 22041965M123  
**Gender:** M  
**Date of birth:** 22/04/1965  
**Date of admission:** 21/02/2011  
**Date of operation:** 22/02/2011  
**Date of discharge/death:** 24/02/2011

### Surgeon Information

**Surgeon 1:** 1/09434/79/140  
**Surgeon 2:** 1/06255/57/140

### BACTS-data TAVI-data AFib-data Personal data

#### Preoperative data

<table>
<thead>
<tr>
<th>Complications</th>
<th>Discharge details</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reoperation</td>
<td>Re-operation for bleeding/tamponade</td>
<td></td>
</tr>
<tr>
<td>New postop stroke</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>New postop dialysis</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Multi system failure</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
BACTS 2012 Registry Timeframe

- 15th BACTS Congress: announcement
- February 24: Extensive presentation
  - Final Version: Data fields, definitions, format
  - Beta version of FP11-file
- Spring 2011: Start implementation of registry in all centers
- Mid 2011: final version FP-11 file
- January 1, 2012: BACTS 2012 Registry goes live
- CPT registration stops
BACTS 2012 Registry

- Risk-adjusted outcomes analysis
- Improvement of quality of care
The European Association for Cardio-Thoracic Surgery

Fourth EACTS Adult Cardiac Surgical Database Report 2010

Towards global benchmarking

Compiled by
Ben Bridgewater & Jan Gummert on behalf of the European Association for Cardio-Thoracic Surgery
Peter K.H. Walton & Robin Kinsman
Decovite Clinical Systems Ltd
Consumer Comprehension of Surgeon Performance Data for Coronary Bypass Procedures

Karen Donelan, ScD, Robert S. Rogers, BA, Andy Eisenhauer, MD, Elizabeth Mort, MD, MPH, and Arvind K. Agnihotri, MD

Mongan Institute for Health Policy, Massachusetts General Hospital, Boston; Division of Cardiology, Brigham and Women’s Hospital, Boston; Department of Surgery, Division of Cardiac Surgery, Massachusetts General Hospital Heart Center, Boston; Harvard Medical School, Boston; and Department of Quality and Safety, Massachusetts General Hospital, Boston, Massachusetts

Background. Public and private organizations have called for increased transparency in reporting of outcomes data for hospitals and surgeons, including risk-adjusted coronary artery bypass graft surgery (CABG) mortality data. Limited information is available about how the public actually interprets these data.

Methods. Four different graphical and tabular displays of CABG outcomes for surgeons, three of which were modeled on current state public reporting sites, were administered to 337 adults. Each display contained mortality and volume data for 5 hypothetical surgeons. For each format, participants were asked to choose which surgeon they were least likely to choose based on the display; they were then asked questions about their perceptions of the surgeon.

Results. Accurate identification of surgeons varied by display format, with a high of 98% on one display and a low of 16% on another. Participants identified the surgeon with the lowest risk-adjusted mortality, compared with respondents having no college education (21% to 72% vs. 9% to 59%; p < 0.01). In one display, the surgeon with the lowest risk-adjusted mortality was effectively penalized for taking on higher-risk patients; respondents tended to select the surgeon with the lowest-risk population but the highest risk-adjusted mortality. Overall, 82% of respondents said that access to these

Conclusions. Comprehension by the public of risk-adjusted CABG outcomes is limited and varies by display format. Poorly constructed displays may have led to misinterpretation, with potential unintended adverse consequences such as risk aversion. Further work is needed to design displays that maximize accurate interpretation by the public and more clearly define the risk and benefit of public reporting of surgeon performance.
30 day - Risk adjusted mortality for isolated CABG

**Table 2** 30 dages dødelighed efter isoleret CABG 2004-2005 justeret for Euroscore

<table>
<thead>
<tr>
<th>Center</th>
<th>Antal indgreb i analysen</th>
<th>Dødelighed uden justering (%)</th>
<th>Dødelighed justeret (%)</th>
<th>95% sikkerhedsgrænser</th>
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</thead>
<tbody>
<tr>
<td>Rigshospitalet</td>
<td>1252</td>
<td>3.0</td>
<td>3.5</td>
<td>(2.6-4.4)</td>
</tr>
<tr>
<td>Gentofte</td>
<td>915</td>
<td>1.7</td>
<td>2.1</td>
<td>(1.0-3.2)</td>
</tr>
<tr>
<td>Odense</td>
<td>768</td>
<td>3.3</td>
<td>2.7</td>
<td>(1.8-3.7)</td>
</tr>
<tr>
<td>Skejby</td>
<td>835</td>
<td>2.3</td>
<td>1.9</td>
<td>(1.0-2.9)</td>
</tr>
<tr>
<td>Aalborg</td>
<td>556</td>
<td>2.7</td>
<td>2.6</td>
<td>(1.3-3.8)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4326</strong></td>
<td><strong>2.6</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P-værdi for afvigelse fra landsgennemsnittet. Samlet test for forskel mellem centre: P = 0.21*
1994 Pilot Project

- A pilot database project was established in 1994 and the first report including data from 12 hospitals was published in 1996.

2009

- Sixth National Adult Cardiac Surgery Report 2008

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Table 4a. All cardiac surgery. Results of cardiac surgery displayed on the Healthcare Commission website; 3 years of data to the end of March 2007. Compared to the complex re-calibrated logistic EuroSCORE with 99% CIs

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Counts</th>
<th>Deaths</th>
<th>Actual mortality</th>
<th>Predicted mortality</th>
<th>Upper CI</th>
<th>Lower CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aberdeen Royal Infirmary</td>
<td>1,665</td>
<td>69</td>
<td>4.1%</td>
<td>4.3%</td>
<td>5.9%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Bart’s &amp; the London</td>
<td>4,927</td>
<td>168</td>
<td>3.4%</td>
<td>4.1%</td>
<td>5.0%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Blackpool Victoria Hospital</td>
<td>2,938</td>
<td>82</td>
<td>2.8%</td>
<td>3.2%</td>
<td>4.2%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Bristol Royal Infirmary</td>
<td>4,328</td>
<td>119</td>
<td>2.7%</td>
<td>3.2%</td>
<td>4.1%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Castle Hill Hospital, Hull</td>
<td>2,809</td>
<td>110</td>
<td>3.9%</td>
<td>3.2%</td>
<td>4.3%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Derriford Hospital, Plymouth</td>
<td>2,705</td>
<td>87</td>
<td>3.2%</td>
<td>3.3%</td>
<td>4.3%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Edinburgh Royal Infirmary</td>
<td>2,713</td>
<td>113</td>
<td>4.2%</td>
<td>3.7%</td>
<td>4.8%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Freeman Hospital, Newcastle</td>
<td>3,029</td>
<td>112</td>
<td>3.7%</td>
<td>4.1%</td>
<td>5.2%</td>
<td>3.1%</td>
</tr>
</tbody>
</table>
Public reporting

• Unsolved methodological problems
• Unintended consequences
• Pitfalls
Public reporting

- **Pitfalls**
  - **Ranking** of centers/surgeons
  - **Gaming**: patient selection
  - **Up-scoring**
  - **Limitations of scoring-systems**: no adequate correction for procedural/patient complexity
  - **Focus on risk, not on quality of procedure**
Does reporting of coronary artery bypass grafting from administrative databases accurately reflect actual clinical outcomes?

Michael J. Mack, MD, Morley Herbert, PhD, Syma Prince, RN, Todd M. Dewey, MD, Mitchell J. Magee, MD, and James R. Edgerton, MD

**Objectives:** Quality assessment of coronary artery bypass grafting has traditionally been performed with data from clinical databases. Administrative databases that rely primarily on information collected for billing purposes increasingly have been used as tools for public reporting of outcomes quality. The correlation of administrative data with clinical data for clinical quality assessment has not been confirmed.

**Conclusions:** Substantial variability of reported outcomes is seen in administrative data sets compared with an audited clinical database in the end points of the number of procedures performed and mortality. This variability makes it challenging for the nonclinician unfamiliar with outcomes analysis to make an informed decision.
Administrative databases

• Build for financial purposes
• Non-clinician extracts data from medical records
• Codes
  – DRG: allocation to highest paying DRG
  – ICD-9
  – MKG/RCM
  – MFG/RFM
  – RIZIV/INAMI
• Code order
Administrative databases

• Limitations
  – Procedural groups
  – Date of surgery / discharge
  – Risk factors / Complications
  – Risk stratification
  – Outcomes

• Not accurate for
  – Auditing the quality of care
  – Risk adjusted outcome analysis
KCE report
Figure 6.11: Funnel plot of the in-hospital mortality by center after isolated CABG

- Definition of groups
- Approximate 30-day mortality

+ anonymous
+ confidence limits
Quality control

• Complex process:
  – Correction variability of pathology
  – Correction variability of clinical condition,
  – Correction variability of procedural complexity

• Outlier identification
  – Secondary process is mandatory
  – Quality of the data
  – Identification of unusual variability in subset of patients.
Procedure of outlier confirmation

• Presumed outlier
  – Internal check of registry
  – Invitation of centre by database manager (Carine)
  – Two steps
    • Review of the quality of the data
    • review of cases with negative outcome: unusual variability/risk records are excluded in the analysis

• Confirmed outlier
  – Remedial processes: not the task of the database committee
  – Confidentiality by database committee
Procedure of outlier confirmation

• Adaptation of MOU
  – Procedure has to be described
  – Invitation: voluntary participation in data check, centre ask involvement of the database committee
  – Presumed outlier – confirmed outlier

• Proposal of new MOU
  – To be discussed in the board
  – To be approved during the general assembly
Conclusion

• The ultimate goal of the database committee is quality improvement
• The BACTS 2012 registry could lead to a better quality of care
• The aggregated report will be available in the public domain
  – Available for everybody.
  – Only the aggregated report will be visible.
  – The data are anonymous
  – The database committee guarantees the confidentiality as described in the memory of understanding.