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This supplementary material has been provided by the authors to give readers additional information about their work.
### eBox. Cost Categories

<table>
<thead>
<tr>
<th>Operative</th>
<th>Postoperative</th>
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<tbody>
<tr>
<td>Anesthesia</td>
<td>Anesthesia</td>
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<tr>
<td>Cardiology</td>
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<tr>
<td>Diagnostic imaging</td>
<td>Diagnostic imaging</td>
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<tr>
<td>Nursing</td>
<td>Emergency room</td>
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<tr>
<td>Pharmacy</td>
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<tr>
<td>Surgical services</td>
<td>Other diagnostics</td>
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<tr>
<td>Professional</td>
<td>Other therapeutics</td>
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<tr>
<td>Other</td>
<td>Rehabilitation</td>
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<tr>
<td></td>
<td>Surgical services</td>
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<td></td>
<td>Professional</td>
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<td>Other</td>
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# Factors Associated With Each Surgical Approach

<table>
<thead>
<tr>
<th>Approach</th>
<th>Coefficient ± SE</th>
<th>P</th>
<th>Reliability (%)&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Robotic vs. Complete Sternotomy (n=198)&lt;sup&gt;b&lt;/sup&gt;</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robotic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Younger&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.66 ± 0.19</td>
<td>&lt; .0005</td>
<td>70</td>
</tr>
<tr>
<td>Higher hematocrit&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3.4 ± 1.2</td>
<td>.004</td>
<td>69</td>
</tr>
<tr>
<td>Greater fractional shortening&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1.4 ± 0.52</td>
<td>.009</td>
<td>57</td>
</tr>
<tr>
<td>Complete sternotomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher grade of AV regurgitation</td>
<td>1.01 ± 0.36</td>
<td>.005</td>
<td>73</td>
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<tr>
<td>Greater left atrial volume&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0.14 ± 0.057</td>
<td>.02</td>
<td>80</td>
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<tr>
<td><strong>Robotic vs. Partial Sternotomy (n=293)&lt;sup&gt;g&lt;/sup&gt;</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robotic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Younger&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.89 ± 0.23</td>
<td>&lt; .001</td>
<td>76</td>
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<tr>
<td>Prevalence of TV regurgitation</td>
<td>0.69 ± 0.32</td>
<td>.03</td>
<td>79</td>
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<tr>
<td>Partial sternotomy</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Higher grade of AV regurgitation</td>
<td>1.2 ± 0.39</td>
<td>.003</td>
<td>87</td>
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<tr>
<td>Higher bilirubin&lt;sup&gt;h&lt;/sup&gt;</td>
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<td><strong>Robotic vs. Anterolateral Thoracotomy (n=224)&lt;sup&gt;i&lt;/sup&gt;</strong></td>
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</tr>
<tr>
<td>Robotic</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Younger&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.84 ± 0.29</td>
<td>.004</td>
<td>70</td>
</tr>
<tr>
<td>More recent procedure&lt;sup&gt;j&lt;/sup&gt;</td>
<td>0.33 ± 0.15</td>
<td>.03</td>
<td>51</td>
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<tr>
<td>Anterolateral thoracotomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.82 ± 0.26</td>
<td>.003</td>
<td>63</td>
</tr>
</tbody>
</table>

<sup>a</sup> Percent of times factor appeared in 1,000 bootstrap models.<sup>40</sup>
<sup>b</sup> C-statistic = 0.74.
<sup>c</sup> Exp(age/50), exponential transformation.
<sup>d</sup> Ln(hematocrit), logarithmic transformation.
<sup>e</sup> Ln(fractional shortening), logarithmic transformation.
<sup>f</sup> (Left atrial volume/21)<sup>2</sup>, squared transformation.
<sup>g</sup> C-statistic = 0.71.
<sup>h</sup> (Bilirubin)<sup>2</sup>, inverse squared transformation.
<sup>i</sup> C-statistic = 0.67.
<sup>j</sup> Ln(interval [years] since 1/1/2006), logarithmic transformation.

KEY: AV, aortic valve; SE, standard error; TV, tricuspid valve.

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eAppendix 1. Return-to-Work Survey

**SURVEY INSTRUCTIONS:** Only fill out this survey for the surgery and date given on the other side. Answer all questions by checking the box next to your answer or writing in your answer. For this survey, “work” is defined as employment or self-employment.

1. Which best describes your work status **before** your surgery? And **now**?
   - Employed
   - Self-employed
   - Retired for health reasons
   - Retired for other reasons
   - Disabled
   - Unemployed
   - Homemaker

2. How long had you worked at your same job **before** your surgery?  [ ] Did not work **before**

3. How long **after** your surgery did you return to work?  [ ] Did not work **after**

4. How many hours per week did you work **before** your surgery? And **now**?  [ ] Did not work **before**  [ ] Do not work **now**

5. What was your annual income from work **before** your surgery? And **now**?
   - $0 (you did/do not work)  [ ]
   - Less than $25,000  [ ]
   - $25,000 to $49,999  [ ]
   - $50,000 to $74,999  [ ]
   - $75,000 to $99,999  [ ]
   - $100,000 or greater  [ ]

6. What was your annual income from sources other than work **before** your surgery? And **now**? (This includes pension, social security, disability, unemployment, etc.)
   - $0 (you had/have no other income)  [ ]
   - Less than $25,000  [ ]
   - $25,000 to $49,999  [ ]
   - $50,000 to $74,999  [ ]
   - $75,000 to $99,999  [ ]
   - $100,000 or greater  [ ]

7. Rate your satisfaction with your job **before** your surgery? And **now**?
   - Not applicable (you did/do not work)  [ ]
   - Not satisfied or mostly dissatisfied  [ ]
   - Somewhat satisfied  [ ]
   - Mostly or highly satisfied  [ ]

8. What was your job **before** your surgery? And **now**?
   - [ ] Did not work **before**
   - [ ] Do not work **now**

9. Which best describes the physical activity of your job **before** your surgery? And **now**?
   - Not applicable (you did/do not work)  [ ]
   - Very light (sitting)  [ ]
   - Light (sitting, some walking)  [ ]
   - Moderate (walking, handling objects)  [ ]
   - Heavy (strenuous manual work)  [ ]

10. What is the highest level of school you **completed**?
    - [ ] 8th grade or less
    - [ ] Some high school, but did not graduate
    - [ ] High school graduate or GED
    - [ ] Some college or 2-year degree
    - [ ] 4-year college graduate or more

11. Which best describes your marital status?
    - [ ] Married or living as married
    - [ ] Widowed
    - [ ] Divorced or separated  [ ] If checked, STOP.
    - [ ] Single  [ ] You completed the survey.

12. What was your partner’s annual income from work **before** your surgery? And **now**?
    - [ ] $0 (partner did/does not work)  [ ]
    - Less than $25,000  [ ]
    - $25,000 to $49,999  [ ]
    - $50,000 to $74,999  [ ]
    - $75,000 to $99,999  [ ]
    - $100,000 or greater  [ ]

13. What was your partner’s annual income from sources other than work **before** your surgery? And **now**? (This includes pension, social security, disability, unemployment, etc.)
    - [ ] $0 (partner had/has no other income)  [ ]
    - Less than $25,000  [ ]
    - $25,000 to $49,999  [ ]
    - $50,000 to $74,999  [ ]
    - $75,000 to $99,999  [ ]
    - $100,000 or greater  [ ]

You completed the survey. Thank you for your time. Please return it in the enclosed postage-paid envelope.

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eAppendix 2. Variables Used in the Analyses

Demography
Age (y), gender, Caucasian, height (cm), weight (kg), body surface area (m²), body mass index (kg•m⁻²)

Symptoms
New York Heart Association functional class I-IV

Cardiac comorbidity
Ventricular arrhythmia, heart failure

Noncardiac comorbidity
Bilirubin (mg•dL⁻¹), creatinine (mg•dL⁻¹), blood urea nitrogen (mg•dL⁻¹), hematocrit (%), total cholesterol (mg•dL⁻¹), high-density lipoprotein (mg•dL⁻¹), low-density lipoprotein (mg•dL⁻¹), triglycerides (mg•dL⁻¹), hypertension, chronic obstructive pulmonary disease, smoking (history of or current)

Valve pathology
Aortic valve regurgitation, aortic valve regurgitation grade, mitral valve regurgitation, mitral valve regurgitation grade, pulmonary valve regurgitation, pulmonary valve regurgitation grade, tricuspid valve regurgitation, tricuspid valve regurgitation grade

Mitral valve pathology
Calcification, posterior chordal rupture

Left ventricular size and function
End-diastolic volume (mL), end-systolic volume (mL), diastolic diameter (cm), systolic diameter (cm), mass (g), posterior wall thickness (cm), septal thickness, ejection fraction (%), fractional shortening

Left atrium
Diameter (mm), area (mm), volume (mL)

Procedure
Atrial fibrillation procedure

Experience
Interval (years) since 1/1/2009

a. Variable was included in the robotic versus complete sternotomy model.
b. Variable was included in the robotic versus partial sternotomy model.
c. Variable was included in the robotic versus anterolateral thoracotomy model.
d. Procedure for atrial fibrillation was included only in the robotic versus complete sternotomy model. For other analyses, concomitant atrial fibrillation procedures were excluded.
eFigure 1. Mirrored Histograms of Propensity-Score Distributions for the Complete Sternotomy (Top Left), Partial Sternotomy (Top Right), and Anterolateral Thoracotomy (Bottom) Groups vs the Robotic Surgery Population
eFigure 2. Covariable Balance for Selected Variables Before (Closed Triangles) and After (Closed Squares) Propensity-Score Matching

Key: AFib, atrial fibrillation; AV, aortic valve; IVSWT, interventricular septal wall thickness; LVEDV, left ventricular end-diastolic volume; LVIDD, left ventricular internal dimension–diastole; MV, mitral valve; NYHA, New York Heart Association; regurg, regurgitation; TV, tricuspid valve; Vent arr, ventricular arrhythmia.

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