The WAERS project: Web-Assisted Estimation of Relative Survival
http://rht.iconcologia.net/stats

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Introduction

- Relative Survival is used for the analysis of patient survival based mainly on data from population-based or hospital-based cancer registries.

- Relative Survival can be used also in other contexts, specially when specific-cause of death is not available.

- Estimating the Survival of the different types of cancer in such area could be a measure of the efficiency of treatment.
Relative Survival (RS)

- Defined as the observed survival in the patient group divided by the expected survival of that group.

- Expected survival is estimated on the basis of the mortality of the general population.

- Nationwide yearly mortality rates, stratified by age and sex, are required to estimate expected survival.
Software Available

• G. Hédelin **RELSURV 2.0** a program for relative survival analysis. Dept. of Epidemiology and public health, Faculty of Medicien, Louis Pasteur University, Strasbourg. France, 1997


**Pros:** Excellent software with tests developed for the analysis of RS.

**Cons:** Each user need to prepare its own Nationwide mortality rates.
WAERS: web-application

**Aim:**
To provide a computing tool which let the cancer registries to estimate relative survival of a cohort of patients.

- *This application runs on a remote server (not necessary to be installed in the user’s computer).*

- *The user doesn’t supply the Mortality tables* *

- *Results are returned in CSV format (i.e.: readable EXCEL) to the mail address supplied by the user.*
• Given a cohort of patients, for which one of its members it is known the age and year of diagnosis, sex, area of residence and if the patient is dead or not, the user can prepare this data in a text file (ASCII) and sent it to the web server.

• The Catalan Institute of Oncology has developed this web-application in R and PHP.

• Available at:

http://rht.iconcologia.catsalut.net/surv_eng.htm
Example

• Suppose we have 10 patients diagnosed with a determined type of cancer in Tarragona, between 1985-1989, and each one of them has been followed-up until 1990.

• From each of these patients are available the ID, year and age of diagnosis, Stage of cancer, gender, vital status at the end of follow-up and final year of follow-up.
Preparing data (I)

- The initial file looks like:

<table>
<thead>
<tr>
<th>ID</th>
<th>Age</th>
<th>Sex</th>
<th>Follow-up</th>
<th>Exitus</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1989</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1989</td>
</tr>
<tr>
<td>3</td>
<td>55</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1989</td>
</tr>
<tr>
<td>4</td>
<td>44</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1989</td>
</tr>
<tr>
<td>5</td>
<td>54</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1985</td>
</tr>
<tr>
<td>6</td>
<td>61</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>1988</td>
</tr>
<tr>
<td>7</td>
<td>35</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>1988</td>
</tr>
<tr>
<td>8</td>
<td>44</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>1988</td>
</tr>
<tr>
<td>9</td>
<td>45</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>1988</td>
</tr>
<tr>
<td>10</td>
<td>54</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>1988</td>
</tr>
</tbody>
</table>
Preparing data (II)

- Lets estimate the RS for the Stage 2 patients (not distinguishing male/female)
- To use WAERS let’s do the next steps:
  1) Compute time of follow-up (Years).
     \[ T = \text{End Follow-up} - \text{Diagnostic Year} \]
  2) Code Sex: Male (M)=1, Female (F)=2
  3) Code Exitus*: Yes=1, No=0

* The patients which are not death at the end of follow-up will have censored time.
Let’s put the name `dataf.txt` to the file name. The file format would be:

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35</td>
<td>1</td>
<td></td>
<td>1</td>
<td>0</td>
<td>1989</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>1</td>
<td></td>
<td>1</td>
<td>0</td>
<td>1989</td>
<td></td>
</tr>
<tr>
<td>3</td>
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<td></td>
<td>2</td>
<td>0</td>
<td>1989</td>
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<td></td>
<td>2</td>
<td>0</td>
<td>1989</td>
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<td>5</td>
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<td>1</td>
<td></td>
<td>2</td>
<td>1</td>
<td>1985</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>61</td>
<td>1</td>
<td></td>
<td>3</td>
<td>0</td>
<td>1988</td>
<td></td>
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<td>4</td>
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<td>1988</td>
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<td>5</td>
<td>1</td>
<td>1988</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>54</td>
<td>1</td>
<td></td>
<td>5</td>
<td>0</td>
<td>1988</td>
<td></td>
</tr>
</tbody>
</table>
NOTE: This process could take few minutes!!

Mortality of the reference population (Spain, province or Autonomous Community):
Esponya

User Names:

Institution-Country:

E-mail where the results should be returned:

Name of the file: [Examiner]

Reference:

Send data Reset
• The user’s e-mail address should be provided.
and the reference population (Tarragona)
• Institution’s name
• Suppose that his/her e-mail is:
  j.gamisans@rcant.edu
and our file: 
dataf.txt

AND THEN
• **The returned file looks like:**

<table>
<thead>
<tr>
<th>Risk</th>
<th>T</th>
<th>RS</th>
<th>LCI</th>
<th>UCI</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1</td>
<td>1.005</td>
<td>1.005</td>
<td>1.005</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>0.886</td>
<td>0.682</td>
<td>1.013</td>
<td>0.875</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>0.892</td>
<td>0.686</td>
<td>1.019</td>
<td>0.875</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>0.896</td>
<td>0.69</td>
<td>1.025</td>
<td>0.875</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>0.451</td>
<td>0.11</td>
<td>1.032</td>
<td>0.438</td>
</tr>
</tbody>
</table>

* **Interpreting variable Risk:** The first event occurs at time 2 (year). Note that the individuals at risk is 8 at the beginning of the second interval, being patients 3 & 4 censored at the end of this interval. The individuals with ID’s 5 & 9 die at times 2 and 5, respectively. The maximum Follow-up was 5 years (censored time, patient #10).
• From those results we could extract (Microsoft Excel):
Future Works on WAERS

- Multivariate analysis coming soon....
- Update of mortality tables....


