

# Web-Assisted Estimation of Relative Survival: The WAERS project of the Catalan Institute of Oncology

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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
- Dickman PW, Hakulinen T, Voutilainen ET. **SURV3**, Relative Survival Analysis. Finnish Cancer Registry. Helsinki, 2000.

**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.*

# RS using WAERS

- 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](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:

ID	Age	Sex	Follow-up	Exitus	Year
1	35	1	1	0	1989
2	45	1	1	0	1989
3	55	1	2	0	1989
4	44	1	2	0	1989
5	54	1	2	1	1985
6	61	1	3	0	1988
7	35	1	4	0	1988
8	44	1	4	0	1988
9	45	1	5	1	1988
10	54	1	5	0	1988

# 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 dead at the end of follow-up will be into the analysis. In this survival analysis those are known as censored.

# File Format

- Let's put the name **dataf.txt** to the file name. The file format would be:

```
1 35 1 1 0 1989
2 45 1 1 0 1989
3 55 1 2 0 1989
4 44 1 2 0 1989
5 54 1 2 1 1985
6 61 1 3 0 1988
7 35 1 4 0 1988
8 44 1 4 0 1988
9 45 1 5 1 1988
10 54 1 5 0 1988
```

# Sending data (I)

- Web page:

[http://rht.iconcologia.catsalut.net/surv\\_eng.htm](http://rht.iconcologia.catsalut.net/surv_eng.htm)

proportion of patients alive after T years of follow-up in the hypothetical situation that cancer is the only possible cause of death. RS is estimated as the ratio between observed survival and expected survival. Expected survival is estimated on the basis of the geographical area to which patients belong.

The user should provide a TEXT file with the following variables :

1. Number of registry (identification number of the patient)
2. Age at entry.
3. Sex (1:Male , 2 Female)
4. Time of follow-up (years)
5. Death (0: No, 1: Yes)
6. Year of entry

In the present version, the user can use mortality from different areas of Spain, as provinces, autonomous communities or Spain.

The file should be in ASCII format, including the following variables:

1	87.00	1	0.08	1	1992
2	70.00	1	10.33	0	1993
3	75.00	1	9.83	0	1991
4	84.00	1	2.67	1	1992
5	85.00	2	5.08	1	1983
6	79.00	2	9.17	0	1988
7	74.00	2	2.58	1	1992

**NOTE: This process could take few minutes!!**

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

User Names:

Institution-Country:

E-mail where the results should be returned:

Name of the file:

**Reference:**  
Clèries R, Ribes J, Gàlvez J, Melià A, Moreno V, Bosch F.X. Automatic calculation of relative survival through the web. The WAERS project of the Catalan Institute of Oncology. Gac Sanit 2005;19:71-75

# Sending data (II)

- 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](mailto:j.gamisans@rcant.edu)

and our file:

dataf.txt

**AND THEN**



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

User Names:  
James Gamisans

Institution-Country:  
Registry of Cancer

E-mail where the results should be returned:  
j.gamisans@rcant.edu

Name of the file:  
c:\dataf.txt

**Reference:**  
Clèries B, Ribes J, Gálvez J, Melià A, Moreno V, Bosch F.X. Automatic calculation of relative survival through the web. The WAERS project of the Catalan Institute of Oncology. Gac Sanit 2005;19:71-75

# Results (I)

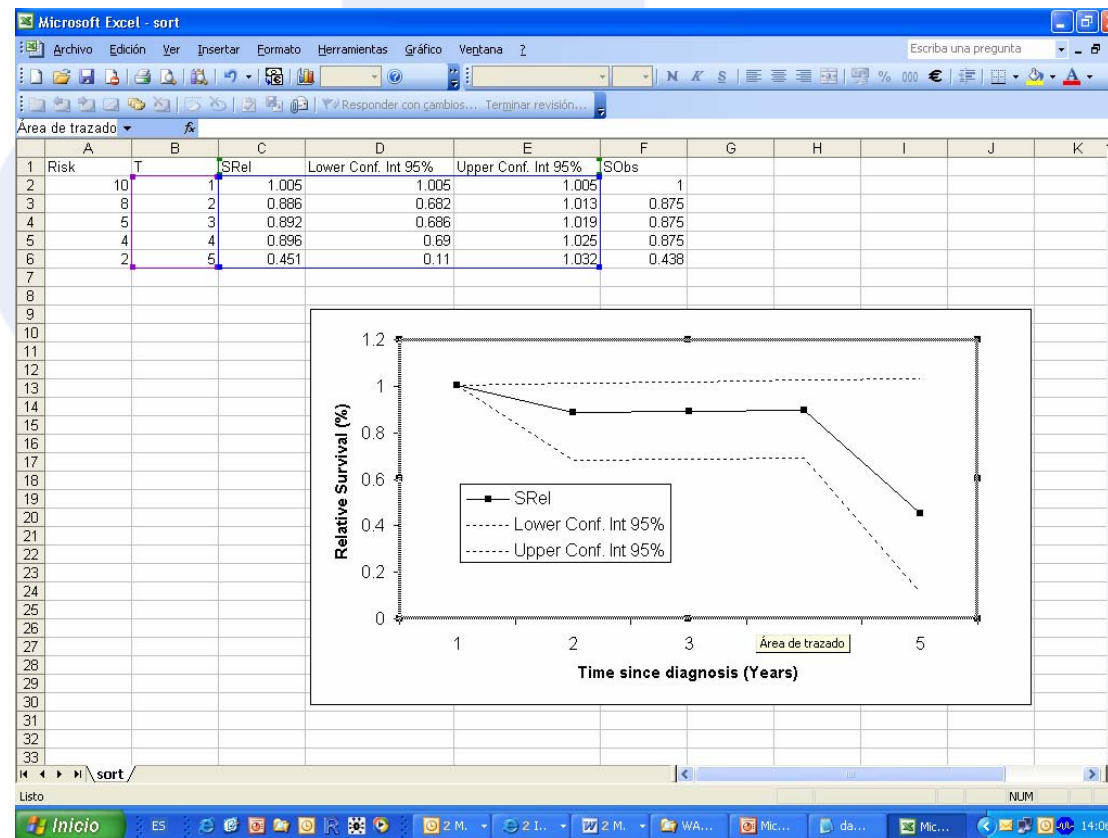
- The returned file looks like:

Risk	T	RS	LCI	UCI	OS
10	1	1.005	1.005	1.005	1
8	2	0.886	0.682	1.013	0.875
5	3	0.892	0.686	1.019	0.875
4	4	0.896	0.69	1.025	0.875
2	5	0.451	0.11	1.032	0.438

- \* **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).

# Results (II)

- From those results we could extract (Microsoft Excel):



# Future Works on WAERS

- Future improvements of this application will include mortality tables of Latin American and European Union countries, and stratified (control variable) analysis.
- Hospital-based and Population-based Cancer Registries, among others, could get profit of WAERS.
- Descriptive statistical curability analyses will be available soon.

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