

# 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 WEARS

- 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.htm>*

# Example

- Suppose we have 20 patients diagnosed of a determined type of cancer in Tarragona, between 1980-1985, 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	Diagn. Year	Age	Stage	Sex	Exitus	End F-U
1	1980	45	1	M	Yes	1989
2	1985	48	2	F	No	1990
3	1982	49	2	M	No	1990
4	1985	50	2	F	No	1990
5	1984	51	4	F	Yes	1987
6	1984	52	2	M	Yes	1985
7	1985	55	2	F	Yes	1987
8	1983	56	2	F	Yes	1988
9	1981	43	2	M	No	1990
10	1981	41	3	F	Yes	1989
11	1981	50	1	M	Yes	1989
12	1982	51	2	F	No	1990
13	1982	52	2	M	No	1990
14	1983	55	2	F	No	1990
15	1985	44	4	F	Yes	1987
16	1984	54	2	M	Yes	1985
17	1983	41	2	F	Yes	1987
18	1985	56	2	F	Yes	1988
19	1982	18	2	M	No	1990
20	1982	41	3	F	Yes	1989

# Preparing data (II)

- Lets estimate the RS for the Stage 2 patients (not distinguishing male/female):

**N=14 patients (6 male/8 female)**

- To use WEARS 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

4) Province: Tarragona=5

\* 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 **datos.txt** to the file name. The file format would be:

<u>ID</u>	<u>Age at Diagnosis</u>	<u>Gender</u>	<u>Follow Up</u>	<u>Exitus</u>	<u>Year of Diagnosis</u>	<u>Province</u>
2	48	2	5	0	1985	5
3	49	1	8	0	1982	5
4	50	2	5	0	1985	5
6	52	1	1	1	1984	5
7	55	2	2	1	1985	5
8	56	2	5	1	1983	5
9	43	1	9	0	1981	5
12	51	2	8	0	1982	5
13	52	1	8	0	1982	5
14	55	2	7	0	1983	5
16	54	1	1	1	1984	5
17	41	2	4	1	1983	5
18	56	2	3	1	1985	5
19	18	1	8	0	1982	5

# Sending data (I)

- Web page:

<http://rht.iconcologia.catsalut.net/cas/surv.html>

Registre Hospitalari de Tumors ICO/CSUB - Microsoft Internet Explorer

Archivo Edición Ver Favoritos Herramientas Ayuda

Actividades

- Material y métodos
- Equipo humano
- Descriptivas
- Consultas abiertas

Desarrollo

- ASEDAT
- Cálculo supervivencia
- Colaboraciones
- Publicaciones

tecnología del RHT

- Registros de tumores
- Documentación
- Links

Esta herramienta permite el cálculo automático de la Supervivencia Relativa a partir de los datos proporcionados por el usuario. La supervivencia relativa (SR) se interpreta como la proporción de pacientes vivos después de T años de seguimiento en la situación hipotética de que el cáncer en cuestión es la única causa posible de mortalidad. La SR se calcula como el cociente entre la supervivencia observada en un grupo de pacientes dividida por la supervivencia esperada que tendrían estos pacientes teniendo en cuenta la mortalidad de una población de referencia. Una ventaja de este dato es que la información de la causa de muerte específica no es necesaria. Por otra parte, la SR da una medida del exceso de mortalidad experimentado por los pacientes diagnosticados de cancer.

Las variables tienen que venir en el siguiente orden:

- Número de Registro
- Edad a la entrada
- Sexo del individuo  
1=Hombre, 2=Mujer
- Tiempo de seguimiento (en años)
- Evento  
1=SI, 0=NO
- Año de entrada
- Población de referencia de la que se utilizan las tasas de mortalidad:  
1=Catalunya, 2=Barcelona, 3=Girona, 4=Lleida, 5=Tarragona

Se tiene que pasar el fichero en formato ASCII con el siguiente formato:

1	87.00	1	0.08	1	1992	1
2	70.00	1	10.33	0	1993	1
3	75.00	1	9.83	0	1991	1
4	84.00	1	2.67	1	1992	1
5	85.00	2	5.08	1	1983	1
6	79.00	2	5.17	0	1988	1
7	74.00	2	2.62	1	1992	1

**ATENCIÓN!!: ESTE PROCESO PUEDE TARDAR ALGUNOS MINUTOS!!**

E-Mail donde se enviarán los resultados:

Nombre del fichero:

**ATENCIÓN!!: ESTE PROCESO PUEDE TARDAR ALGUNOS MINUTOS!!**

E-Mail donde se enviarán los resultados:

Nombre del fichero:

# Sending data (II)

- The user's e-mail address should be provided.
- Suppose that our e-mail is :  
[usuario@registro.com](mailto:usuario@registro.com)

and our file:

[datos.txt](#)

E-Mail donde se enviarán los resultados:

Nombre del fichero:

# Results (I)

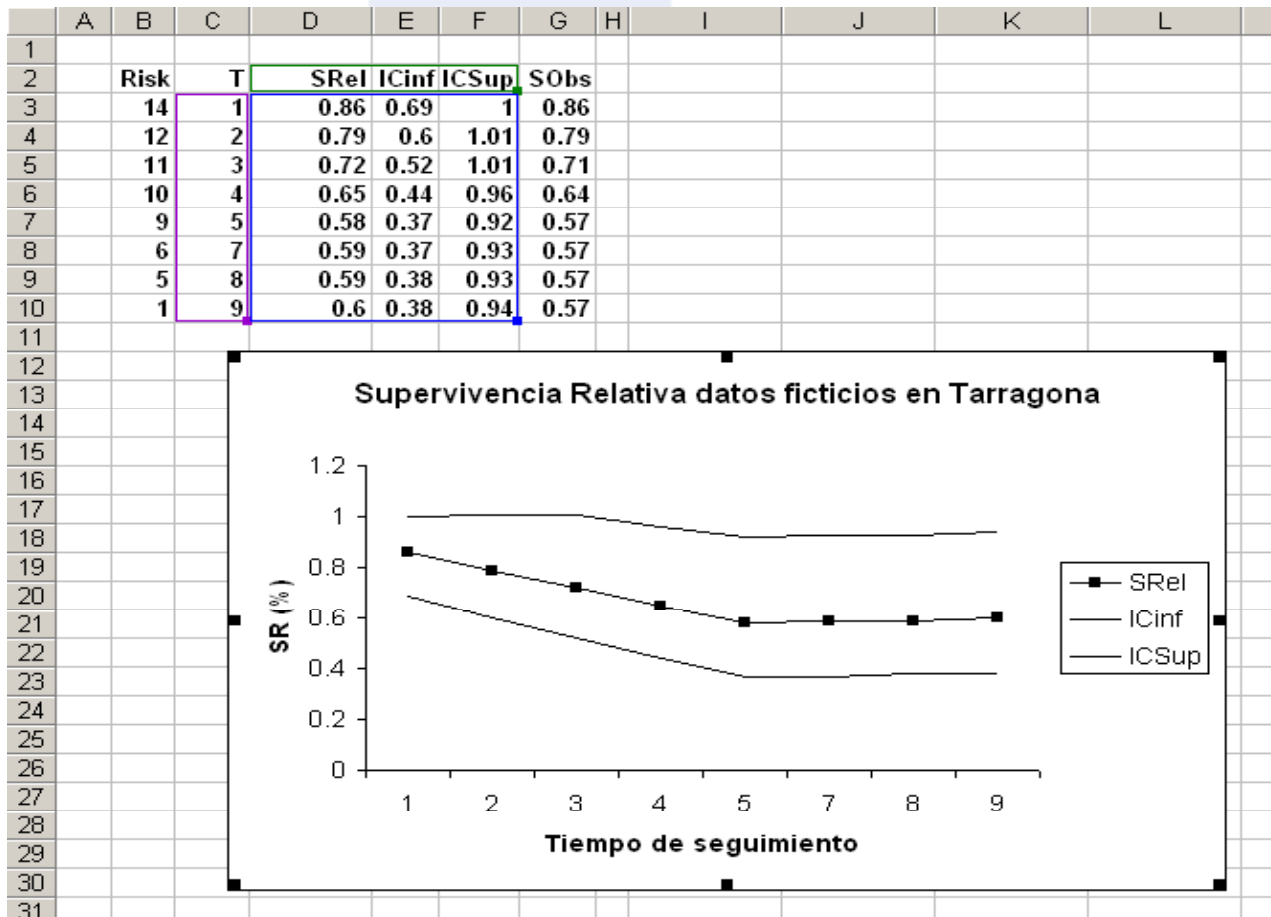
- The returned file looks like:

Risk	T	SRel	ICinf	ICSup	SObs
14	1	0.86	0.70	1.00	0.86
12	2	0.79	0.60	1.01	0.79
11	3	0.72	0.52	1.01	0.71
10	4	0.65	0.44	0.96	0.64
9	5	0.58	0.37	0.92	0.57
6	7	0.59	0.37	0.93	0.57
5	8	0.59	0.38	0.93	0.57
1	9	0.60	0.38	0.94	0.57

- \* **Interpreting variable Risk:** The first event occurs at time 1 (year). Note that the individuals at risk is 14 (The total of individuals in the file `datos.txt`). The individuals with ID's 6 y 16 die at time 1, therefore we have 12 individuals at risk after the 1st year of follow-up. The maximum Follow-up was 9 years (censored time).

# Results (II)

- From those results we get (Microsoft Excel):



# Future Works on WEARS

- We expect the whole spanish mortality tables are available, stratified by province and autonomous community, once have been requested and granted by the Instituto Nacional de Estadística (INE).
- European countries mortality available soon (using WHO mortality database).
- Hospital-based and Population-based Cancer Registries, among others, could get profit of WAERS.
- Descriptive statistical curability analyses will be available soon.

# Bibliography

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