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# Italian supercentenarians: Age validation of deaths from 1969 to 2000

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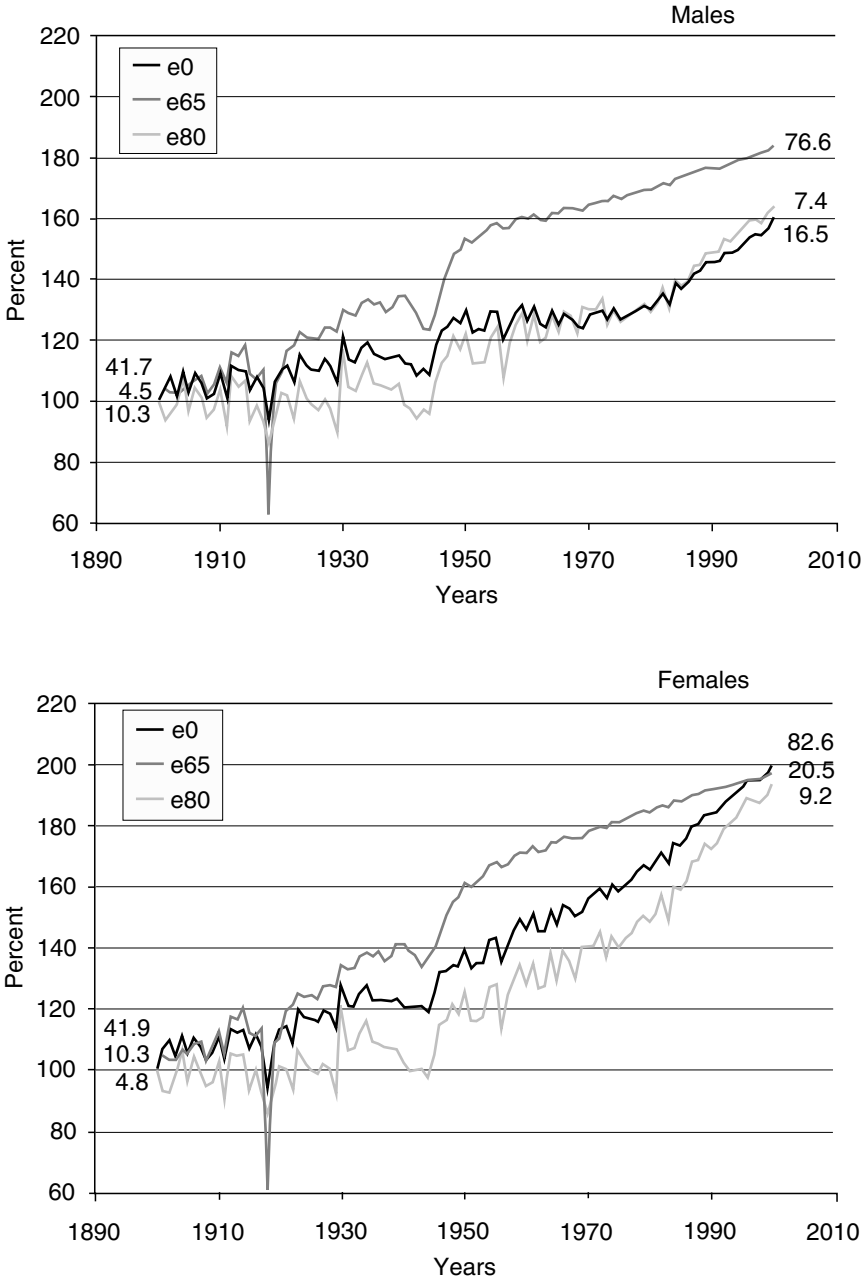
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**Abstract.** This report describes the first stage of the age validation process of Italian supercentenarians. The process is still in progress and to date has only concerned supercentenarians deceased in the period 1969–2000. Of 35 potential supercentenarians included in the Italian National Institute of Statistics (Istituto nazionale di statistica, or Istat) database, 21 cases (three males and 18 females) are fully validated, seven cases refer to false supercentenarians—the error often being a misreported date of birth—and seven cases still remain unverified. The maximum age reached by the validated supercentenarians is 111, and the first case is recorded in 1973. In Italy supercentenarians have become a significant phenomenon only in the last few years.

## 1 Introduction

The decline in mortality at advanced ages plays a major role in determining future numbers of the elderly, and especially of the very old population. James Vaupel (1997) has noted that the remaining life expectancy of 80-year-old women in England and Wales is about 50% higher today than in 1950. This trend is also to be observed in Italy where, since the 1970s, life expectancy for those in their eighties (especially men) has increased much more quickly than for other ages (see Figure 1).

The growing number of 80-year-olds in the population, along with their increased life expectancy, has generated a progressively larger number of centenarians. In Italy, as in many other developed countries,



**Fig. 1.** Relative increases in life expectancy at birth, at age 65 and age 80, from 1900 to 2000, Italy

since the 1970s the number of centenarians, particularly women, has doubled every six to 10 years (Robine and Caselli, 2005). On January 1, 2005, 9,091 centenarians were recorded, compared with 6,300 in the 2001 census (October 21). Moreover, among this population group, the number of people reaching age 105 has also grown, as has the number of people topping 110 years—i.e., the supercentenarians.

Since 2002, statistics regarding centenarians from the Anagrafe (population register of the municipalities) have been modified in keeping with data from the 2001 census. Their total was reduced by 30%, compared with figures dating to January 1 of the same year. This adjustment does not, however, exclude other possible errors that crop up fairly frequently in surveys of the population over the age of 90. Hence, when considering extreme ages, it would be advisable to validate all those who claim these ages. Naturally, no cross-checking is possible if certain generalities are not known. Close cooperation is called for between civil status and population registry offices (Anagrafe), though privacy laws must be fully respected.

Identifying and validating deceased centenarians is a simpler procedure, as each death certificate contains information regarding the deceased's birth (date and place of birth) and death. In 2001, various countries, Italy included, established the International Database on Longevity (IDL), which gathers complete lists of validated supercentenarians (i.e., persons aged 110 and above). For each supercentenarian, the database will include information on sex, nationality, date of birth, and, eventually, date of death; as well as on the methods used to validate the person's age.

This report describes the first stage of the age validation process of Italian supercentenarians. The process is still in progress, and, to date, has only concerned supercentenarians deceased in the period 1969-2000, for which an electronic database is available. The number of living supercentenarians has been recorded in the national 2001 census (Istat). Table 1 shows figures for all those aged 100 and over. Although Istat used a special procedure for centenarians, the number of supercentenarians cannot be considered fully validated, as these cases were not processed according to the IDL protocol.

## 2 Data sources

The data sources used to build and to update the Italian Database on Supercentenarians are the Civil Status Office and the Istat Causes of Death Register.

**Table 1.** Living centenarians and supercentenarians, Italy, 2001 Census

	Age													
	100	101	102	103	104	105	106	107	108	109	110	111	112	100+
<i>Male</i>	519	306	111	55	37	21	9	10	2	4	2	1	3	1080
<i>Female</i>	2401	1405	658	381	172	105	48	30	12	10	5	3	3	5233
<i>Total</i>	2920	1711	769	436	209	126	57	40	14	14	7	4	6	6313

**Source:** Istat - 14th national population census (21/10/2001)

The Civil Status Office of each municipality collects birth, marriage, and death records of the present population in the municipality. It is different from the Anagrafe, the population registry office that maintains records on the resident population in each municipality. When an event does not occur in the place of residence, the Civil Status Office sends the information about the event to the Anagrafe of the municipality of residence. In Italy, there are no central offices at the regional or provincial levels that keep these records.

The Istat Causes of Death Register is an important instrument for the evaluation of the health status of the population, for the assessment of health programs and resource allocation, and for collecting information about individual demographic and social characteristics. It is a sort of ‘death census’ based on administrative data routinely collected by the Civil Status Office of the municipality on death, and on the diagnosis of causes of death provided by a physician (hospital, family, or post mortem physician). Moreover, it includes other social and economic information about the deceased, such as educational level, professional status, and occupational sector. Data on mortality by cause are annually collected, processed, and published by Istat.

The collection of data included in the Causes of Death Register is done by means of the death certificate (Istat forms D.4 for males and D.5 for females over one year old, and D.4 bis and D.5 bis for infant deaths; see Appendix). This document is the only acceptable official form in Italy, and is to be completed by a physician after the death, and by a Civil Status Officer. Under Italian law, each death must be reported within 24 hours to the local registrar of the municipality of death.

The death certificate is composed of two parts: Part A, to be completed by the physician; and Part B, to be filled out by the Civil Status Officer. Part A contains medical details and the name and age of the deceased. The medical section of the death certificate encompasses all the different pathologies (whether fatal or non-fatal), and, in case of

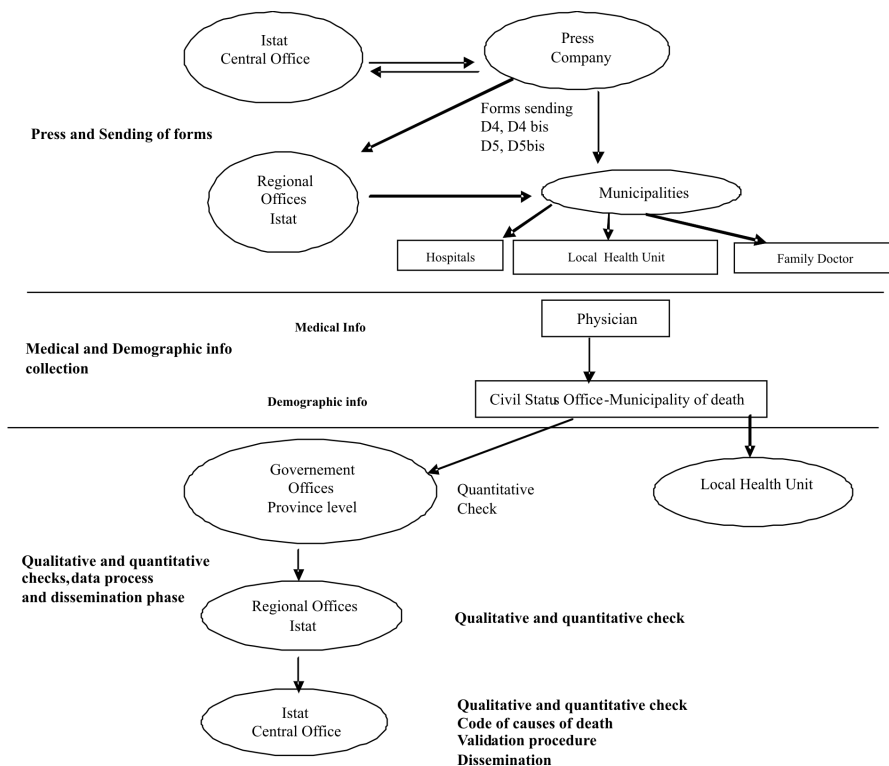
violent death, the traumatic circumstances that occurred before death. Nevertheless, the data published refer to the underlying cause of death, i.e., the one that has mainly contributed to death. Part B contains information on the places and dates of birth and residence, marital status, education, profession, economic activity, citizenship, and an individual code of the deceased. Since 1997, Part B contains the deceased's tax identification number (codice fiscale) as well. This number consists of a code of 16 letters that comprises letters from the person's name, and place and date of birth. The tax identification number was very useful in checking the accuracy of the details recorded in Part B of the death form. Recently, Istat has implemented a new procedure for checking the correctness of the age reported on the death form by comparing the age declared by physicians in Part A to the dates of birth and death, and the tax identification number, reported by the Civil Status Officer in Part B.

Every year, Istat sends the new forms (D4, D5, D4 bis, D5 bis) of the death certificate to its regional offices and to all Italian municipalities, which, in turn, send the forms to the local health units, hospitals and family doctors (Istat 2004). The Civil Status Office of each Italian municipality of death, after receiving the forms completed in Part A by the physicians, must complete the demographic part of the death certificate (Part B). Subsequently, the form follows two different paths. One copy is sent to the local health unit of the place where the event occurred. Meanwhile, a second copy is first sent to the provincial government offices; then to the regional offices of Istat, where a preliminary quantitative check of forms is done; and, finally, to the central office of Istat (Figure 2).

### 3 The validation procedure and its results

For all deceased supercentenarians found in the Istat Causes of Death Registrar, Istat first contacted the Civil Status Office of the municipality where the death occurred, explaining the IDL project and stressing its importance. The offices were asked to check the data regarding the dates and places of birth and death of the deceased supercentenarian and, as a proof of validation in accordance with the IDL protocol, to provide a copy of the death certificate. In addition, when the places of birth and death coincided, a copy of the certificate of birth was also requested.

Demographic data were available for each deceased supercentenarian, thus facilitating the work of the Civil Status Officers. At times, the



**Source:** La Nuova Indagine sulle Cause di Morte. La codifica automatica, il bridge coding e altri elementi innovativi - Istat - Metodi e Norme - n.8 -2001

**Fig. 2.** The Causes of Death Registrar: the data flow

number of the birth registration act transcript over the death certificate was also available, thus facilitating the search for the birth certificate. For deaths recorded in 1969-1997, the names of the supercentenarians were not available, thus it was not always possible to validate the dates and place of birth and death.

Subsequently, for the deceased supercentenarians with different places of birth and death, Istat contacted the Civil Status Offices of the municipality of birth, asking for a copy of the birth certificate.

Results from the validation procedure are shown in Table 2. The Istat Causes of Death Registrar includes 35 possible supercentenarians deceased during the period 1969-2000, with the first case recorded in 1973.

For 27 out of 35 cases, Istat received a copy of the death certificate from the municipalities where the deaths occurred. Of these, 22 were confirmed, whereas for the remaining five cases, the validation revealed false supercentenarians. One municipality replied only by phone, revealing a further case of a false supercentenarian. For four out of 35 cases, the Civil Status Office replied that it was not able to proceed due to lack of information. Three municipalities failed to reply despite several solicitations.

For 21 of the 22 cases verified by the municipalities of death, a copy of the birth certificate was obtained from the municipalities of birth. In the remaining case, confirmed by the municipality of birth and death, which coincided, the whole historical archive had been destroyed during the war. In addition to these 22 records, another case was recorded as a false supercentenarian where a birth certificate was available, but the Civil Status Office of the death municipality did not answer our request.

To summarize, of 35 potential supercentenarians included in the Istat database for the period 1969-2000, 21 cases (three males and 18 females) are fully validated; seven cases refer to false supercentenarians, with the error often being a misreported date of birth; and seven cases still remain unchecked.

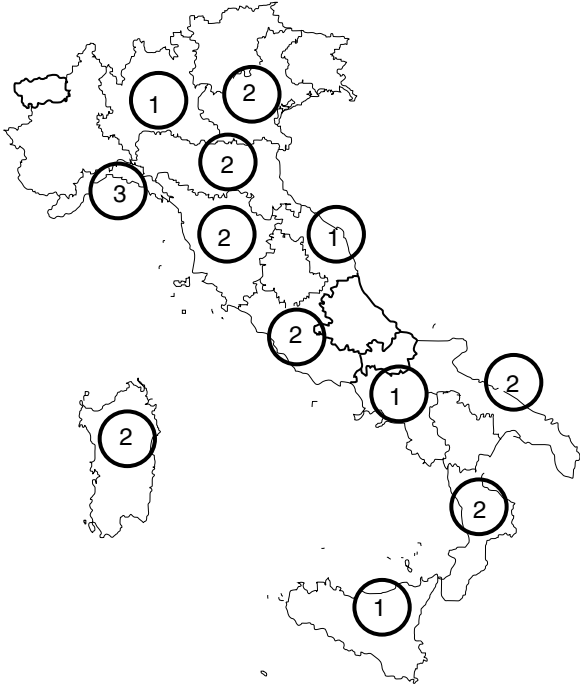
The maximum age reached by the validated supercentenarians during the time period studied was 111, and was recorded for men in Calabria and Veneto, and for women in Liguria. This extreme age has already been surpassed in Sardinia by Antonio Todde, who died at age 112 on January 3, 2002, and thus was not included in this study. Table 3 and Figure 3 depict the distribution by sex and region of the validated supercentenarians. Table 4 shows that the number of the oldest old has increased rapidly over the study period. In particular, supercentenarians in Italy have become a significant phenomenon only in the last few years.

## 4 Some conclusions

This analysis only concerned deceased supercentenarians, but some of these cases have now been entered in the International Database on Longevity as a result of this study. As we pointed out, a stringent procedure is followed prior to entering a name the database. The results obtained here corroborate this approach: of the 35 possible supercentenarians included in the Istat database for the period 1969-2000, only 21 (three men and 18 women) are fully validated. This alone entailed

more than 18 months of work. It follows naturally that a greater effort is called for on the part of Italy regarding the “Supercentenarians” international research project, not only to validate the deceased aged 110 and above, but also to validate supercentenarians still living.

It is vital to persuade Istat of the importance of this study so that, as is the case elsewhere, supercentenarians could be identified when they are still living, and not on the basis of their death certificates. In Italy, the ages of individuals can be validated using civil status registries, birth and marriage certificates, as well as population data registries (Anagrafe) containing information on current place of residence. Reference to these sources, together the active collaboration of the civil status authorities, would make possible the validation of Italian supercentenarians.



**Fig. 3.** Distribution of supercentenarians by region of death. Period 1968-2000



Table 2. Italian deaths at age 110 and over, 1969-2000

ID	Result of the validation procedure	Birth year	Death year	Age	Sex	Birth region	Death region	Birth certificate availability	Death certificate availability
1	checked info	1863	1973	110	Female	Lazio	Lazio	Yes	Yes
2	deceased info not found	1867	1978	110	Female	Sardegna	Toscana	No <sup>1</sup>	No <sup>1</sup>
3	checked info	1874	1985	110	Female	Sardegna	Sardegna	Yes	Yes
4	checked info	1875	1986	110	Female	Abruzzo	Abruzzo	No <sup>2</sup>	Yes
5	no answer from municipality	1879	1989	110	Female	Sicilia	Sicilia	No <sup>3</sup>	No <sup>4</sup>
6	no answer from municipality	1879	1990	111	Female	Campania	Campania	No <sup>3</sup>	No <sup>4</sup>
7	deceased info not found	1880	1991	111	Male	Emilia Romagna	Puglia	No <sup>1</sup>	No <sup>1</sup>
8	checked info	1880	1991	111	Male	Calabria	Calabria	Yes	Yes
9	checked info	1880	1991	110	Female	Toscana	Toscana	Yes	Yes
10	checked info	1880	1991	110	Female	Campania	Campania	Yes	Yes
11	checked info	1881	1991	110	Female	Marche	Marche	Yes	Yes
12	deceased info not found	1879	1991	111	Female	Sicilia	Sicilia	No <sup>1</sup>	No <sup>1</sup>
13	checked info	1881	1992	111	Female	Liguria	Liguria	Yes	Yes
14	checked info	1882	1993	110	Female	Calabria	Calabria	Yes	Yes
15	FALSE supercentenarian -the deceased was 100 years old and not 110 years old	1893	1993	100	Female	Basilicata	Basilicata	Yes <sup>1</sup>	No <sup>4</sup>
16	checked info	1883	1993	110	Female	Sardegna	Sardegna	Yes	Yes
17	FALSE supercentenarian -the deceased was 101 years old and not 111 years old	1892	1993	101	Female	Lombardia	Lombardia	Yes <sup>1</sup>	Yes
18	deceased info not found	1883	1994	110	Female	Sardegna	Sardegna	No <sup>1</sup>	No <sup>1</sup>
19	FALSE supercentenarian -the deceased was 13 years old and not 113 years old	1991	1995	13	Male	Lombardia	Lombardia	No <sup>6</sup>	No <sup>5</sup>
20	FALSE supercentenarian -the deceased was 100 years old and not 110 years old	1895	1995	100	Female	Piemonte	Emilia-Romagna	No <sup>6</sup>	Yes

Table 2. (continued)

ID	Result of the validation procedure	Birth year	Death year	Age	Sex	Birth region	Death region	Birth certificate availability	Death certificate availability
21	checked info	1885	1995	110	Female	Campania	Liguria	Yes	Yes
22	checked info	1886	1997	111	Male	Veneto	Veneto	Yes	Yes
23	checked info	1886	1997	110	Female	Liguria	Liguria	Yes	Yes
24	checked info	1887	1997	110	Female	Liguria	Emilia-Romagna	Yes	Yes
25	FALSE supercentenarian -the deceased was 102 years old and not 112 years old	1894	1997	102	Female	Emilia Romagna	Emilia Romagna	$N_0^6$	Yes
26	FALSE supercentenarian -the deceased was 103 years old and not 113 years old	1893	1997	103	Female	Toscana	Toscana	$N_0^6$	Yes
27	checked info	1887	1998	111	Male	Veneto	Veneto	Yes	Yes
28	checked info	1887	1998	110	Female	Lazio	Lazio	Yes	Yes
29	checked info	1887	1998	110	Female	Puglia	Puglia	Yes	Yes
30	checked info	1888	1998	110	Female	Emilia Romagna	Emilia Romagna	Yes	Yes
31	checked info	1888	1999	110	Female	Sicilia	Sicilia	Yes	Yes
32	checked info	1889	1999	110	Female	Lombardia	Lombardia	Yes	Yes
33	FALSE supercentenarian -the deceased was 109 years old and not 110 years old	1889	1999	109	Female	Emilia Romagna	Emilia Romagna	$N_0^6$	Yes
34	checked info	1889	2000	110	Female	Toscana	Toscana	Yes	Yes
35	checked info	1889	2000	110	Female	Puglia	Puglia	Yes	Yes

 $N_0^1$  = Document not available $N_0^2$  = Document destroyed during war $N_0^3$  = Document requested (2nd time) $N_0^4$  = No answer from death municipality $N_0^5$  = confirmed by phone $N_0^6$  = False SupercentenarianYes<sup>1</sup> = False Supercentenarian

**Table 3.** Distribution of semi-supercentenarians and supercentenarians by sex, age group, and region of death. Period 1969-2000

<i>Regions of death</i>	<i>Number of deaths</i>						
	Over 105			Over 108		Over 110	
	Males	Females	F/M	Males	Females	Males	Females
Piedmont	20	86	4.30	0	6	0	0
Valle D'Aosta	0	3	..	0	1	0	0
Lombardy	26	137	5.27	2	9	0	1
Trentino A.A.	1	12	12.00	1	1	0	0
Veneto	19	95	5.00	2	8	2	0
Friuli	4	46	11.50	0	4	0	0
Liguria	16	68	4.25	1	16	0	3
Emilia	14	109	7.79	2	11	0	2
Toscana	18	114	6.33	1	9	0	2
Umbria	10	21	2.10	1	2	0	0
Marche	6	43	7.17	0	4	0	1
Lazio	29	132	4.55	4	9	0	2
Abruzzo	10	34	3.40	0	2	0	0
Molise	4	10	2.50	1	1	0	0
Campania	27	79	2.93	3	6	0	1
Puglia	14	75	5.36	0	14	0	2
Basilicata	8	9	1.13	1	1	0	0
Calabria	14	42	3.00	2	5	1	1
Sicilia	16	89	5.56	1	9	0	1
Sardegna	28	46	1.64	3	10	0	2
Italy	284	1250	4.40	25	128	3	18

**Table 4.** Semi-supercentenarian and Supercentenarian rates (per 1,000,000) in four periods

<i>Age at death</i>	1969-71	1979-81	1989-91	1998-00
105 and over	0.22	0.32	0.95	2.49
110 and over	0	0	0.02	0.05

**Note:** The supercentenarians rate is calculated by means of the ratio between the deaths over 105 or 110 years, and the mean population of the periods 1969-1971, 1979-1981, 1989-1991, 1998-2000.

## Acknowledgements

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<b>Municipality</b>	<b>Province</b>
Alseno	Piacenza
Asiago	Vicenza
Bari	Bari
Berchidda	Sassari
Casaleone	Verona
Catania	Catania
Cesenatico	Forl-Cesena
Collegno	Torino
Fiorenzuola d'Arda	Piacenza
Firenze	Firenze
Forl	Forl-Cesena
Galatone	Lecce
Genova	Genova
Imola	Bologna
Legnano	Milano
Lizzanello	Lecce
Milano	Milano
Monteriggioni	Siena
Nogara	Verona
Palombara Sabina	Roma
Petilia Policastro	Crotone
Piobbico	Pesaro e Urbino
Porretta Terme	Bologna
Rapone	Potenza
Rimini	Rimini
Roccastrada	Grosseto
San Sosti	Cosenza
Sant'Olcese	Genova
Siena	Siena
Taranta Peligna	Chieti
Torre del Greco	Napoli
Truccazzano	Milano
Varese Ligure	La Spezia
Ventimiglia	Imperia
Villafranca di Verona	Verona
Villagrande Strisaili	Nuoro
Zone	Brescia

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# Appendix

## Italian Death Certificate (Istat form)

For a correct filling of the form please read the INSTRUCTIONS on the back of the form

Istat D.4 Edizio

Name and Surname of the deceased \_\_\_\_\_ Age \_\_\_\_\_  
**DEATH CERTIFICATE OVER 1 YEAR OF LIFE FOR MALE** Individual code \_\_\_\_\_

**PART A** (to be completed by physicians)  
**Place of death**  
 Home 1  
 Private Hospital 2  
 Public Hospital 3  
 Social and Health care Institution 4

**Province of death**  
**Municipality of death**  
**Agency for Local Health Autopsy** requested  1 not requested  2

**PART B -** (to be completed by Civil Status Officer)  
 Check and eventually correct the name of the deceased  
**Number of death declaration**  
**Part** 1  I 2  II  
**Series** 1  B 2  C  
 Municipality \_\_\_\_\_  
 Province \_\_\_\_\_

**NATURAL CAUSE OF DEATH**  
**1. Underlying cause** (write in capital letter)  
 Choose the only pathology considered the initial cause of the morbidity process which lead to death, duration yy m m d d  
 ↓ which caused cause 2 ↓  
**2. Intermediate cause** (write in capital letter)  
 Complication of disease indicated previously yy m m d d  
 ↓ which caused cause 3 ↓  
**3. Final cause** (write in capital letter)  
 Condition which directly caused the death. Don't insert the mode of dying (e.g. cardiac arrest or respiratory arrest) yy m m d d  
**4. Other Significant Conditions** yy m m d d  
 Enter all diseases or conditions that contributed to death that were not listed in the chain of events in questions 1-2-3 and that did not result in the underlying cause-of-death  
**Declaration of the physician**  
 Date \_\_\_\_\_  
 Sign of the physician \_\_\_\_\_

**EXTERNAL CAUSE OF DEATH**  
**5. Violent cause**  
 Accident 1 Work Accident 2  
 Suicide 3 Homicide 4  
**6. Description of injury** (write in capital letter)  
**7. Diseases or Complication linked to underlying injury** (write in capital letter)  
**8. Morbidity conditions which already existed before the injury and which have, in case but not directly, contributed to death.**  
**9.1 Mode in which the injury has been done**  
**Interval between the accident and the death**  
 yy | ly | | m | m | | d | d | | h | h |  
**9.2 Date of accident**  
 Hour day month year  
**9.3 Place of accident**  
 1 Home 2 Institutions 3 Schools 4 Free Time place  
 5 Street 6 Place of Service 7 Industrial Area  
 8 Farm 9 Others \_\_\_\_\_ in charge of the deceased coroner

**1. Death date**  
 time Day Month Year  
**2. Birth date**  
 Day Month Year  
**3. Place of birth**  
 the same municipality of death 1  
 Other municipality 2  
 Foreign Country \_\_\_\_\_ municipality (g. l. g. l.) province \_\_\_\_\_ country \_\_\_\_\_  
**4. Age**  
 Years 4  
**5. Civil Status**  
 Bachelor 1  
 Married 2  
 Widower 3  
 Divorced 4  
 Separated 5  
 Birth Year of survivor spouse \_\_\_\_\_  
 Wedding date \_\_\_\_\_  
**6. Place of residence**  
 the same municipality of death 1  
 Other municipality 2  
 Foreign Country \_\_\_\_\_ municipality (g. l. g. l.) province \_\_\_\_\_ country \_\_\_\_\_  
**7. Educational level**  
 University degree (long) 1  
 University degree (short) 2  
 High school 3  
 Secondary school diploma 4  
 Primary school diploma 5

**8. Occupation**  
**9. Working and not working status**  
 Employed  
 Unemployed  
 First job seeker  
 Retired  
 Housekeeper  
 Student  
 Unable to work  
 Others  
**10. Professional position**  
**Self-employed**  
 Entrepreneurs and free-lancers  
 Self-employed others  
**Employed**  
 Managers and functionaries  
 Employee - Wage earners  
 Not skilled employee  
 Others  
**11. Economical activity**  
 Agriculture  
 Industry  
 Service  
 Public Administration  
 Others  
**12. Citizenship**  
 Italian for birth obtained  
 Foreign  
 Sign of the Civil Status Officer \_\_\_\_\_