

BRIDGE-Health WP-8

Population-based Register of Coronary and Cerebrovascular Events



Luigi Palmieri
Istituto Superiore di Sanità
Rome



OBJECTIVE

To estimate attack rate and case fatality of major coronary and cerebrovascular events in men and women aged 35-74 years in the North, Center and South of Italy

Italian population-based register of coronary and cerebrovascular events

Brianza:
G. Cesana
n = 456,122

Firenze:
E. Buiatti
n = 427,243

Roma:
M. Uguccioni
n = 283,737

Napoli:
S. Lodato
n = 480,015



Friuli:
D. Vanuzzo
n = 629,544

Veneto:
P. Spolaore
n = 2,273,840

Modena:
C.A. Goldoni
n = 324,635

• Caltanissetta:
F. Vancheri
n = 126,294

Mean population in the period 1998-99 by register geographical area; ages 35-74 years

Area	Men	Women	Total
Brianza	221,432	234,690	456,122
Veneto	1,111,997	1,161,843	2,273,840
Friuli	305,883	323,661	629,544
Modena	159,152	165,483	324,635
Florence	204,187	223,056	427,243
Rome	133,306	150,431	283,737
Naples	232,890	247,125	480,015
Caltanissetta	59,694	66,600	126,294
Total	2,428,541	2,572,889	5,001,430

METHODS

1. identification of the “current” coronary events
2. validation of a sub-sample of 1000 *current* events in each area using the MONICA diagnostic criteria
3. evaluation of the Positive Predictive Values (PPV) for each ICD code
4. estimation of the number of events, attack rates and case fatality

Ferrario M, Giampaoli S, Vancheri F, Vanuzzo D. [Registro per gli eventi coronarici e cerebrovascolari. Protocollo dello studio](#). Rapporti ISTISAN 2001;01/8:1-89;

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METHODS

Flow-chart: collection of current coronary events

MORTALITY

Death certificates with underlying cause, ICD-9:
410-414, 798-799, 250 (*), 401-404 (*),
420-429(*), 440-447(*)
(*) with 410-414 in at least one of the secondary
causes

HOSPITAL DISCHARGE DIAGNOSIS

Hospital discharge diagnosis, ICD-9:
410-414
in at least one of the hospital discharge
diagnoses

Discharged before the 28th day, ICD-9
410-414

Alive at the 28th day, ICD-9
410-414

Cross-check with the mortality registry
by **name, date of birth, residence
and gender**

**NON FATAL CORONARY
EVENT**

Death certificates with underlying cause, ICD-9:
410-414, 798-799, 250 (*), 401-404 (*),
420-429(*), 440-447(*)
(*) with 410-414 in at least one of the secondary
causes

Alive at the 28th day, ICD-9
410-414

**FATAL CORONARY
EVENT**

**NON FATAL CORONARY
EVENT**

VALIDATION

Flow-chart: collection of current cerebrovascular events

MORTALITY

Death certificates with underlying cause, ICD-9:
342, 430-434, 436-438, 250 (*), 401-404 (*),
427(*), 440(*)
(*) with 342, 430-434, 436-438 in at least one of
the secondary causes

HOSPITAL DISCHARGE DIAGNOSIS

Hospital discharge diagnosis, ICD-9:
342, 430-438
in at least one of the hospital discharge
diagnoses

Discharged before the 28th day ICD-9
342, 430-438

Alive at the 28th day, ICD-9
342, 430-438

Cross-check with the mortality registry
by **name, date of birth, residence
and gender**

**NON FATAL
CEREBROVASCULAR
EVENT**

Death certificates with underlying cause, ICD-9:
342, 430-434, 436-438, 250 (*), 401-404 (*),
427(*), 440(*)
(*) with 342, 430-434, 436-438 in at least one
of the secondary causes

Alive at the 28th day, ICD-9
342, 430-438

**FATAL CEREBROVASCULAR
EVENT**

**NON FATAL
CEREBROVASCULAR
EVENT**

METHODS

Positive Predictive Value of an identified ICD code:

PPV_i = proportion of events validated as positive identified by an ICD code, over total events with the same ICD code

In order to estimate the number of events by each specific age group and gender, separately by fatal and non-fatal cases:

$$N_{EC} = N_{OC} * \sum (PPV_i * Pr_i)$$

where:

N_{EC} = Number of estimate cases,

N_{OC} = Number of observed cases,

PPV_i = Positive Predictive Value of a specific ICD code,

Pr_i = Prevalence of a specific ICD code.

Example of estimated events calculation: Brianza 1997, Men - Non fatal CE

			PPV - MONICA		
ICD9 code	Number of Events	Preval.	CE	Not CE	Estimated CE
410	615	0.20	0.83	0.17	510
411	300	0.10	0.17	0.83	51
412	41	0.01	0.10	0.90	4
413	459	0.15	0.06	0.94	28
414	401	0.13	0.11	0.89	44
420-429	279	0.09	0.05	0.95	14
others	1010	0.32	0.08	0.92	81
Tot(Noc)	3105	1	0.2358		732

CRITICISMS

- **Selection of the register population:** defined geographical areas or municipalities should be chosen in order to have complete and available information on mortality and HDR databases; resident population distribution by age and sex is also necessary
- **Wideness of the register population:** as suggested in the EUROCISS project, about 300 coronary events per year should occur in the selected register population aged 45-74 years
- **Cleaning databases:** before starting. HDR and mortality databases should be carefully checked and cleaned:
 - a) to avoid mistakes in key variables necessary for record linkage such as *name, date of birth, sex, residence, ID number* (if available)
 - b) to avoid double death records in mortality database

Estimation of population size required to implement a Register of coronary and cerebrovascular events 2004-2005

Attack Rate percent variation (t %)	Events	Attack rate (x 10,000)		Male and Female population required according to gender specific attack rates		Total population required using EU standard population structure		Total population required after 10 years under the assumption of continuous attack rate decrease		
		Men	Women	Male population	Female population	Total pop based on MEN	Total pop based on WOMEN	Total pop based on MEN	Total pop based on WOMEN	
2%										
Total CE Attack rates										
Italy	314	44.1	12.8	71,192	245,277	444,948	1,532,984	544,563	1,876,191	
Finland	314	272.7	116.9	11,512	26,846	71,948	167,789	88,056	205,354	
Total CVA Attack rates										
Italy	314	33.5	20.3	93,718	154,658	585,737	966,611	716,873	1,183,017	
Finland	314	112.0	61.2	28,044	51,317	175,276	320,730	214,517	392,536	
1%										
Total CE Attack rates										
Italy	1256	44.1	12.8	284,767	981,110	1,779,791	6,131,937	1,967,964	6,780,251	
Finland	1256	272.7	116.9	46,047	107,385	287,794	671,157	318,222	742,116	
Total CVA Attack rates										
Italy	1256	33.5	20.3	374,872	618,631	2,342,949	3,866,443	2,590,663	4,275,232	
Finland	1256	112.0	61.2	112,177	205,267	701,104	1,282,921	775,229	1,418,560	



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Possible discrepancies in HDR and Mortality dbs

	C.U. (A)				C.U. (B)						C.U. (C)			
	1998		1999		1998		1999		2000		1998		1999	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Num HDR	6056		5522		945		1215		1400		9912		9322	
Num Mortality	541		498		193		223		236		992		951	
File HDR														
name or surname	10	0,2	38	0,7	80	8,5	105	8,6	43	3,1	85	0,9	123	1,3
date of birth	14	0,2	44	0,8	85	9,0	83	6,8	75	5,4	242	2,4	185	2,0
residence ISTAT code	1	0,0	11	0,2	75	7,9	110	9,1	21	1,5	-		-	
sex	-		-		17	1,8	21	1,7	15	1,1	5	0,1	9	0,1
fiscal code (ID)	-		393	7,1	-		-		-		-		-	
Recovered by HDR			102	1,8										
Recovered by Mortality			12	0,2										
File Mortality														
name or surname	10	1,8	4	0,8	1	0,5	-		-		-		5	0,5
double certificate	-		-		3	1,6	-		-		2	0,2	-	
HDR - Mortality														
name or surname	10	0,2	8	0,1	4	0,4	17	1,4	19	1,4	46	0,5	49	0,5
date of birth	2	0,0	11	0,2	13	1,4	7	0,6	21	1,5	73	0,7	63	0,7
date of death	2	0,0	8	0,1	1	0,1	7	0,6	1	0,1	18	0,2	13	0,1
discharge procedure	-		-		-		-		25	1,8	66	0,7	78	0,8
residence	10	0,2	5	0,1	-		32	2,6	10	0,7	-		1	0,0
sex	-		-		-		-		5	0,4	2	0,0	8	0,1
TOTAL	59	1,0	129	2,3	279	29,5	382	31,4	235	16,8	539	5,4	534	5,7
Missing Mortality	116		100		28		43		-		132		143	
(in HDR discharged as 'dead', but corresponding Mortality is missing)														

ADVANTAGES

- Limited costs
- Inclusion of geographical areas not considered in the MONICA Project (Center-South of Italy)
- 10-year age widening of the population under surveillance (65-74 years) which represent a group particularly exposed to cardiovascular events
- to implement validated population-based register at the regional level

DISADVANTAGES

- Delayed computerized data availability
- Impossibility of all ages inclusion, since PPV change particularly in the elderly
- Detailed data are available for a sub-sample only
- All indicators (attack rates, case fatality, ...) are estimated in a probabilistic method

CONCLUSION

Results show the feasibility of implementing a population-based register applying a simplified methodology, in order to produce reliable indicators essential for monitoring cardiovascular diseases, and planning primary and secondary prevention interventions

www.cuore.iss.it

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