



AIR Meeting Italia 2014

27-28 giugno, Roma

Epidemiologia dell'IPF in Italia

EPIDEMIOLOGIA IN LOMBARDIA

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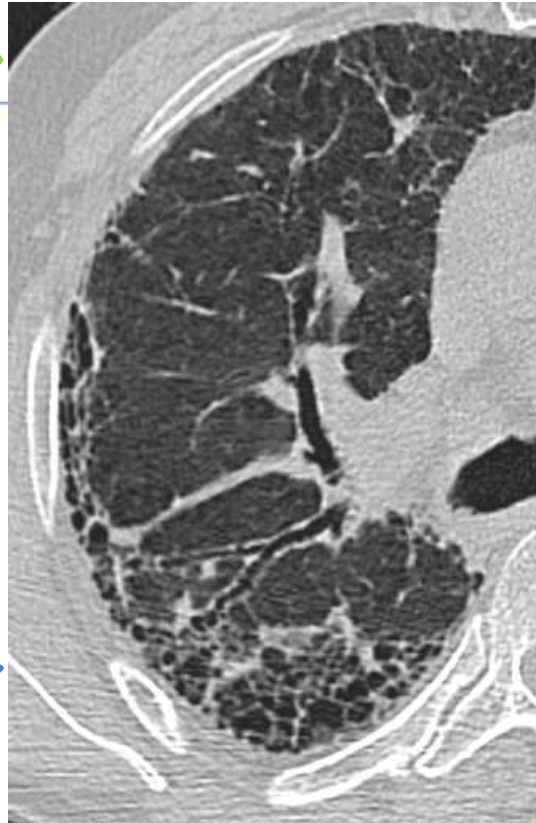
Servizio di Fisiopatologia Respiratoria ed Emodinamica Polmonare

Osp. San Giuseppe - MultiMedica, Milano

Worldwide prevalence is estimate of at least 5 million people

Progressive deterioration is inevitable

Considerable inter- and intra patient variability



IPF

Lung transplantation is an option

A genetic disease?

Median survival historically is only ~3-5 years

A rare disease

Limited therapeutic options

BACKGROUND

- ◆ IPF epidemiology has been difficult to study because of its rarity and evolution in diagnostic and coding practices
- ◆ Though uncommon, it is likely underappreciated both in terms of its occurrence (ie, incidence, prevalence) and public health impact (ie, health care costs and resource utilization)
- ◆ Incidence and mortality appear to be on the rise, and prevalence is expected to increase with the aging population

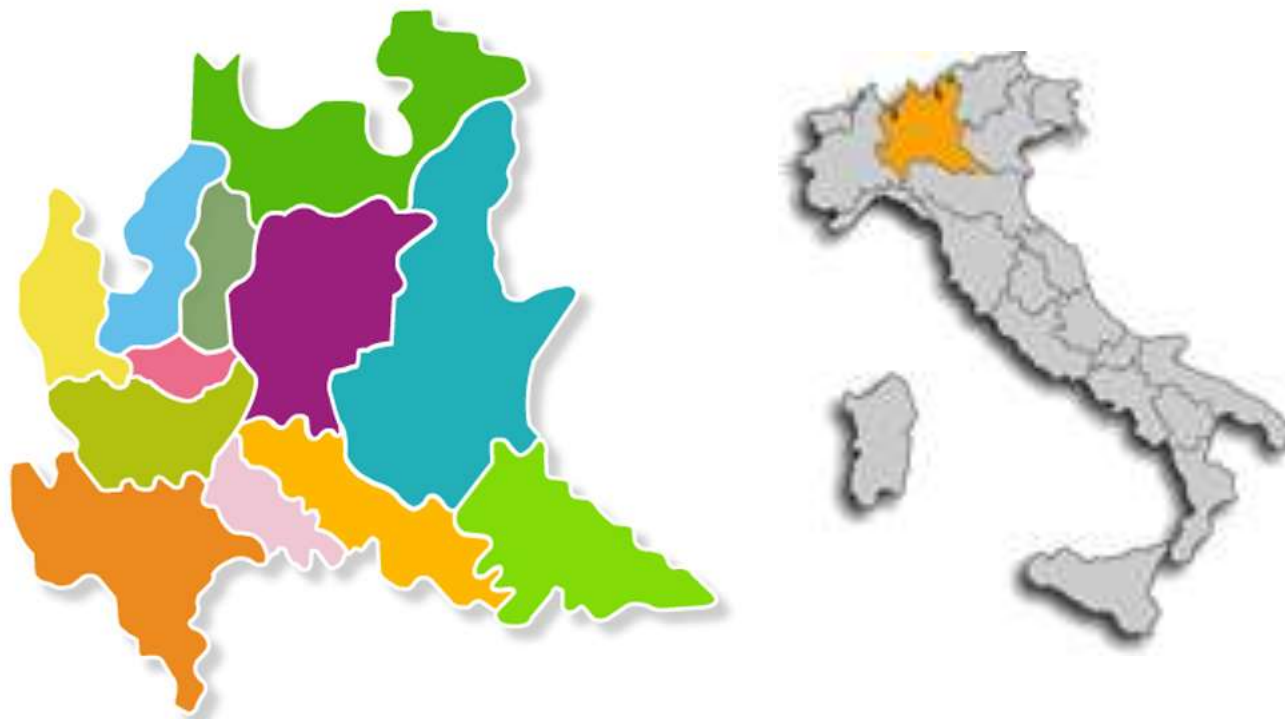
BACKGROUND

- ◆ We are living in a time of great opportunity and promise in the field of IPF
- ◆ As the management options for IPF patients improve, an accurate understanding of the epidemiology of IPF will be important so that health care systems and policy-makers are adequately prepared to facilitate care

Epidemiology of IPF in Lombardy region

The context: Lombardy region

~10 million people
49% males
≥ 65 yrs: 20%



The population living in Lombardy at January 1st, 2010 was 9,826,141 (48.9% males) and this region accounted for the 16.3% of the Italian population (*data source ISTAT*)

The context: Lombardy region

- ◆ The increase of the population is equal to 4.6% comparing 2005 to 2010
- ◆ In 2010, the mean age of population was 43.4 years
- ◆ The population with less than 15 years was 14.1%, people aged between 15 and 64 were 65.5% and the elderly (≥ 65 years-old) accounted for 20.4% of the total population

STUDY DESIGN

We conducted an observational retrospective study
using healthcare administrative databases of the
regional Health System

SOURCE OF DATA

The governance of the health service in Lombardy promoted the creation of a data warehouse (called DENALI) to control and organize the main administrative healthcare databases since 2000

STUDY POPULATION

- ◆ The study population consisted in all the subjects living in Lombardy with IPF diagnosed during the period from 1st January 2000 to 31st December 2010
- ◆ We extracted all records for individuals with at least one of the two following characteristics:
 - an hospitalization with diagnosis of IPF (code 516.3) in at least one of the six possible discharge diagnoses;
 - an outpatient visit with a diagnosis of IPF (code 516.3)

We then identified all the subjects thereby extracted as IPF case (“generic case definition” - GCD)

STUDY POPULATION



We also applied the two definitions suggested by Raghu et al. to identify IPF patients through healthcare administrative databases

◆ “*broad case definition*” – *BCD*

- Meet GCD;
- No medical claims (hospitalization or outpatient visit) with a diagnosis code for any other type of ILDs

◆ “*narrow case definition*” – *NCD*

- Meet BCD;
- One or more medical claims with a procedure code for surgical lung biopsy (ICD-9-CM 33.28), or transbronchial lung biopsy (ICD-9-CM 33.27), or computed tomography of the thorax (ICD-9-CM 87.41)

Case Definition	Criteria
<i>Generic</i>	An hospitalization or an outpatient visit with diagnosis of IPF (code 516.3)
<i>Broad</i>	Meet GCD; No medical claims (hospitalization or outpatient visit) with a diagnosis code for any other type of ILDs
<i>Narrow</i>	Meet BCD One or more medical claims with a procedure code for surgical lung biopsy (ICD-9-CM 33.28), or transbronchial lung biopsy (ICD-9-CM 33.27), or computed tomography of the thorax (ICD-9-CM 87.41)

PREVALENCE DEFINITION

- ◆ We identified the prevalent cases of IPF in Lombardy from 2000 to 2010 according to the three case definitions aforementioned
- ◆ Since DENALI doesn't include information about health services provided prior to 2000 and the median survival of IPF patients is 2-5 years from the diagnosis, the IPF prevalent cases determined from 2005 can be considered a reliable estimate of the total number of patients affected by IPF in Lombardy

INCIDENCE DEFINITION

- ◆ To identify subjects having a newly diagnosed IPF (incident cases) we excluded patients covered by the Lombardy Health Service from less than 5 years at the time of the first medical claim with a diagnosis code for IPF (index event)
- ◆ Incidence rates were calculated from 2005 to 2010
- ◆ To compare the rates and evaluate temporal trends, the incidence rates were standardized by age and sex using the 2010 Lombardy population as reference (*data source ISTAT*)

Number of hospital admissions and outpatient visits with IPF diagnosis (ICD-9-CM 516.3) in Lombardy from 2000 to 2010

Data source	Quality assessment		Difference
	Before	After	
	N	N	%
Hospital admissions	11,679	11,558	-1.04
Outpatient visits	5,141	5,117	-0.47
Total	16,820	16,675	-0.86

Number of subjects with IPF identified through the accesses to Health Services (hospital discharges and outpatient visits) occurred in Lombardy from 2000 to 2010

Data source	Case definition		
	Generic	Broad	Narrow
Hospital admissions, n	5,931	3,945	2,472
Hospital admissions + Outpatient visits	6,578	4,308	2,479
Difference*, n (%)	647 (10.91)	363 (9.20)	7 (0.28)

* increase due to the inclusion of outpatient visits

Increase of prevalence

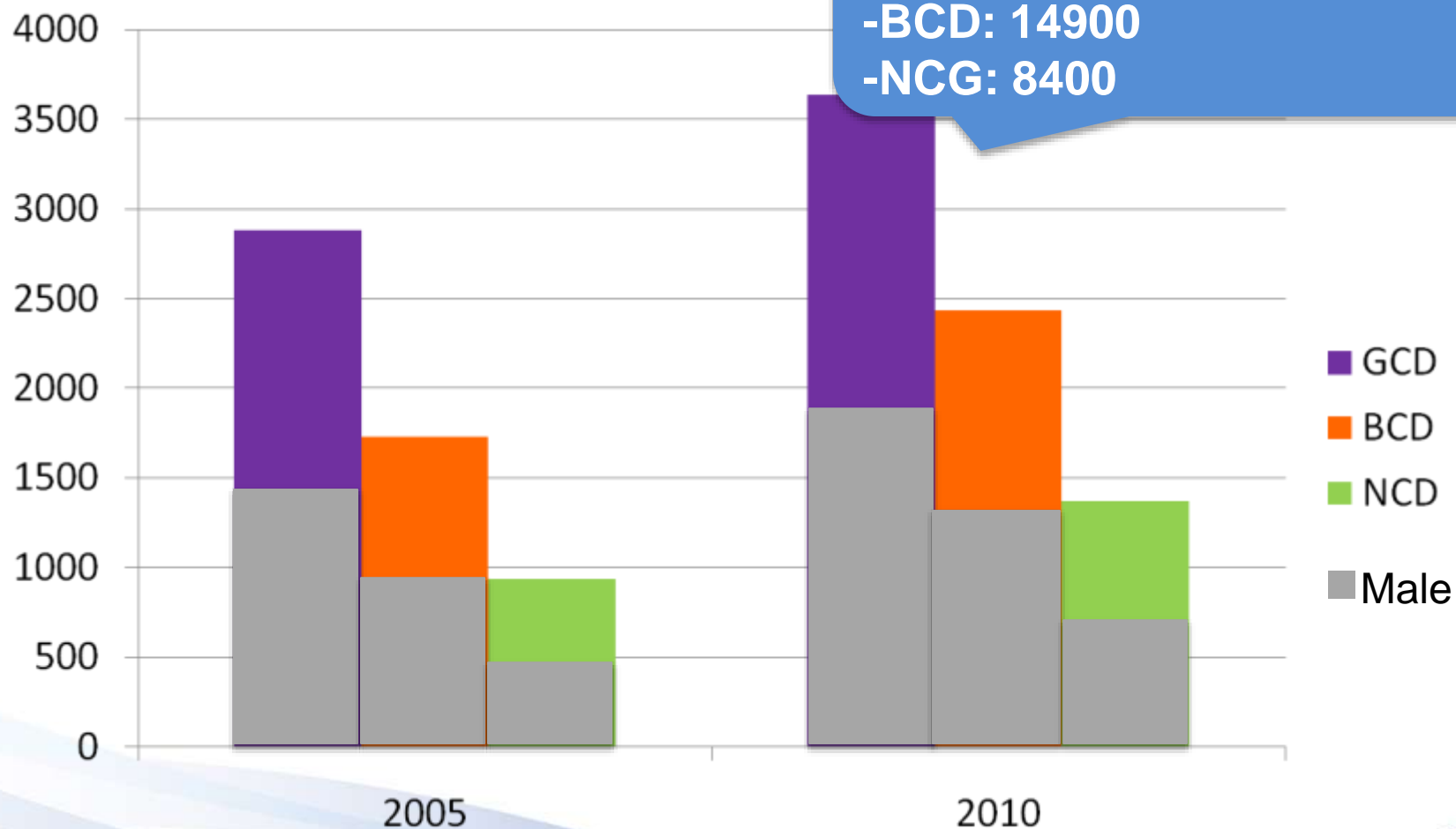


In Italy:

-GCD: 22300 people with IPF

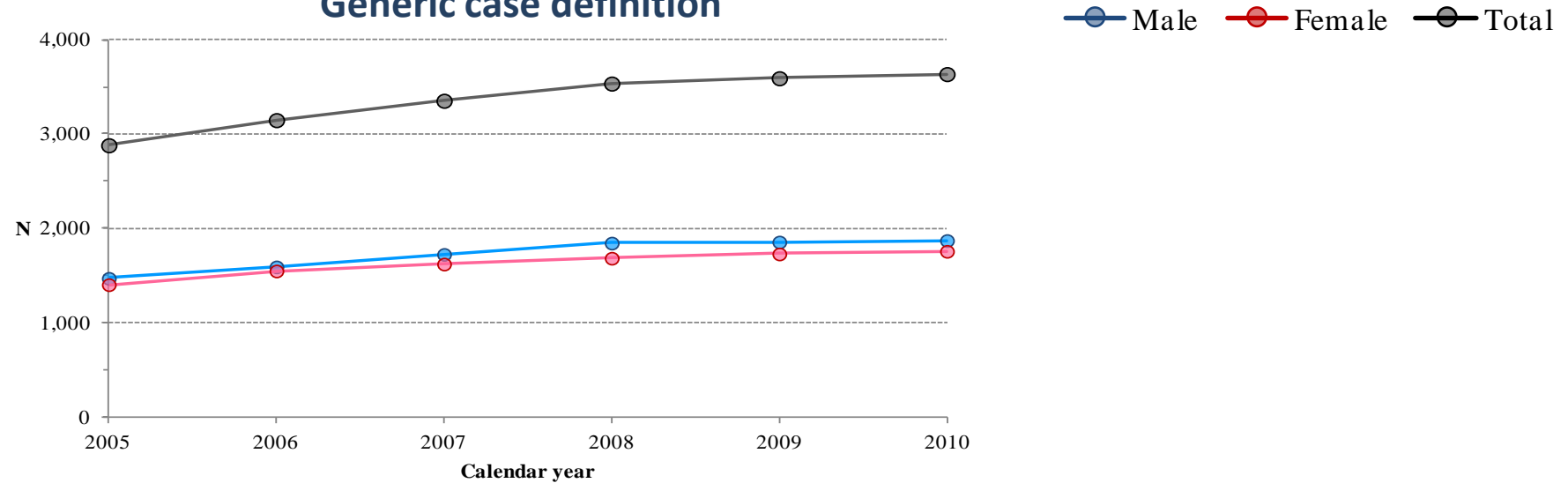
-BCD: 14900

-NCG: 8400

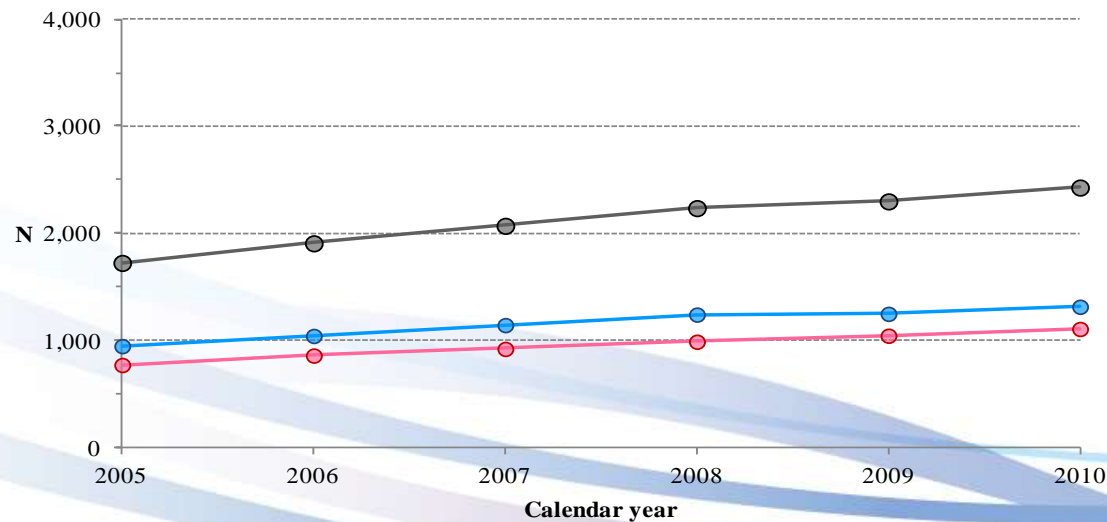


Number of prevalent IPF cases identified according to the three definitions, during the period 2005-2010

Generic case definition

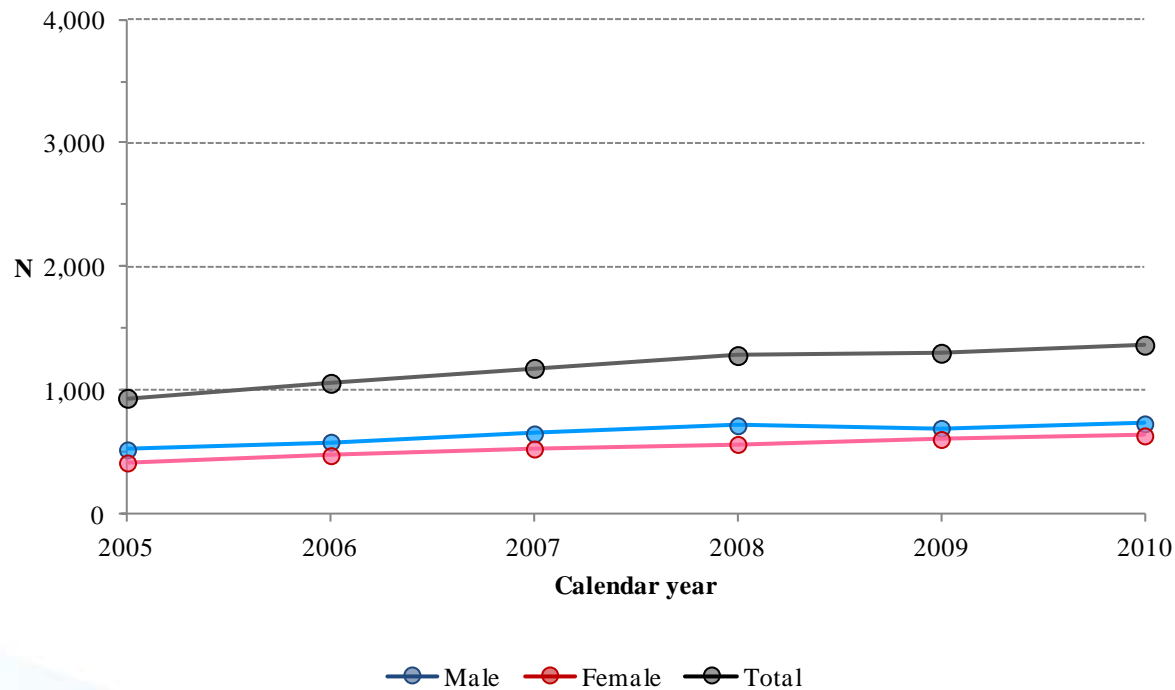


Broad case definition



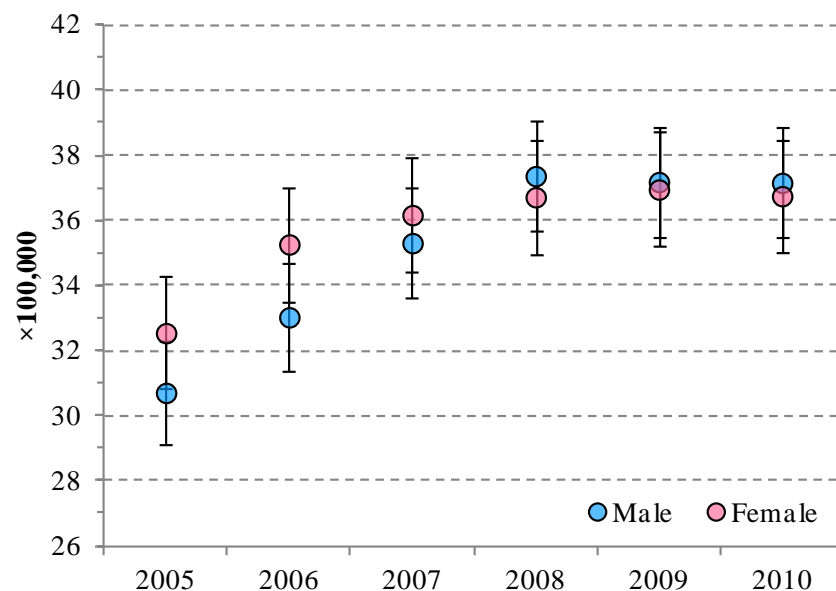
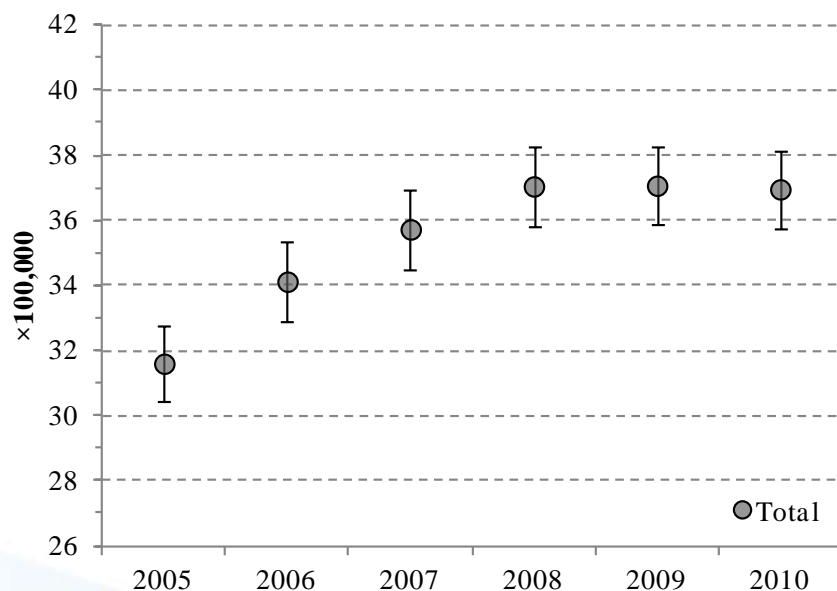
Number of prevalent IPF cases identified according to the three definitions, during the period 2005-2010

Narrow case definition

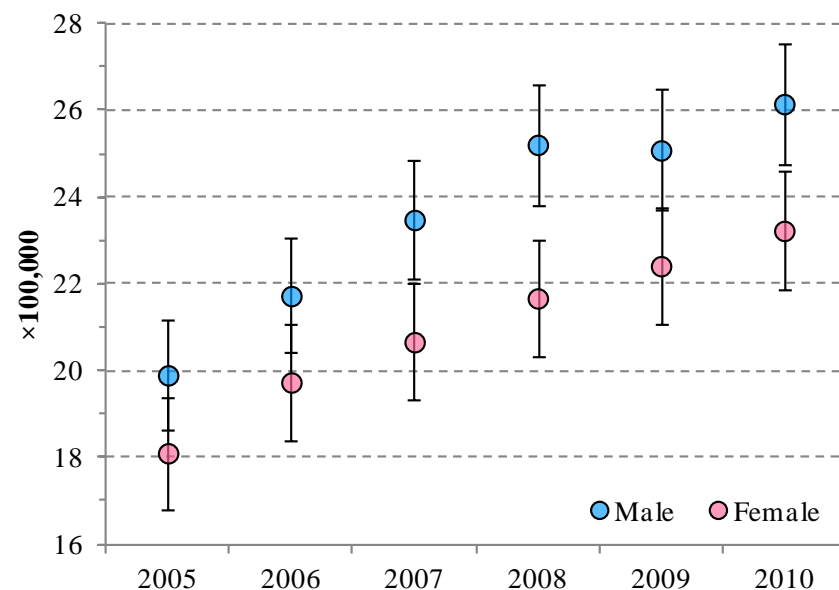
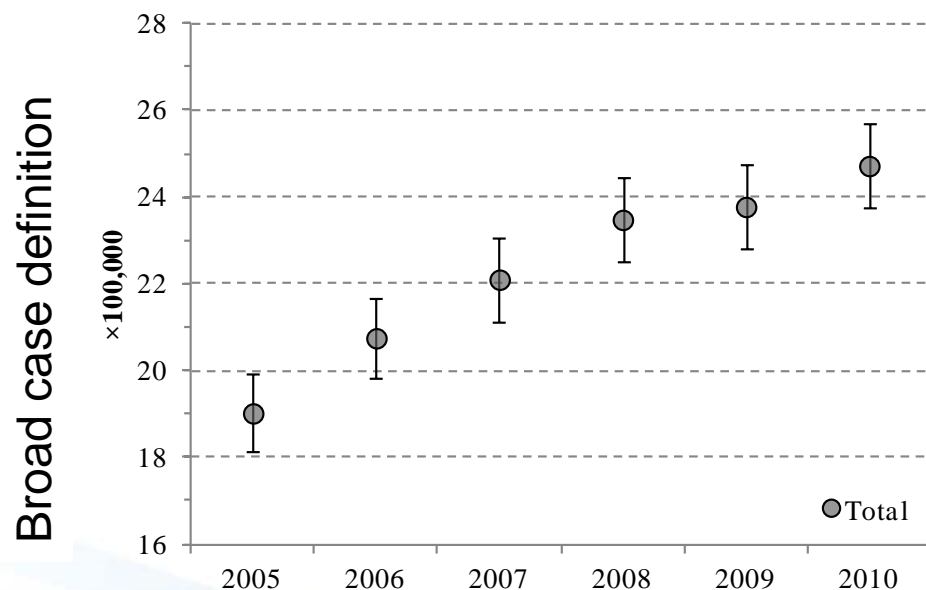


Trend in annual standardized prevalence rate (x100,000 person-years) according to the generic case definition, during the period 2005-2010

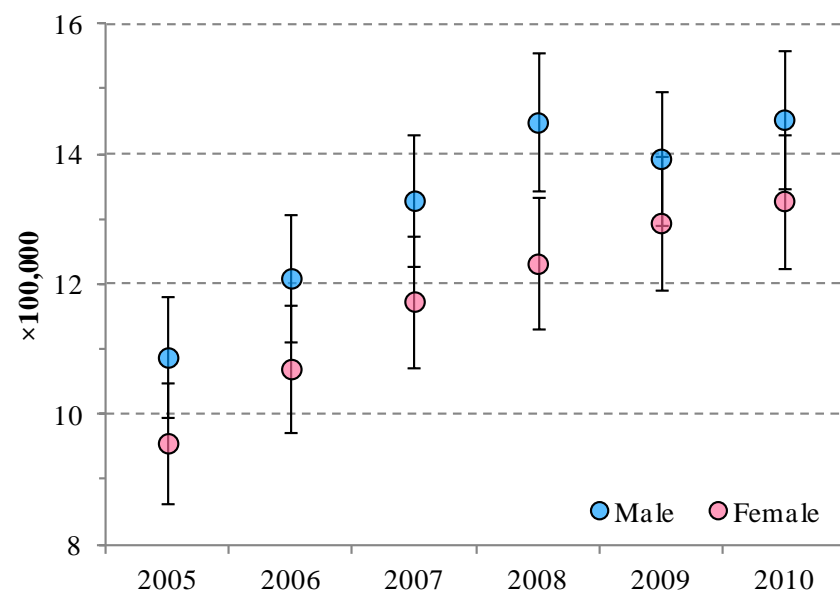
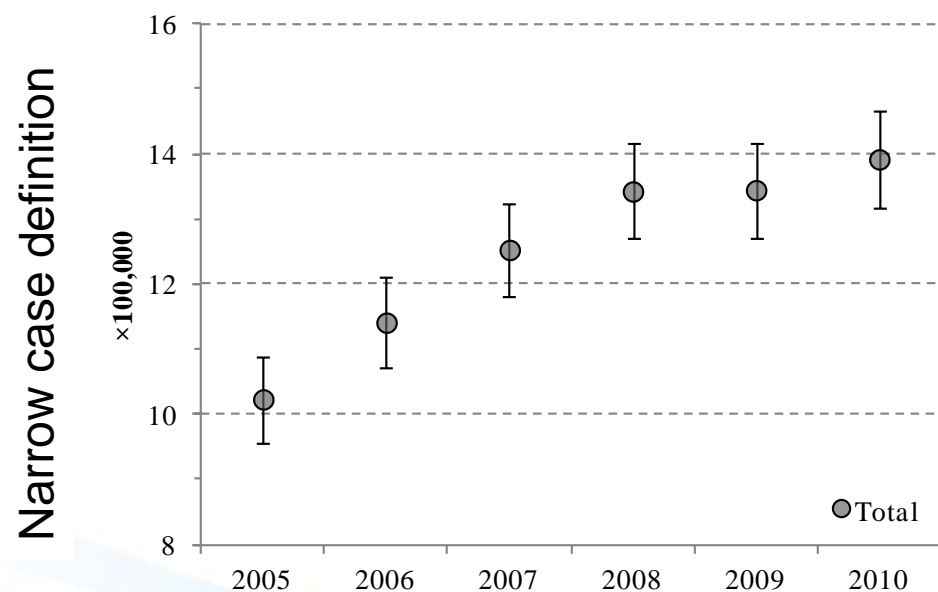
Generic case definition



Trend in annual standardized prevalence rate (x100,000 person-years) according to the broad case definition, during the period 2005-2010



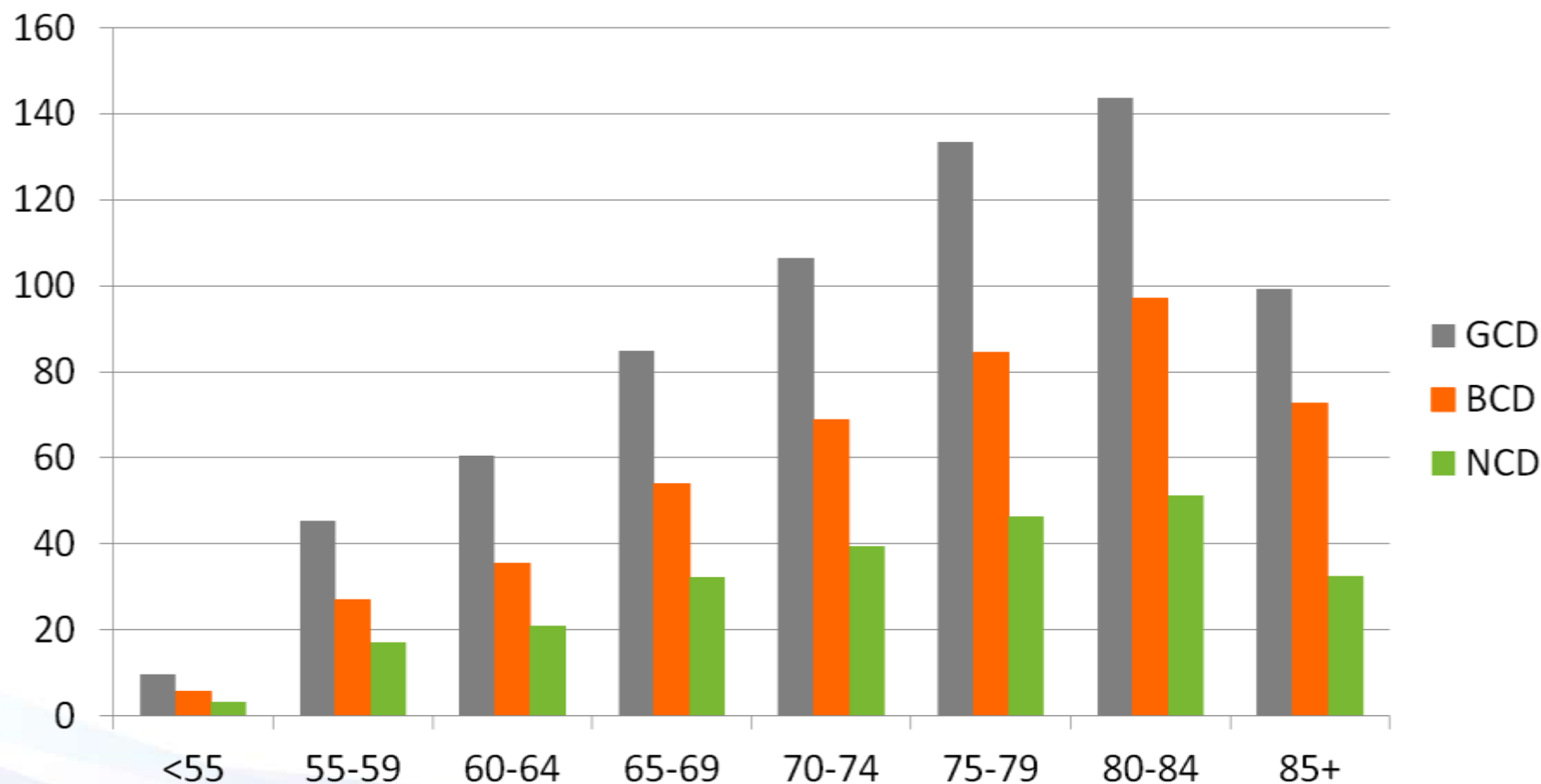
Trend in annual standardized prevalence rate (x100,000 person-years) according to the narrow case definition, during the period 2005-2010



*Estimates of the mean annual standardized **prevalence rate** (x100,000 person-years) according to the three case definitions, during the period 2005-2010*

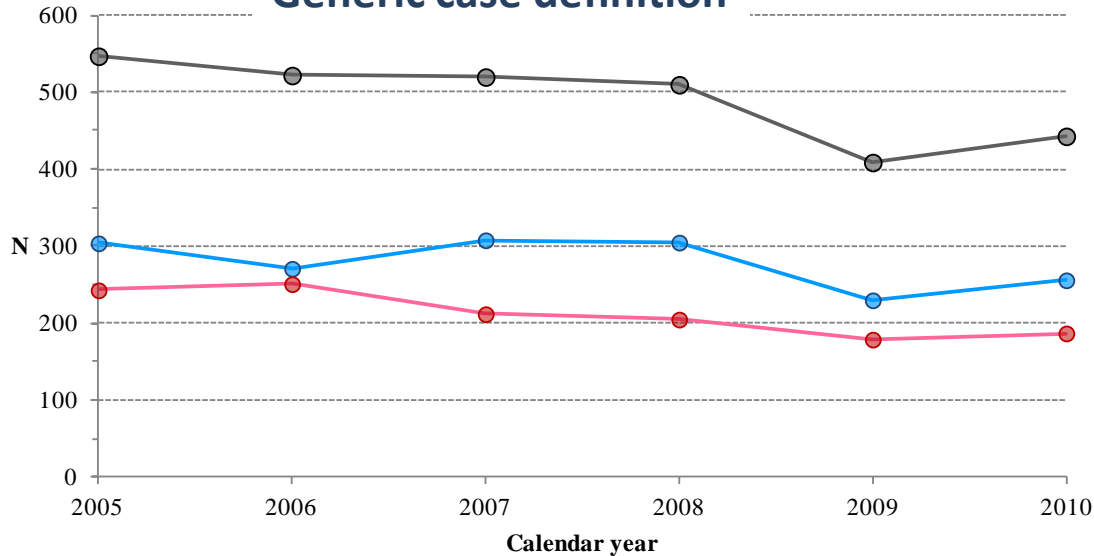
	Case definition		
	Generic	Broad	Narrow
Total	35.51 (35.02 - 36.00)	22.39 (21.99 - 22.78)	12.55 (12.26 - 12.84)
Gender			
Male	35.19 (34.51 - 35.87)	23.64 (23.08 - 24.20)	13.23 (12.82 - 13.65)
Female	35.84 (35.13 - 36.55)	21.07 (20.52 - 21.62)	11.84 (11.43 - 12.25)
Age class			
<55	9.77 (9.46 - 10.08)	5.67 (5.44 - 5.91)	3.22 (3.04 - 3.39)
55-59	45.34 (43.18 - 47.51)	27.09 (25.42 - 28.76)	16.98 (15.66 - 18.30)
60-64	60.45 (57.85 - 63.05)	35.47 (33.48 - 37.46)	20.90 (19.37 - 22.43)
65-69	84.79 (81.66 - 87.93)	53.94 (51.44 - 56.44)	32.21 (30.27 - 34.14)
70-74	106.36 (102.60 - 110.13)	68.83 (65.80 - 71.85)	39.47 (37.17 - 41.76)
75-79	133.37 (128.66 - 138.08)	84.43 (80.69 - 88.17)	46.40 (43.62 - 49.17)
80-84	143.71 (137.89 - 149.53)	97.14 (92.36 - 101.92)	51.28 (47.81 - 54.75)
85+	99.20 (93.66 - 104.74)	72.72 (67.98 - 77.46)	32.54 (29.37 - 35.71)

*Estimates of the mean annual standardized **prevalence rate** (x100,000 person-years) according to the three case definitions, during the period 2005-2010*

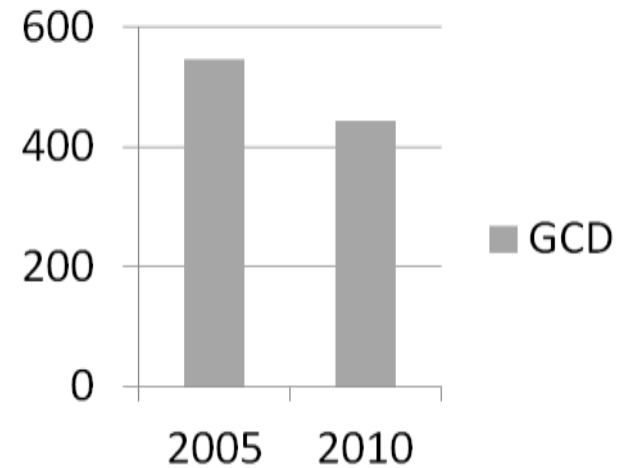


Number of incident IPF cases identified according to the three definition cases, during the period 2005-2010

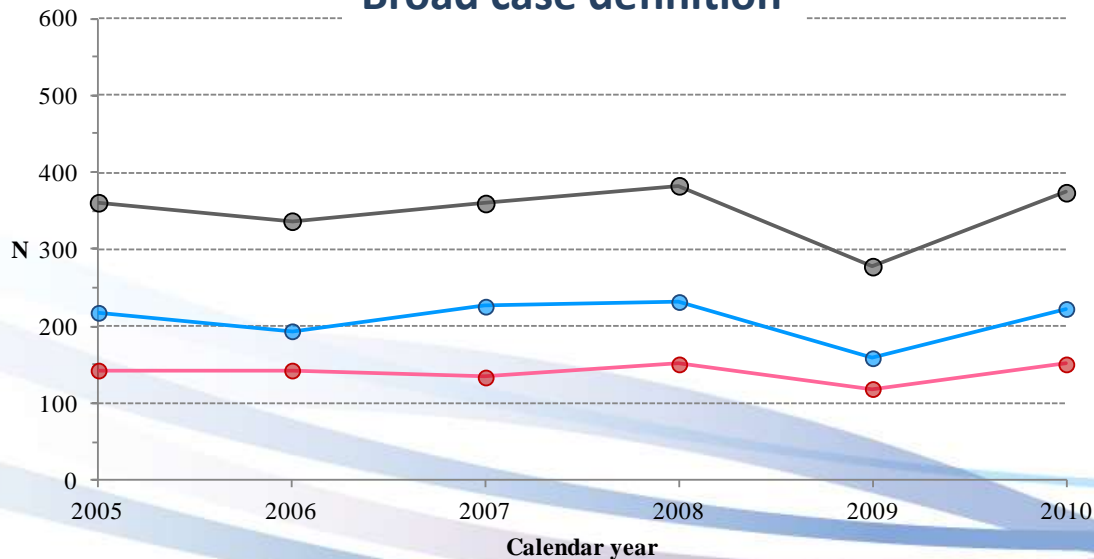
Generic case definition



GCD



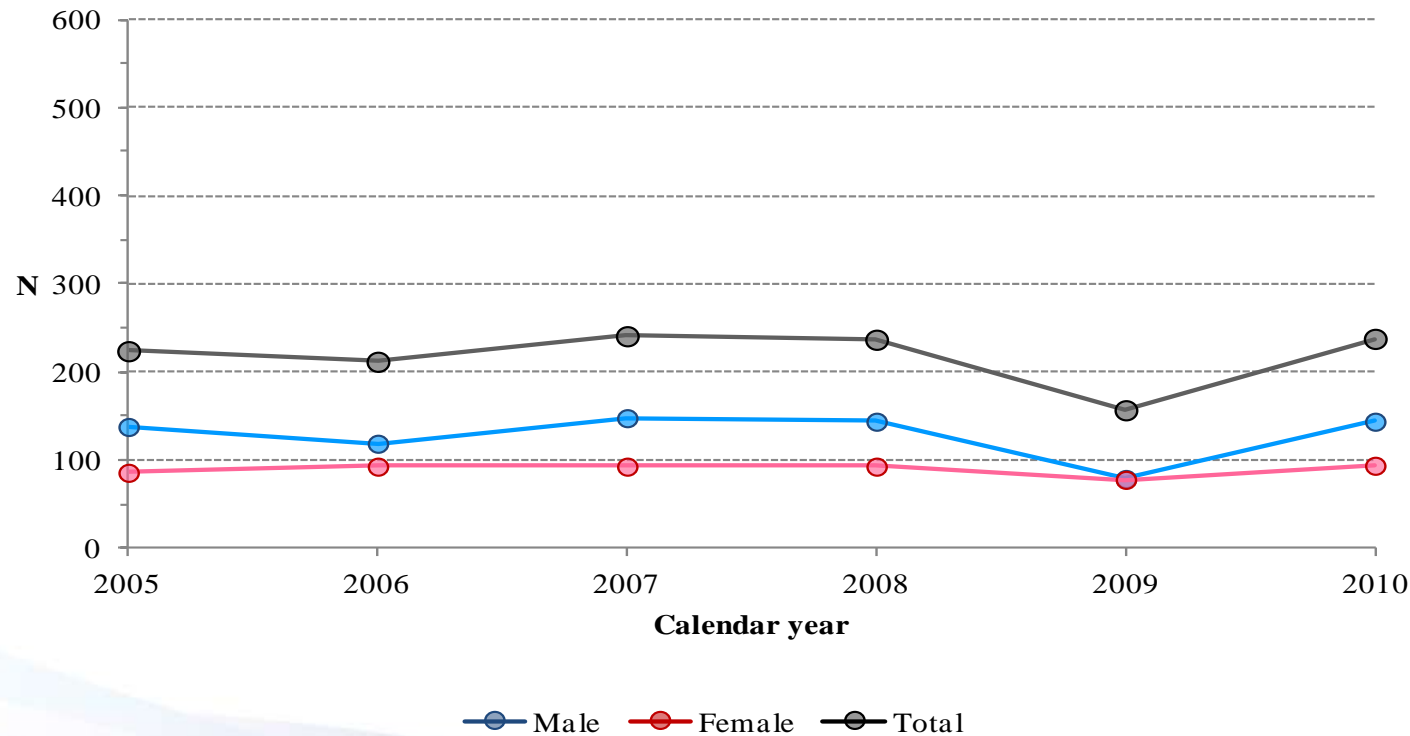
Broad case definition



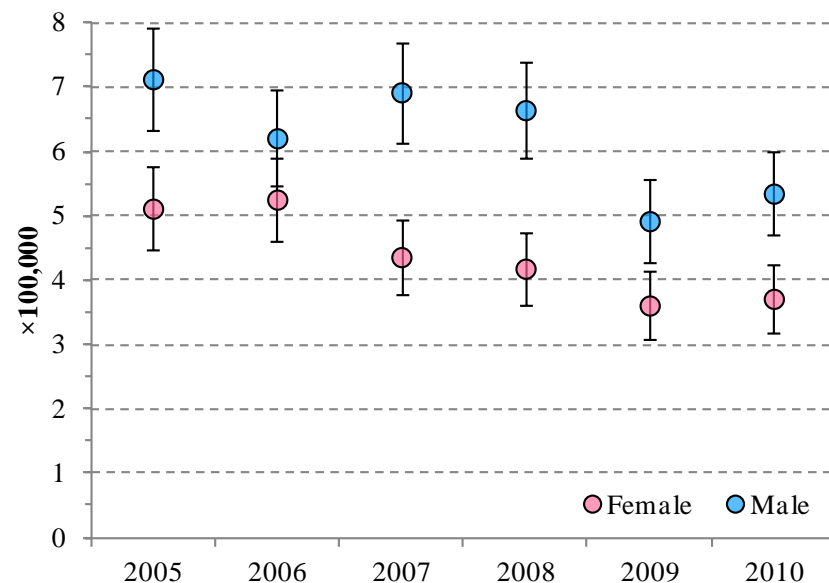
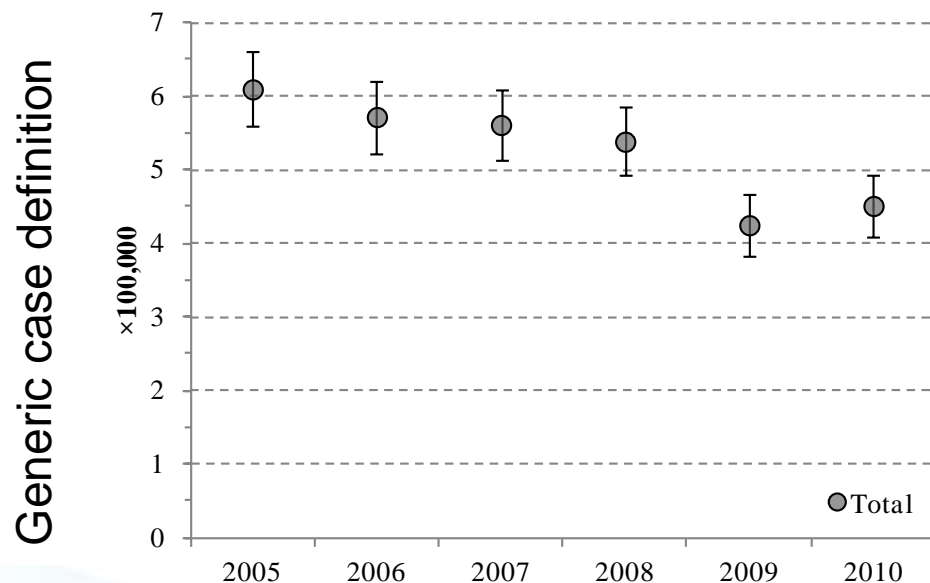
—●— Male —●— Female —●— Total

Number of incident IPF cases identified according to the three definition cases, during the period 2005-2010

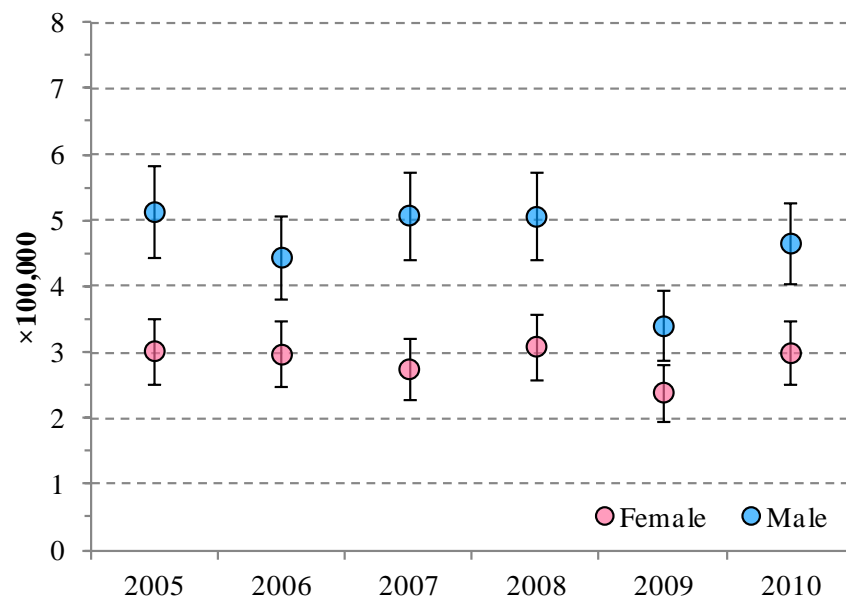
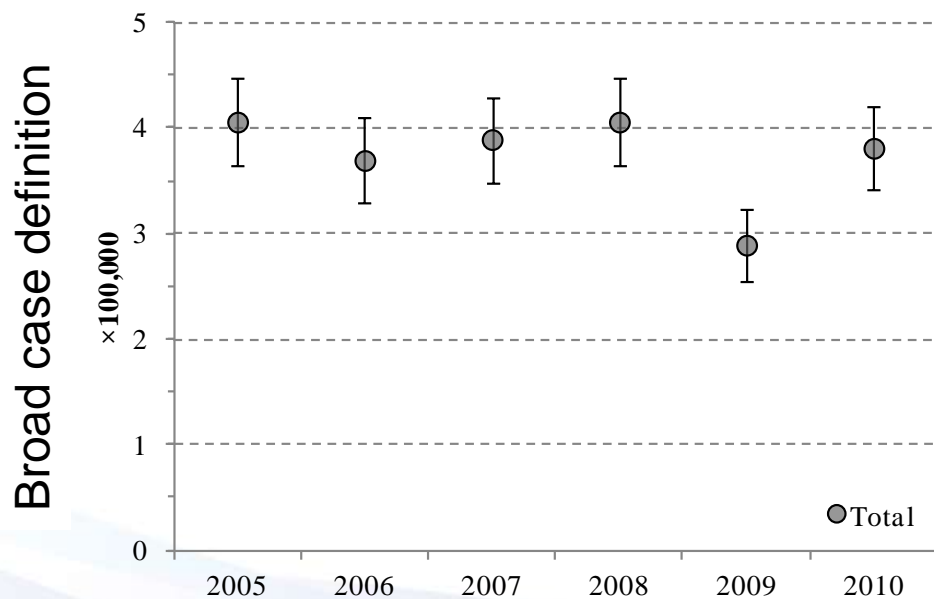
Narrow case definition



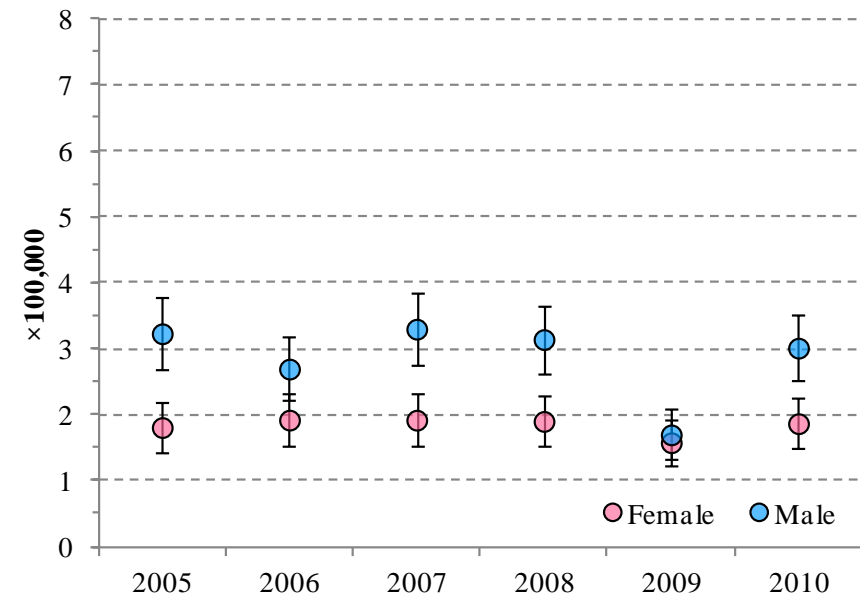
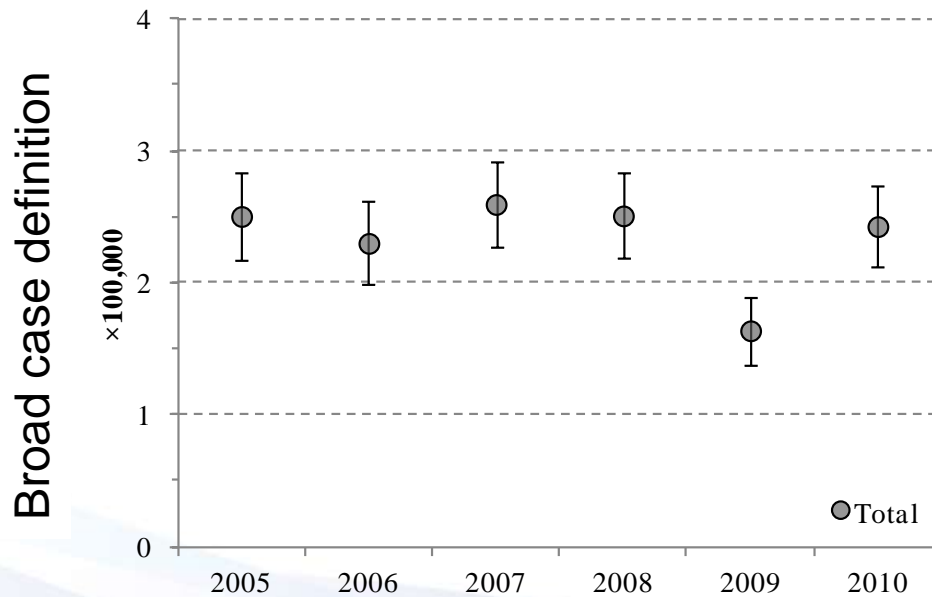
Trend in annual standardized incidence rate (x100,000 person-years) according to the generic case definition, during the period 2005-2010



Trend in annual standardized incidence rate (x100,000 person-years) according to the broad case definition, during the period 2005-2010

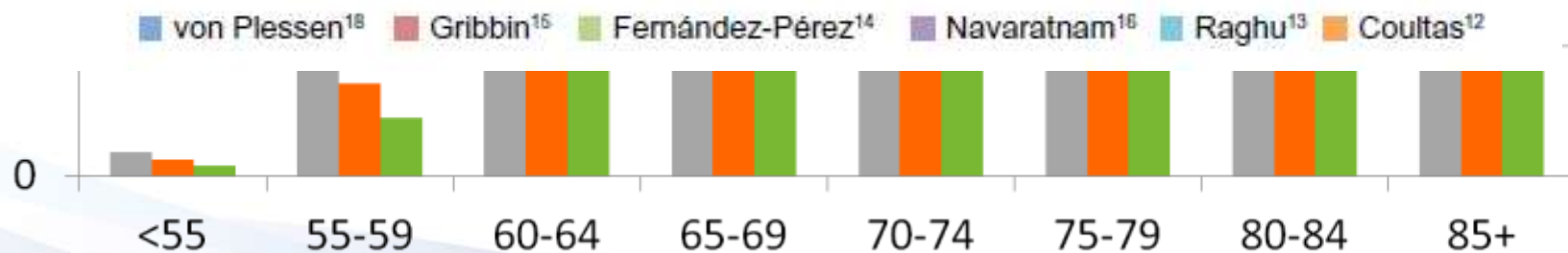
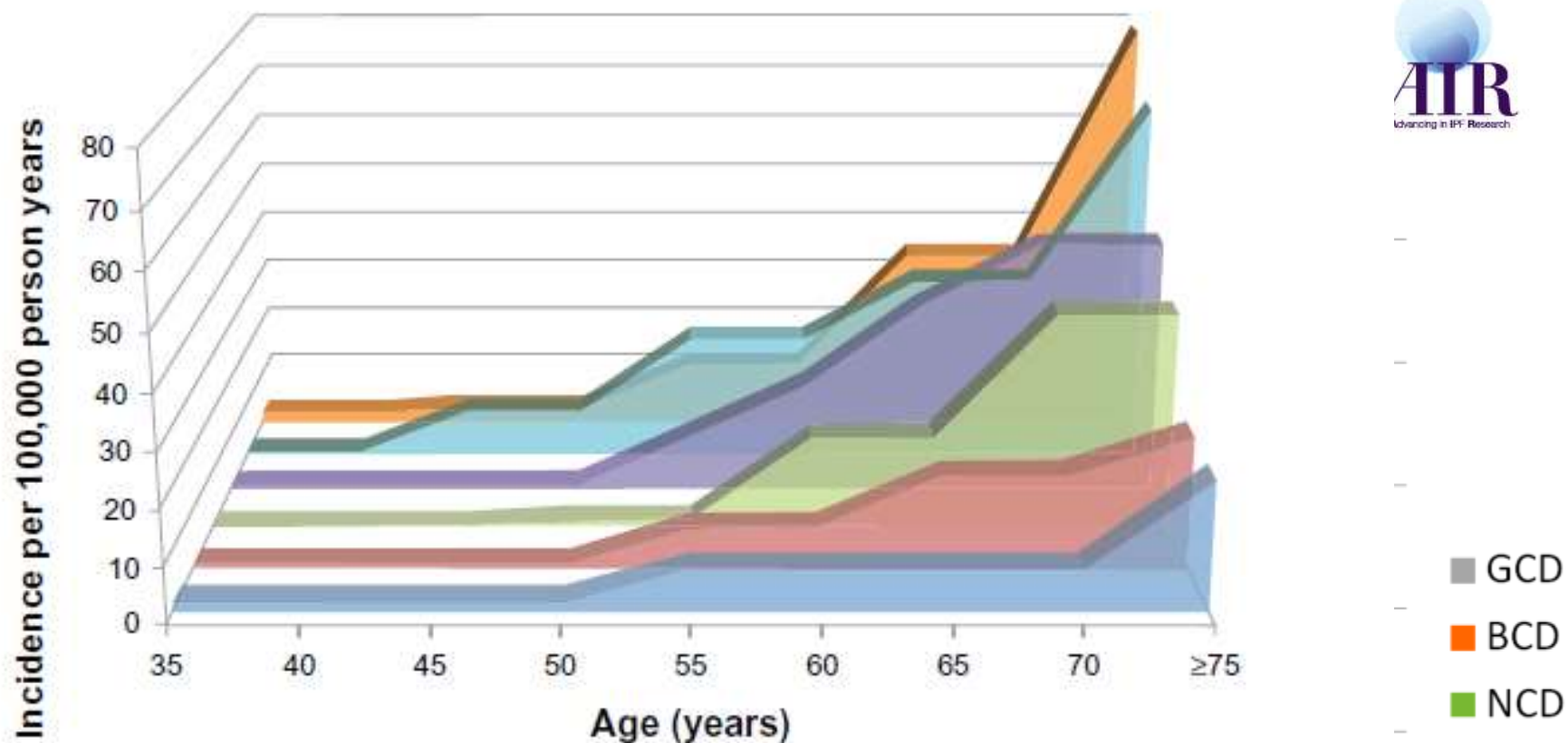


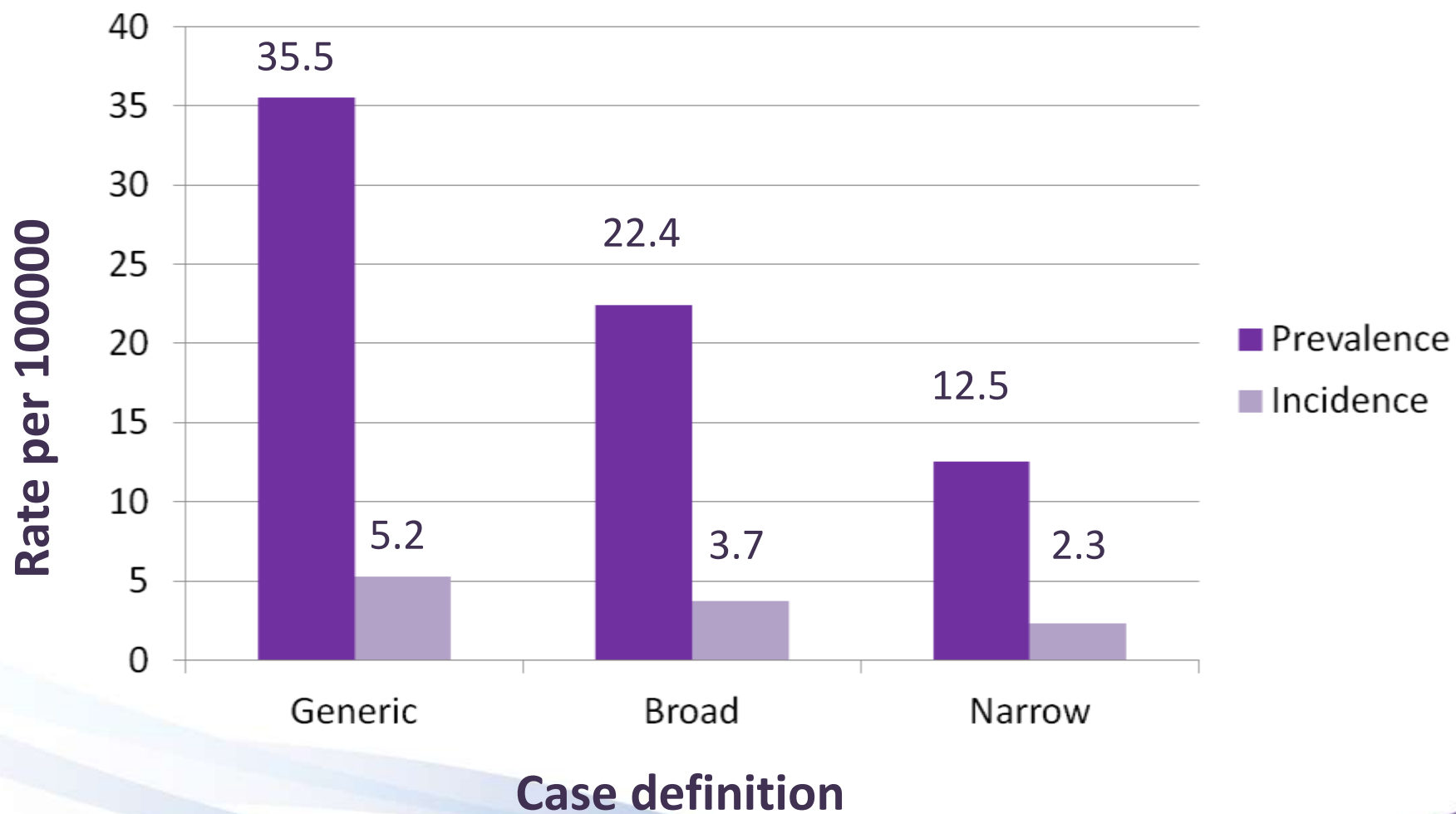
Trend in annual standardized incidence rate (x100,000 person-years) according to the narrow case definition, during the period 2005-2010



*Estimates of the mean annual standardized **incidence rate** (x100,000 person-years) according to the three case definitions, during the period 2005-2010*

	Case definition		
	Generic	Broad	Narrow
Total	5.25 (5.06 - 5.44)	3.74 (3.58 - 3.90)	2.33 (2.20 - 2.46)
Gender			
Male	6.18 (5.88 - 6.48)	4.63 (4.37 - 4.89)	2.85 (2.65 - 3.05)
Female	4.37 (4.13 - 4.61)	2.88 (2.69 - 3.08)	1.84 (1.68 - 2.00)
Age class			
<55	0.92 (0.82 - 1.01)	0.62 (0.54 - 0.69)	0.39 (0.33 - 0.46)
55-59	5.36 (4.62 - 6.10)	3.54 (2.93 - 4.14)	2.22 (1.75 - 2.70)
60-64	8.51 (7.54 - 9.49)	5.84 (5.03 - 6.65)	4.13 (3.45 - 4.80)
65-69	12.08 (10.90 - 13.27)	8.70 (7.70 - 9.70)	5.59 (4.78 - 6.39)
70-74	17.40 (15.88 - 18.93)	12.06 (10.79 - 13.34)	7.53 (6.52 - 8.53)
75-79	23.69 (21.70 - 25.68)	16.68 (15.01 - 18.36)	10.40 (9.08 - 11.72)
80-84	25.59 (23.13 - 28.06)	19.40 (17.26 - 21.55)	11.45 (9.81 - 13.10)
85+	18.91 (16.50 - 21.31)	14.93 (12.79 - 17.07)	8.29 (6.69 - 9.88)





Generic case definition

Characteristics of the study population



	Female	Male	Total
N (%)	1,277 (43.27)	1,674 (56.73)	2,951
Age at onset			
mean \pm sd	69.71 \pm 13.41	69.27 \pm 12.69	69.46 \pm 13.01
median	72	71	72
IQR	63 - 79	63 - 78	63 - 79
Chronic comorbidity			
Myocardial Infarction*	54 (4.23)	235 (14.04)	289 (9.79)
Congestive Heart Failure*	236 (18.48)	357 (21.33)	593 (20.09)
Peripheral Vascular Disease*	42 (3.29)	175 (10.45)	217 (7.35)
Dementia	18 (1.41)	20 (1.19)	38 (1.29)
Chronic Pulmonary Disease*	449 (35.16)	707 (42.23)	1156 (39.17)
Connective Tissue Disease-Rheumatic Disease*	192 (15.04)	92 (5.50)	284 (9.62)
Peptic Ulcer Disease*	11 (0.86)	38 (2.27)	49 (1.66)
Renal Disease*	67 (5.25)	155 (9.26)	222 (7.52)
AIDS/HIV*	0 (0.00)	6 (0.36)	6 (0.20)
Diabetes*	166 (13.00)	291 (17.38)	457 (15.49)
Cerebrovascular diseases*	141 (11.04)	253 (15.11)	394 (13.35)
Liver Diseases	102 (7.99)	155 (9.26)	257 (8.71)
Tumour*	139 (10.88)	237 (14.16)	376 (12.74)

Generic case definition

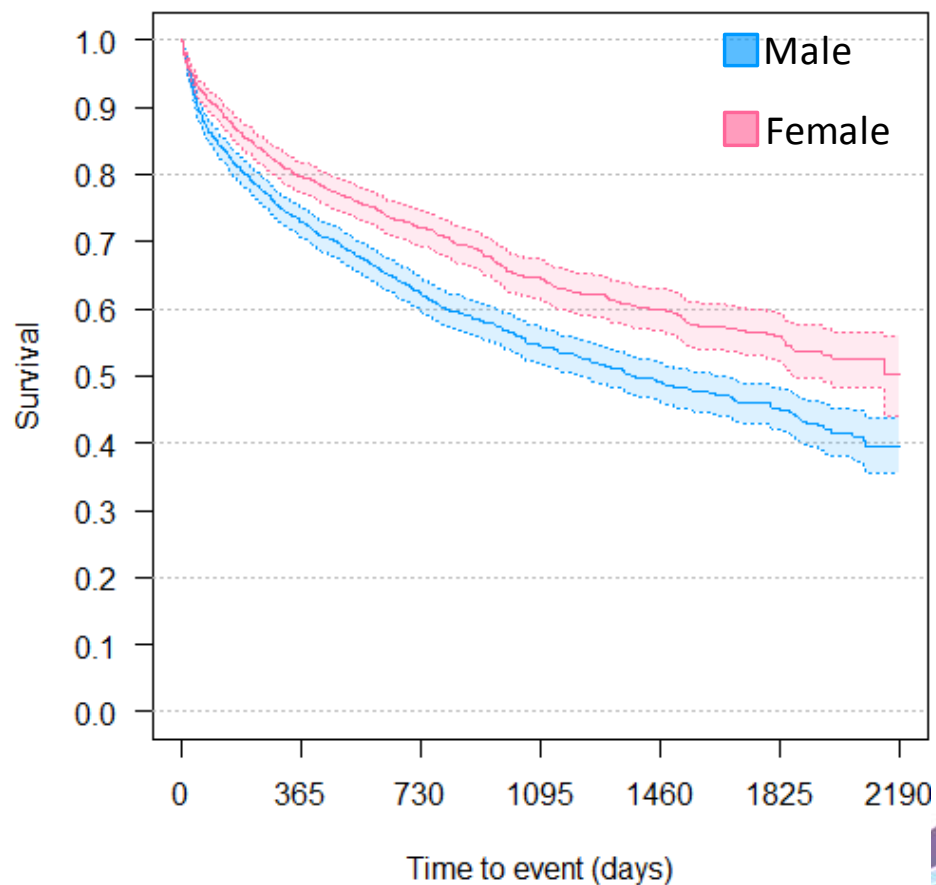
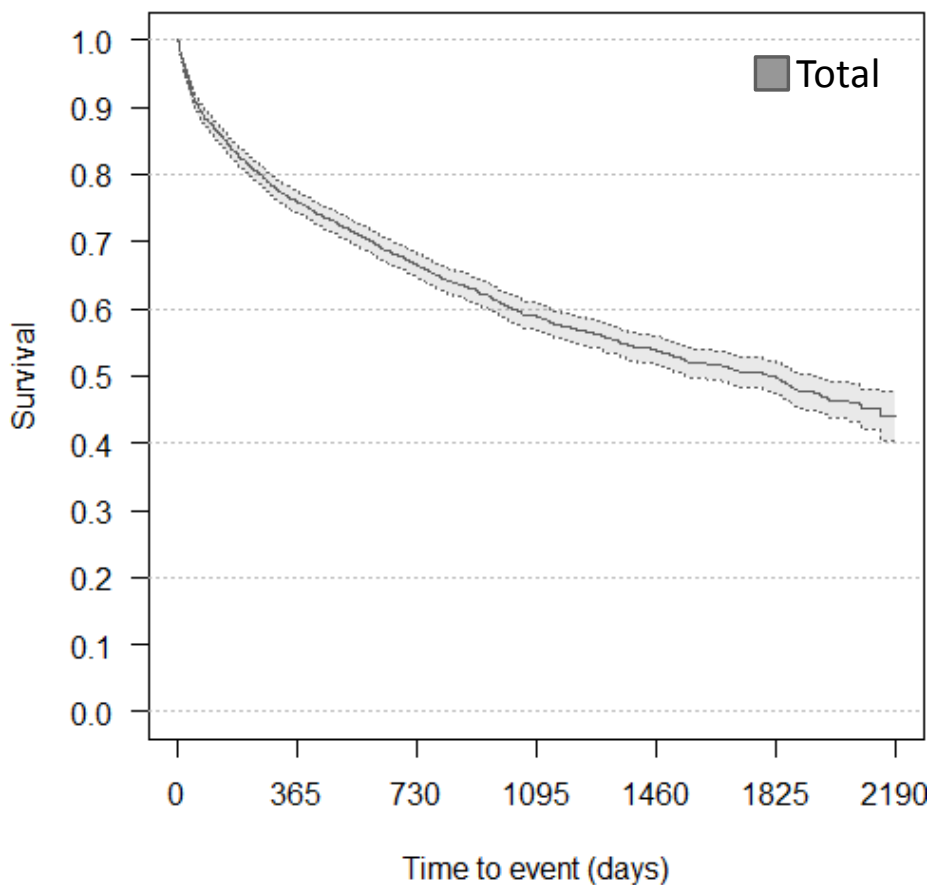
Outcomes of interest during the follow-up



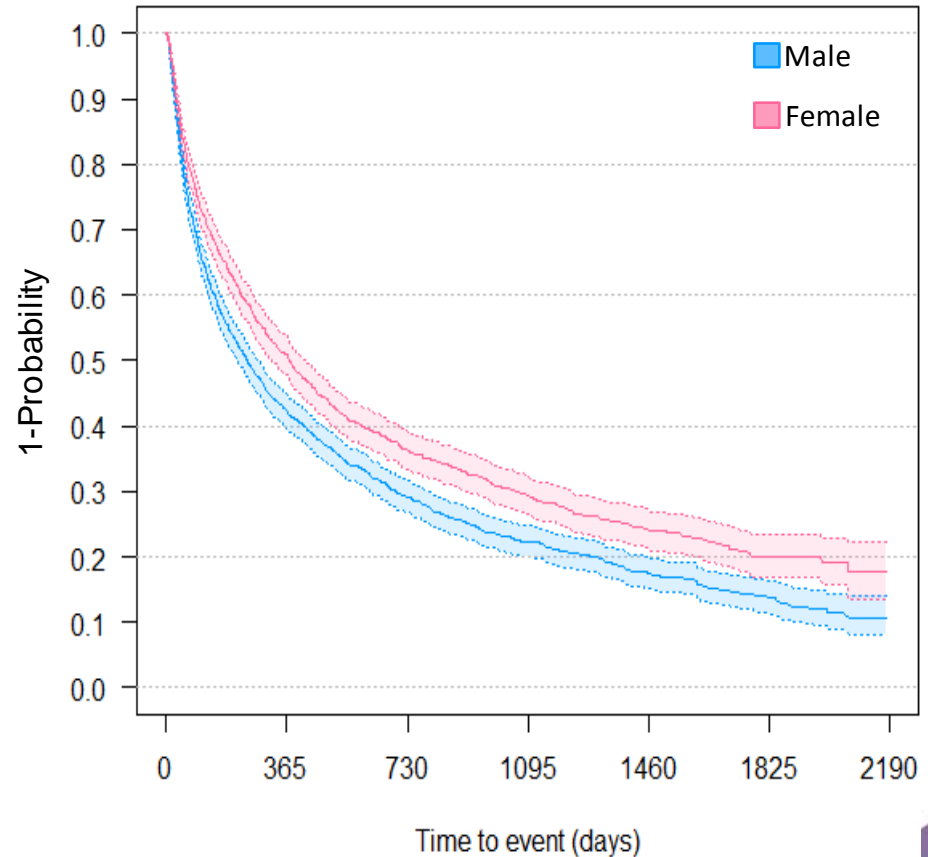
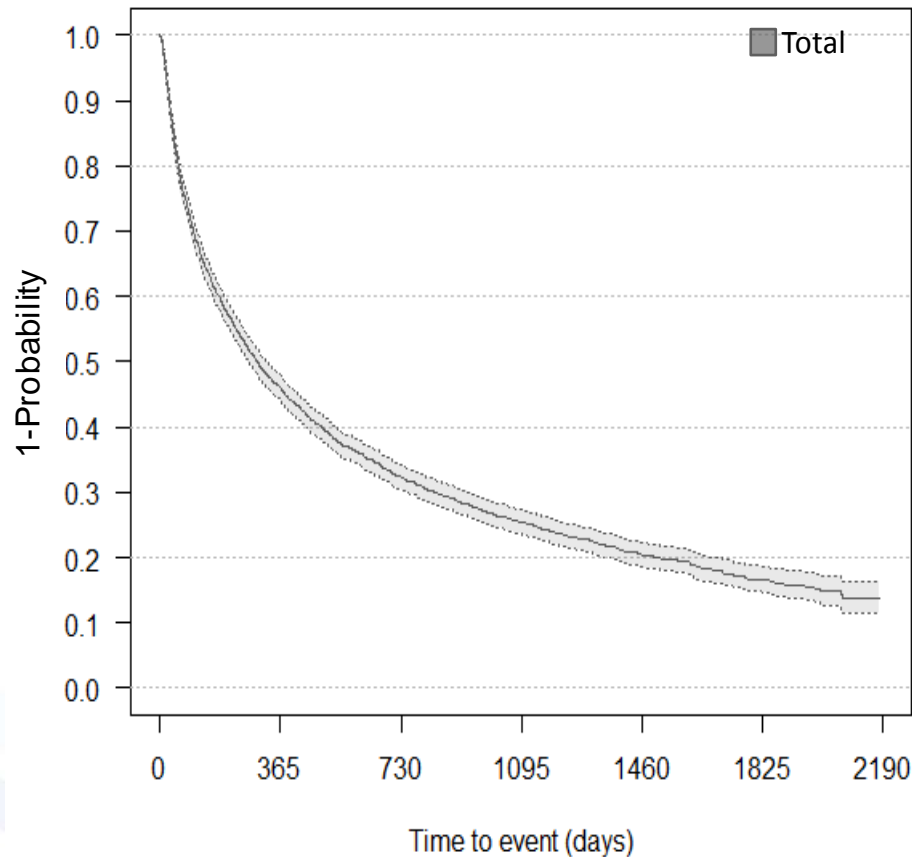
	Female	Male	Total
Drop-out, n (%)	10 (0.78)	17 (1.02)	27 (0.91)
Deaths, n (%)*	441 (34.53)	732 (43.73)	1,173 (39.75)
Subjects with at least a:			
Hospital admissions, n (%)	905 (70.87)	1,229 (73.42)	2,134 (72.31)
Acute hospital admissions, n (%)*	799 (62.57)	1,129 (67.44)	1,928 (65.33)
Survival time, days			
mean \pm es*	1,470.50 \pm 26.90	1,271.78 \pm 24.41	1,358.32 \pm 18.19
Time to first hospitalization, days			
mean \pm es*	550.71 - 23.36	460.60 \pm 18.51	501.61 \pm 14.72
Time to first hospitalization (acute), days			
mean \pm es*	765.82 \pm 26.17	612.49 \pm 21.00	680.15 \pm 16.54

**p-value*<0.05, Female vs. Male

Generic case definition. Estimation of the survival probabilities during follow-up (Kaplan-Meier curves)



Generic case definition. Estimation of the first acute hospitalization probabilities during follow-up (Kaplan-Meier curves)



Broad case definition

Characteristics of the study population



	Female	Male	Total
N (%)	841 (40.18)	1,252 (59.82)	2,093
Age at onset			
mean \pm sd	70.69 \pm 13.55	69.71 \pm 12.60	69.98 \pm 12.99
median	73	72	72
IQR	64 - 80	64 - 79	64 - 79
Chronic comorbidity			
Myocardial Infarction*	39 (4.64)	185 (14.78)	224 (10.70)
Congestive Heart Failure*	153 (18.19)	269 (21.49)	422 (20.16)
Peripheral Vascular Disease*	29 (3.45)	134 (10.70)	163 (7.79)
Dementia	16 (1.90)	18 (1.44)	34 (1.62)
Chronic Pulmonary Disease*	283 (33.65)	520 (41.53)	803 (38.37)
Peptic Ulcer Disease*	7 (0.83)	30 (2.40)	37 (1.77)
Renal Disease*	48 (5.71)	120 (9.58)	168 (8.03)
AIDS/HIV*	0 (0.00)	3 (0.24)	3 (0.14)
Diabetes*	111 (13.20)	214 (17.09)	325 (15.53)
Cerebrovascular Diseases*	97 (11.53)	190 (15.18)	287 (13.71)
Liver Diseases	60 (7.13)	116 (9.27)	176 (8.41)
Tumour*	95 (11.30)	175 (13.98)	270 (12.90)

* p -value<0.05, Female vs. Male

Broad case definition

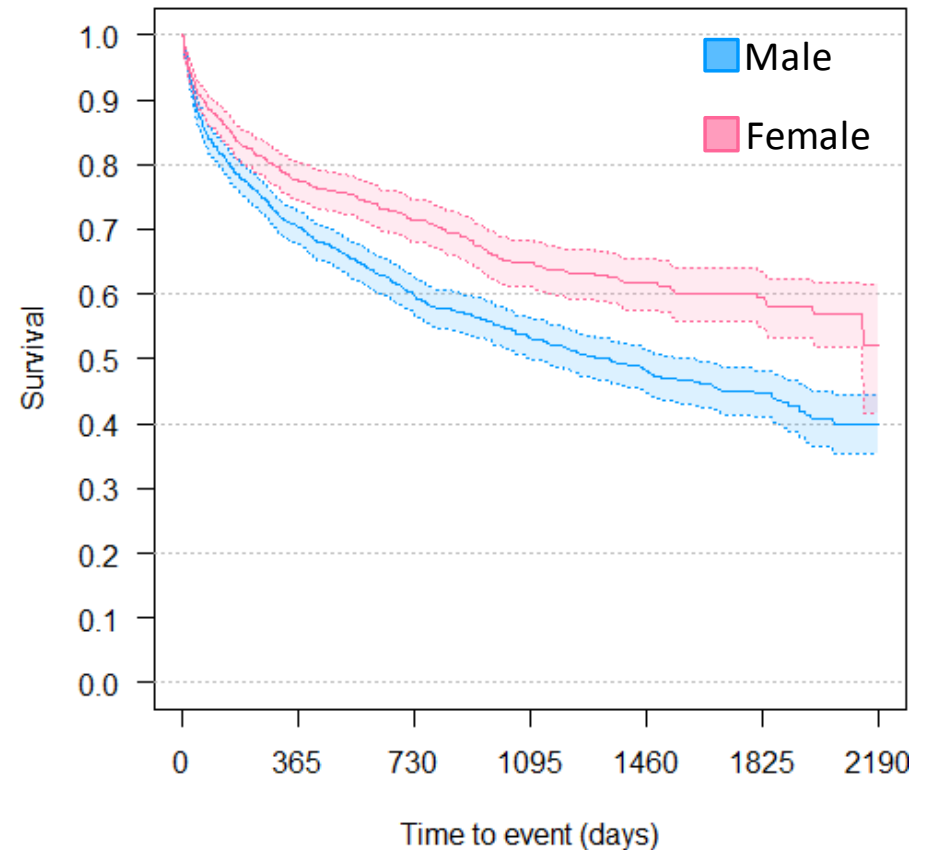
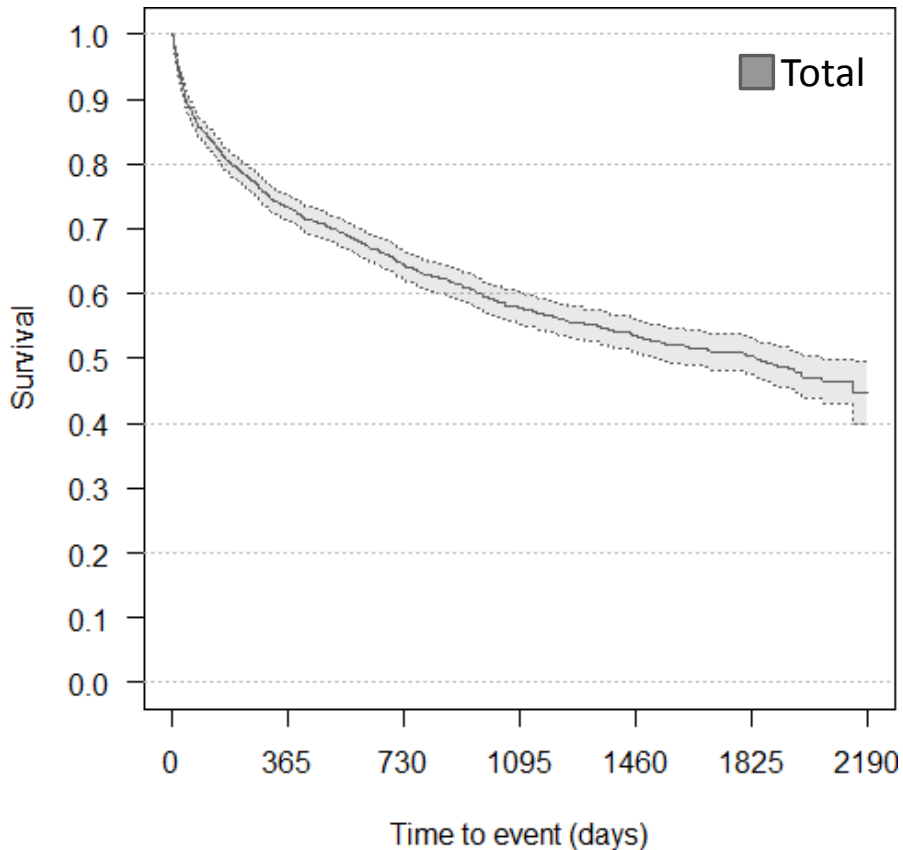
Outcomes of interest during the follow-up



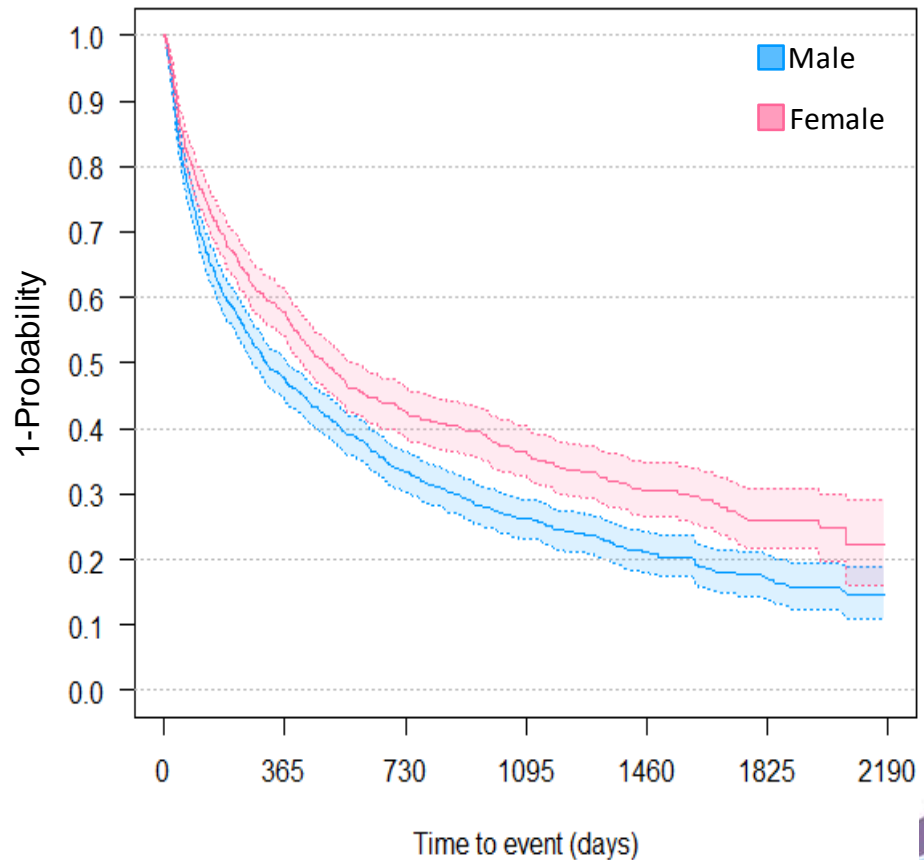
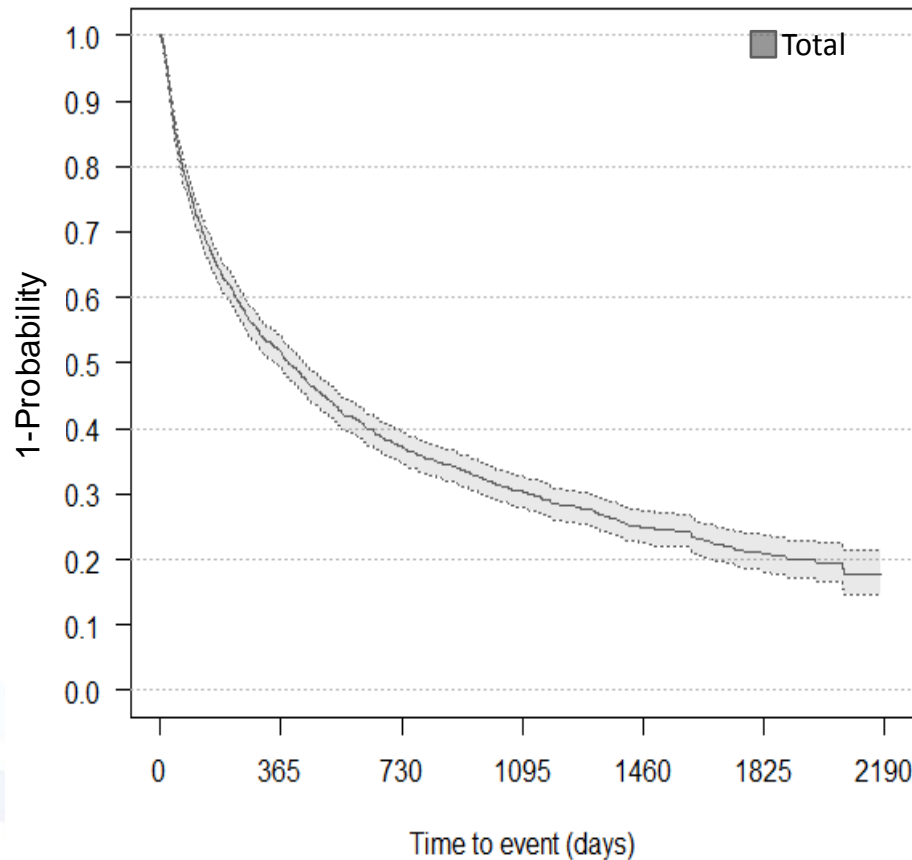
	Female	Male	Total
Drop-out, n (%)	6 (0.71)	12 (0.96)	18 (0.86)
Deaths, n (%)*	271 (32.22)	553 (44.17)	824 (39.37)
Subjects with at least a:			
Hospital admissions, n (%)*	512 (60.88)	828 (66.13)	1,340 (64.02)
Acute hospital admissions, n (%)*	451 (53.63)	759 (60.62)	1,210 (57.81)
Survival time			
mean \pm es*	1,487.56 \pm 34.23	1,237.63 \pm 28.84	1,337.46 \pm 22.27
Time to first hospitalization, days			
mean \pm es*	706.50 \pm 33.43	561.64 \pm 24.71	622.81 \pm 20.22
Time to first hospitalization (acute), days			
mean \pm es*	896.09 \pm 35.37	700.09 \pm 26.70	780.80 \pm 21.54

**p*-value<0.05, Female vs. Male

Broad case definition. Estimation of the survival probabilities during follow-up (Kaplan-Meier curves)



Broad case definition. Estimation of the first acute hospitalization probabilities during follow-up (Kaplan-Meier curves)



Narrow case definition.

Characteristics of the study population



	Female	Male	Total
N (%)	537 (41.02)	772 (58.98)	1,309
Age at onset			
mean \pm sd	69.72 \pm 13.47	69.32 \pm 12.46	69.48 \pm 12.88
median	72	71	72
IQR	63 - 80	63 - 78	63 - 79
Chronic comorbidity			
Myocardial Infarction*	29 (5.40)	112 (14.51)	141 (10.77)
Congestive Heart Failure	111 (20.67)	170 (22.02)	281 (21.47)
Peripheral Vascular Disease*	20 (3.72)	94 (12.18)	114 (8.71)
Dementia	11 (2.05)	9 (1.17)	20 (1.53)
Chronic Pulmonary Disease*	207 (38.55)	343 (44.43)	550 (42.02)
Peptic Ulcer Disease*	2 (0.37)	18 (2.33)	20 (1.53)
Renal Disease*	34 (6.33)	78 (10.10)	112 (8.56)
AIDS/HIV	0 (0.00)	3 (0.39)	3 (0.23)
Diabetes	81 (15.08)	130 (16.84)	211 (16.12)
Cerebrovascular Diseases*	62 (11.55)	133 (17.23)	195 (14.90)
Liver Diseases	40 (7.45)	77 (9.97)	117 (8.94)
T	76 (14.15)	122 (15.54)	198 (14.97)

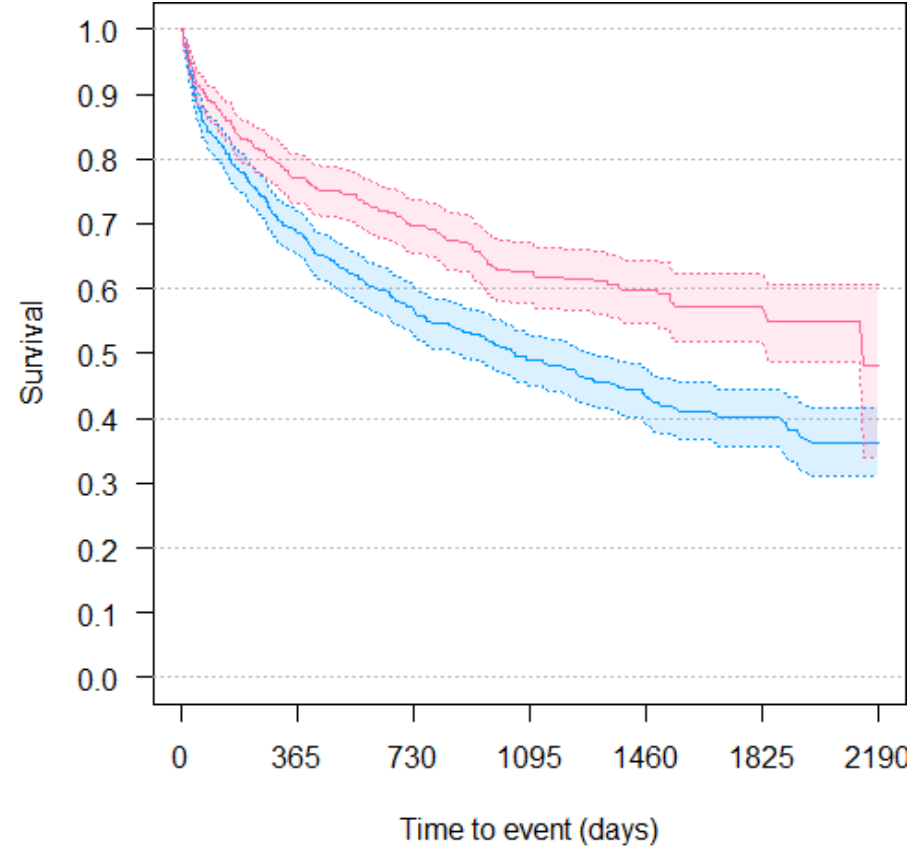
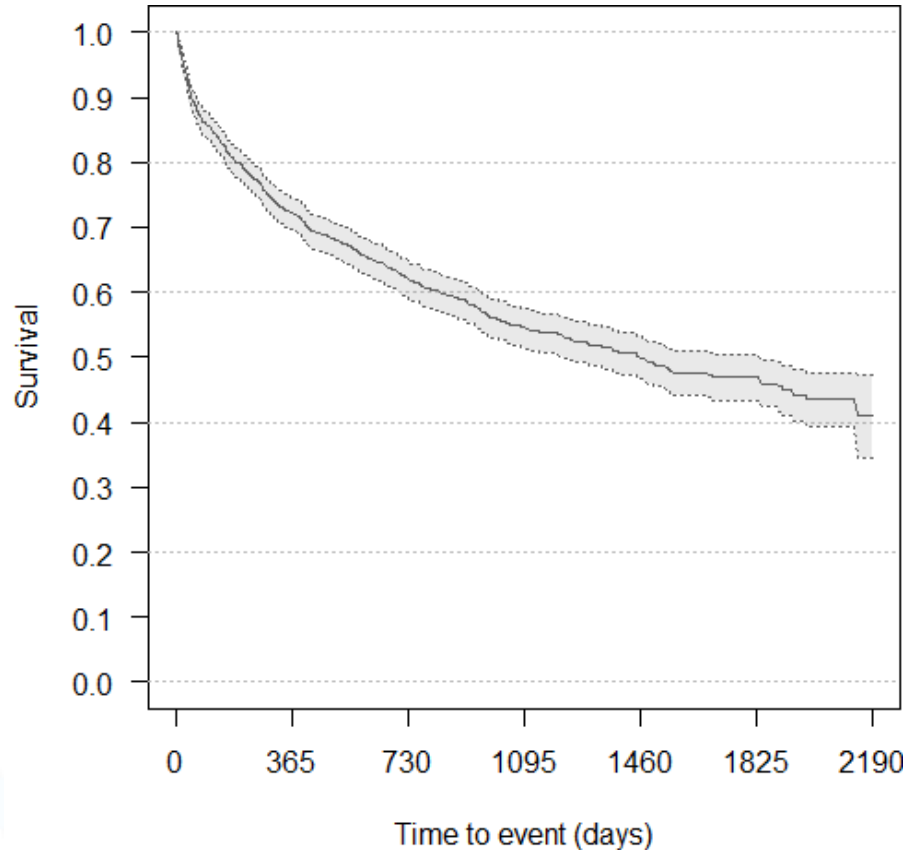
Narrow case definition.

Outcomes of interest during the follow-up

	Female	Male	Total
Drop-out, n (%)	4 (0.74)	6 (0.78)	10 (0.76)
Deaths, n (%)*	182 (33.89)	372 (48.19)	554 (42.32)
Subjects with at least a:			
Hospital admissions, n (%)*	344 (64.06)	547 (70.85)	891 (68.07)
Acute hospital admissions, n (%)*	304 (56.61)	514 (66.58)	818 (62.49)
Survival time			
mean \pm es*	1,451.18 \pm 43.16	1,164.86 \pm 36.20	1,280.23 \pm 28.07
Time to first hospitalization, days			
mean \pm es*	639.13 \pm 40.35	490.26 \pm 28.80	551.89 \pm 23.88
Time to first hospitalization (acute), days			
mean \pm es*	827.73 \pm 43.50	593.02 \pm 30.41	690.69 \pm 25.71

**p-value*<0.05, Female vs. Male

Narrow case definition. Estimation of the survival probabilities during follow-up (Kaplan-Meier curves)



Narrow case definition. Estimation of the first acute hospitalization probabilities during follow-up (Kaplan-Meier curves)

