

Malmö Preventive Project
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Malmö Preventive Project

Cardiovascular Endpoints

End of follow-up: 31 December 2016

Report: 4 April 2018

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General information

All cardiovascular disease groups, except *atrial fibrillation* and *flutter* events, can have both prevalent and incident outcomes at the individual level.

Prevalent: date of diagnosis \leq date of entry

Incident: date of diagnosis $>$ date of entry

Abbreviations:

CABG = Coronary Artery Bypass Graft surgery

MACE = Major Adverse Coronary Events

PCI = Percutaneous Coronary artery Intervention

Amendments and implementation of new procedures

Year* Description

- 2017 - Added the variables `cgdat_ep`, `fucg`, `pcdat_ep`, `fupc`
- Included all secondary diagnoses (currently max 31) in the Patient Register and added two more groups of the source-variables for the disease groups CABG, atrial fibrillation/flutter, aortic stenosis (both "as" and "ay")
 - Removed events which have occurred after the date of emigration (if available)
- 2015 - Validation of stroke events by means of the Stroma register started in 1989 and ceased in year 2013, the latest year with complete validated data was 2010. New non-validated stroke events from hospitals in Malmö were included as endpoints, but only events after 2010.
- Atrial fibrillation and flutter events from the Hospital-based outpatient care (Öppenvårdsregistret) were included as endpoints. Previously only data from the Hospital Discharge Register (Slutenvårdsregistret) and the Cause-of-Death Register were included.
 - As a consequence of the amendments above the coding of the source variables `pr_stso`, `stso` and `afso` was changed. The coding of the variable `pr_st` was also modified.
- 2014 - Introduced a separate last follow-up date for stroke.
- 2012 - The original value for the recidive date in the Recidive Registry (part of the Stroma Registry) is composed of year and month (i.e. YYYYMM; day is missing). By default the day has been set to 15 in previous endpoint updates. Nevertheless, a few individuals have died a few days before day 15, which was not taken into account previously. However, in the new update the recidive date has been changed for such cases to date of death.
- 2011 - Five new endpoints were added to the cardiovascular endpoint update: CABG surgery event, PCI event, MACE event (coronary event, CABG or PCI), Aortic stenosis event (based on ICD code), and Aortic stenosis event (based on surgery code).
- In order to relate the cardiovascular events to the date at rescreening (2007-2012), a new file was created, parallel to the ordinary file with baseline screening date (1991-1996).
 - Information of reused (återanvända) Personal Identity Numbers (PIN) was taken into account, diagnoses appearing after the date of death of an MDC participating individual were removed.
 - For individuals with changed PINs, data with the new PIN (death, emigration) were included in the endpoint update.
 - Date of death as given by SCB has been used (previously dates from SoS were used)
 - One individual in the MDC cohort (not in CV cohort) was identified with two different PINs, the latest PIN was removed. The new MDC cohort number is 30 446.

* The year when the endpoint update was made, usually the year after last follow-up year.

1. Cohort

Baseline 1974-1992

Total: 33 346

Men: 22 444

Women: 10 902

Rescreening 2002-2006 (MPP-AUS)

All individuals in the MPP cohort, alive, not emigrated, and living in southern Sweden, were invited to rescreening during 2002-2006. In total 18 240 individuals participated in the study out of the original number 33 346.

Total: 18 240

Men: 11 558

Women: 6 682

2. Time of follow-up

Number of person-years from date of entry to death, lost to follow-up or to 31 December 2016.

	Baseline MPP (n=33 346)	Rescreening MPP-AUS (n=18 240)
Total	1 001 290	192 187
Men	688 873	117 462
Women	312 417	74 725

3. Summary of prevalent and incident events by disease group

Number of individuals with first prevalent and/or first incident cardiovascular disease until 31 December 2016 by cohort and disease group.

Disease group	Baseline			Rescreening		
	MPP (n=33 346)			MPP-AUS (n=18 240)		
	Prevalent	Incident	Incident 2016	Prevalent	Incident	Incident 2016
Coronary events	122	6 098	154	1 058	1 901	140
Stroke	42	3 958	151	667	1 520	110
Heart failure	9	2 634	141	230	1 131	98
Atrial fibrillation or flutter	44	5 962	360	847	2 854	275
CABG surgery	1	3 825	118	1 090	1 573	113
PCI		2 161	100	427	1 101	89
MACE (coronary events, CABG or PCI)	122	7 314	180	1 545	2 468	173
Aortic stenosis (based on ICD code)	5	1 015	77	93	558	61
Aortic stenosis (based on surgery code)		362	19	56	165	15

REFERENCE TIME POINT AT BASELINE (tables 4-13)

4. Incident cardiovascular events by year of diagnosis – Part 1

Number of individuals with first incident coronary, stroke, heart failure and/or atrial fibrillation/flutter events until 31 December 2016 by year of diagnosis.

Year	Coronary events	Stroke	Heart failure*		Atrial fibrillation/ flutter**
			Pre MI	Post MI	
1975	6				
1976	6				
1977	7	4		1	2
1978	28	5			4
1979	33	3		2	9
1980	48	4		1	6
1981	59	12	3	3	6
1982	86	8	2	2	13
1983	75	16	5	3	11
1984	67	14	8	3	22
1985	107	17	4	5	22
1986	105	30	10	5	31
1987	110	35	6	5	29
1988	103	47	19	6	26
1989	104	43	16	10	30
1990	119	59	16	15	41
1991	148	65	22	9	54
1992	139	66	21	9	49
1993	151	77	28	17	59
1994	152	88	41	17	69
1995	177	116	40	15	76
1996	172	103	39	17	98
1997	187	126	31	18	88
1998	176	124	44	17	101
1999	192	155	57	21	114
2000	177	152	51	22	122
2001	207	142	55	17	219
2002	226	161	50	17	210
2003	211	138	61	27	243
2004	242	161	70	38	242
2005	242	167	65	30	271
2006	209	167	72	34	298
2007	232	160	80	34	264
2008	248	194	84	44	323
2009	205	162	86	45	346
2010	247	126	96	40	341
2011	207	179	110	44	338
2012	203	178	105	52	377
2013	183	155	108	50	338
2014	185	188	105	46	335
2015	163	160	103	39	375
2016	154	151	95	46	360
Total	6 098	3 958	1 808	826	5 962

* Incident heart failure events were splitted into following groups:

Pre MI = heart failure at least one day before a possible acute myocardial infarction

Post MI = heart failure on the same day or after a non-fatal acute myocardial infarction (incl. possible prevalent MI)

Acute myocardial infarction were identified through ICD8/9=410 and ICD10=I21 in the Hospital Discharge Register

** No incident atrial fibrillation/flutter event is recorded if the individual has a prevalent event

5. Incident cardiovascular events by year of diagnosis – Part 2

Number of individuals with first incident CABG, PCI, MACE, aortic stenosis (ICD and surgery) events until 31 December 2016 by year of diagnosis.

Year	CABG surgery	PCI	MACE	Aortic stenosis (ICD)	Aortic stenosis (surgery)
1975			6		
1976			6		
1977			7		
1978			28	2	
1979			33		
1980			48		
1981			59	3	
1982			86	2	
1983	2		76	4	
1984	1		68	5	
1985	21		121	5	4
1986	21		111	3	2
1987	23		120	4	3
1988	20		113	7	2
1989	53		135	3	1
1990	44	1	140	9	2
1991	91	15	198	8	4
1992	80	18	185	11	4
1993	85	21	205	10	4
1994	118	27	210	10	9
1995	104	10	224	9	4
1996	98	24	215	25	16
1997	112	22	232	15	9
1998	126	60	223	10	7
1999	129	71	253	19	9
2000	137	79	238	19	12
2001	163	124	262	16	5
2002	171	29	271	38	13
2003	162	113	248	30	17
2004	200	125	303	30	12
2005	197	130	298	35	20
2006	191	136	268	62	20
2007	188	147	274	39	12
2008	171	138	286	37	15
2009	153	123	237	51	20
2010	173	131	279	56	26
2011	150	120	230	77	21
2012	132	99	228	69	20
2013	125	96	204	58	14
2014	139	105	207	79	14
2015	127	97	199	78	22
2016	118	100	180	77	19
Total	3 825	2 161	7 314	1 015	362

6. Coronary events by diagnosis

Number of individuals with first prevalent and/or first incident coronary events until 31 December 2016 by diagnosis group.

Prevalent: date of diagnosis \leq date of entry

Incident: date of diagnosis $>$ date of entry

Diagnosis	ICD-9	Prevalent	Incident	Incident 2016
Acute myocardial infarction	410	122	5 218	119
Other acute and subacute forms of ischemic heart disease	411		5	
Old myocardial infarction	412		91	
Angina pectoris	413			
Other forms of chronic ischemic heart disease	414		784	35
Total		122	6 098	154

7. Incident coronary events by diagnosis and source

Number of individuals with first incident coronary event until 31 December 2016 by diagnosis group and source of information.

Diagnosis	ICD-9	Hospital Discharge Register	Cause-of-death Register	Total
Acute myocardial infarction	410	4 420	798	5 218
Other acute and subacute forms of ischemic heart disease	411		5	5
Old myocardial infarction	412		91	91
Angina pectoris	413			
Other forms of chronic ischemic heart disease	414		784	784
Total		4 420	1 678	6 098

8. Stroke events by diagnosis

Number of individuals with first prevalent and/or first incident stroke events until 31 December 2016 by diagnosis group.

Diagnosis	ICD-9	Prevalent	Incident	Incident 2016
Unknown	-		27	
Subarachnoid hemorrhage	430	17	172	5
Intracerebral hemorrhage	431	7	483	22
Occlusion of cerebral arteries	434	12	3 128	121
Acute, but ill-defined, cerebrovascular disease	436	6	148	3
Total		42	3 958	151

9. Incident stroke events by diagnosis and source

Number of individuals with first incident stroke event until 31 December 2016 by diagnosis group and source of information.

Diagnosis	ICD-9	Stroma register (not in HDR*)	Stroma register (also in HDR*)	HDR, outside Malmö*	HDR*, Malmö, before 1989	HDR*, Malmö, after 2010	Recidiv register	Peter Lind protein study	Total
Unknown	-						27		27
Subarachnoid hemorrhage	430	4	56	85	13	14			172
Intracerebral hemorrhage	431	28	243	107	12	90	2	1	483
Occlusion of cerebral arteries	434	249	1 583	600	74	610		12	3 128
Acute, but ill-defined, cerebrovascular disease	436	13	24	52	28	22		9	148
Total		294	1 906	844	127	736	29	22	3 958

* HDR = Hospital Discharge Register

10. Heart failure events by diagnosis

Number of individuals with first prevalent and/or first incident heart failure events until 31 December 2016 by diagnosis group.

Diagnosis	ICD-9/ ICD-10	Prevalent*		Incident*		Incident 2016
		pre MI	post MI	pre MI	post MI	
Heart failure	428	8	1	1 794	821	141
Hypertensive heart disease with (congestive) heart failure	I11.0			14	5	
Total		8	1	1 808	826	141

* Prevalent and incident heart failure events were splitted into following groups:

Pre MI = heart failure at least one day before a possible acute myocardial infarction

Post MI = heart failure on the same day or after a non-fatal acute myocardial infarction (incl. possible prevalent MI)

Acute myocardial infarction were identified through ICD8/9=410 and ICD10=I21 in the Hospital Discharge Register

11. Incident heart failure events by diagnosis and source

Number of individuals with first incident heart failure event until 31 December 2016 by diagnosis group and source of information.

Diagnosis	ICD-9/ ICD-10	Hospital Discharge Register*		Total
		Pre MI	Post MI	
Heart failure	428	1 794	821	2 615
Hypertensive heart disease with (congestive) heart failure	I11.0	14	5	19
Total		1 808	826	2 634

* Incident heart failure events were splitted into following groups:

Pre MI = heart failure at least one day before a possible acute myocardial infarction

Post MI = heart failure on the same day or after a non-fatal acute myocardial infarction (incl. possible prevalent MI)

Acute myocardial infarction were identified through ICD8/9=410 and ICD10=I21 in the Hospital Discharge Register

12. Atrial fibrillation and flutter events by diagnosis

Number of individuals with first prevalent or first incident atrial fibrillation and flutter events until 31 December 2016. Only the first event of an individual is recorded, thus no incident event is recorded if the individual has a prevalent event.

Diagnosis	ICD-9	Prevalent	Incident	Incident 2016
Atrial fibrillation and flutter	427D	44	5 962	360

13. Incident atrial fibrillation and flutter events by diagnosis and source

Number of individuals with first incident atrial fibrillation and flutter event until 31 December 2016 by diagnosis group and source of information. Only the first event of an individual is recorded, thus no incident event is recorded if the individual has a prevalent event.

Diagnosis	ICD-9	Hospital Discharge Register	Hospital-based out-patient care	Cause-of-death Register	Total
Atrial fibrillation and flutter	427D*	4 439	1 475	48	5 962

* Corresponding code in the Cause-of-death Register is 4273