

The Malmö Diet and Cancer Study
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Malmö Diet and Cancer Study

The EPIC cohort

The MDC CV cohort

Diabetes Endpoints

End of follow-up: 31 December 2016
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General information

An individual with diabetes can be characterized as either prevalent or incident with respect to diabetes onset in relation to the time of baseline study. Hence, individuals with prevalent diabetes can not be incident. Only the first recorded diabetes event of an individual has been used in this report.

Prevalent: date of diagnosis \leq date of entry

Incident: date of diagnosis $>$ date of entry

In total, 15 different sources of data were used to identify individuals with diabetes (table 5). All individuals in the Diabetes 2000 (except certain with missing data), the ANDIS (Alla Nya Diabetiker I Skåne) and the NDR (Swedish National Diabetes Register) registries were considered as diabetics, as well as individuals with at least two HbA1c-values $\geq 6,0\%$ (not on the same day) in the HbA1c register at Clinical Chemistry, Malmö. In the National Patient Register (inpatient care and outpatient care) and the Swedish Cause of Death Register from the National Board of Health and Welfare individuals with the ICD10 codes E10-E14 and O244-O249 (and corresponding ICD7-9 codes), were treated as diabetics. The ATC code A10 was used to identify diabetics in the Prescribed Drug Register. From the MPP and MDC cohorts, seven different study generated data sources from baseline, rescreening and subcohort studies have been used to identify diabetics. The MPP endpoint update takes into account MDC data, and vice versa. Briefly, individuals with fasting blood glucose $\geq 6,5$, or glucose ≥ 11 mmol/L at 120 minutes OGTT, or fasting plasma glucose ≥ 7 mmol/L, or have reported intake of A10 drugs, or have responded “Yes” on the question “Do you have diabetes?” (or similar) have been considered as diabetics. Elevated glucose levels in the MDC CV rescreening study must have been verified through fasting plasma glucose and/or OGTT tests in a subsequent examination in order to confirm new diabetes.

Type of diabetes are reported in the Diabetes 2000 and NDR registries, but the type has also been possible to assign through the ICD codes in the National Patient Register and the Swedish Cause of Death Register. Diabetics who have taken oral anti-diabetes drugs only have been classified as Type 2 diabetics. An individual can have information about diabetes from more than one source but only the information associated with the first recorded event has been used regardless of completeness or reliability. Contradictory information about diabetes status or type in subsequent events has been neglected. Some of the 15 diabetes sources contain multiple information (e g both questionnaire and lab data) on diabetes. In order to choose one of these within source the following selection order has been applied: 1) questionnaire, 2) drugs, 3) fasting plasma glucose, and 4) glucose at 120 minutes OGTT. Year at diabetes onset was only available in the Diabetes 2000 and the NDR registries. Information on diabetes onset year was taken into account, together with data from 15 sources in determining the timing of prevalent or incident diabetes.

Amendments and implementation of new procedures

Year* Description

- 2017 - Added data from the ANDIS register (source number 15)
- Replaced earlier reclassification of diabetes type in the Diabetes2000 register by the variable derived by Diabetes2000
 - Increased the number of accounted secondary diagnoses in the Outpatient care register from 8 to 12 (i e the same number as already used for Inpatient care and Cause-of-Death registers)

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

1. Cohorts

Background population: 74 137

Men: 31 513

Women: 42 624

Malmö Diet and Cancer Study (MDC) cohort

Individuals qualify to the MDC cohort if they participated in at least one part of the Malmö Diet and Cancer Study.

Total: 30 446

Men: 12 120

Women: 18 326

EPIC cohort

Individuals qualify to the EPIC cohort if they completed the socio-medical questionnaire, anthropometric measurements and dietary assessment.

Total: 28 098

Men: 11 063

Women: 17 035

Cardiovascular (CV) cohort

Every other individual in the MDC cohort screened between 1991 to 1994 was invited to a CV project which included a B-mode carotid ultrasound examination for determination of carotid intima-media thickness and plaques. Out of 6 103 individuals which accepted the invitation about 5 500 further participated in an extended examination, including laboratory analyses.

Total: 6 103

Men: 2 572

Women: 3 531

2. Time of follow-up

Follow-up time from date of entry to death, lost to follow-up or to 31 December 2016.

Population	Person-years
EPIC cohort	556 990
Men	209 685
Women	347 305
CV cohort*	127 609
Men	51 693
Women	75 916

* One individual (male) out of 6 103 lack follow-up time due to missing screening date

3. Individuals with prevalent or incident diabetes by sex

Number of individuals with diabetes until 31 Dec 2016 in the EPIC and CV cohorts.

	EPIC (n=28 098)	CV (n=6 103)
Diabetes, total	5 528	1 368
Prevalent diabetes at baseline	1 244	292
Men	654	157
Women	590	135
Incident diabetes	4 284	1 076
Men	2 048	512
Women	2 236	564

4. Individuals with incident diabetes by year of diabetes onset or first recorded event

Number of individuals with incident diabetes until 31 December 2016 in the EPIC and CV cohorts by year of diabetes onset or first recorded event.

Year	EPIC (n=28 098)	CV (n=6 103)
1991	2	
1992	9	4
1993	82	76
1994	93	68
1995	85	16
1996	125	26
1997	164	26
1998	181	38
1999	126	26
2000	170	25
2001	189	43
2002	212	48
2003	230	53
2004	275	62
2005	386	82
2006	245	64
2007	356	87
2008	278	92
2009	229	60
2010	246	62
2011	160	46
2012	106	22
2013	94	18
2014	90	9
2015	70	13
2016	81	10
Total	4 284	1 076

5. Individuals with prevalent or incident diabetes by source and type of diabetes

Number of individuals with prevalent or incident diabetes (recorded in the first event) until 31 December 2016 in the EPIC cohort by source of data and type of diabetes.

Source	Type of diabetes							Total
	Type 1	Type 2	LADA	Pregnancy	Secondary	Other	Unknown	
1. Diabetes 2000	1	168	9		1	1	29	209
2. NDR	17	844					72	933
3. HbA1c							1 712	1 712
4. Inpatient	74	239				5	295	613
5. Outpatient	72	152				4	26	254
6. Cause of death		8					6	14
7. Drug		409					67	476
8. MPP baseline							237	237
9. MPP 6-yr rescr							52	52
10. MPP rescr		19					293	312
11. MDC base		105					152	257
12. MDC CV base							137	137
13. MDC 5-yr rescr		21					64	85
14. MDC CV rescr		1					118	119
15. ANDIS		110	5		1		2	118
Total	164	2 076	14	0	2	10	3 262	5 528

- 1) The Diabetes 2000 Registry
- 2) The Swedish National Diabetes Register (NDR)
- 3) The HbA1c register at Clinical Chemistry, SUS, Malmö
- 4) The Hospital Discharge Register (also The National Inpatient Register, IPR) (Slutenvårdsregistret)
- 5) The National Patient Register – Outpatient Care (Spec Öppenvårdsregistret)
- 6) The Cause-of-death Register (Dödsorsaksregistret)
- 7) The Swedish Prescribed Drug Register (Läkemedelsregistret)
- 8) MPP baseline screening (1974-92) (type of source: questionnaire, fB-glucose, OGTT)
- 9) MPP 6-year rescreening (1981-89) (questionnaire, fB-glucose, OGTT)
- 10) MPP rescreening (2002-06) (questionnaire, list of drugs, fP-glucose)
- 11) MDC baseline screening (1991-96) (questionnaire, list of drugs)
- 12) MDC baseline screening cardiovascular cohort (1992-94) (fB-glucose)
- 13) MDC 5-year rescreening (1997-2001) (questionnaire, list of drugs)
- 14) MDC cardiovascular rescreening (2007-12) (questionnaire, list of drugs, fP-glucose, OGTT)
- 15) The ANDIS (Alla Nya Diabetiker I Skåne) Registry