

Supplemental Online Content

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This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. Summary of ICD-10, ATC, and Procedure Codes Used

Condition	ICD-10 code	ATC code	Procedure code
Anxiety diagnoses			
Phobic anxiety disorders	F40		
Other anxiety disorders	F41		
Obsessive compulsive disorder	F42		
Dispensed prescription medication for anxiety			
Anxiolytics		N05B	
Benzodiazepine derivatives		N05CD	
Depression diagnoses			
Depressive episode	F32		
Recurrent depressive disorder	F33		
Dispensed prescription medication for depression			
Antidepressants		N06A	
Mood disorders (used for exclusion)			
Schizophrenia	F20		
Bipolar disorder	F31		
Delusional	F22		
Genetic syndromes (used for exclusion)			
Noonan	Q87.1E		
Prader–Willi	Q87.1F		
Russel–Silver	Q87.1G		
Laurence–Moon–Bardet–Biedl	Q87.8B		
Down syndrome	Q90		
Turner syndrome	Q96		
Klinefelter syndrome	Q98		
Fragile X chromosome	Q99.2		
Craniopharyngioma (used for exclusion)			
Benign neoplasm of craniopharyngeal duct	D353		
Neoplasm of uncertain behavior of craniopharyngeal duct	D444		
Malignant neoplasm of craniopharyngeal duct	C752		
Diabetes			
Insulins and analogues (used for exclusion)		A10A	
Blood glucose-lowering drugs, excl. insulins		A10B	
Type 1 diabetes (used for exclusion)	E10		
Pre-existing type 1 diabetes, in pregnancy (used for exclusion)	O24.0		
Type 2 diabetes	E11		
Pre-existing type 2 diabetes, in pregnancy	O24.1		
Other specified diabetes (used for exclusion)	E13		
Non-specified diabetes (used for exclusion)	E14		
Unspecified pre-existing diabetes in pregnancy (used for exclusion)	O24.3		
Gestational diabetes (used for exclusion)	O24.4		
Unspecified diabetes in pregnancy (used for exclusion)	O24.9		

Condition	ICD-10 code	ATC code	Procedure code
Hypertension			
Essential (primary) hypertension	I10		
Hypertensive heart disease	I11		
Hypertensive chronic kidney disease	I12		
Hypertensive heart and chronic kidney disease	I13		
Secondary hypertension (used for exclusion)	I15		
Elevated blood pressure, without diagnosis of hypertension	R03.0		
Pre-existing essential hypertension complicating pregnancy	O10		
Hyperaldosteronism (used for exclusion)	E26		
Other disorders of adrenal gland (used for exclusion)	E27		
Agents acting on arteriolar smooth muscle		C02D	
Antihypertensives and diuretics in combination		C02L	
Diuretics		C03	
Calcium channel blockers		C08	
Agents acting on the renin–angiotensin system		C09	
Fractures			
Fracture of skull and facial bones	S02		
Fracture of shoulder and upper arm	S42		
Fracture of forearm	S52		
Fracture at wrist and hand level	S62		
Fracture of femur	S72		
Fracture of lower leg, including ankle	S82		
Fracture of foot and toe, except ankle	S92		
Diseases related with pathological fracture (used for exclusion)			
Osteochondrodysplasia	Q77, Q78		
Osteoporosis	M81		
Malignant neoplasm	C00-C97		
Benign neoplasm of bone and articular cartilage	D16		
Disorder of bone density and structure	M85		
Paget's disease of bone	M88		
Dyslipidemia			
Pure hypercholesterolemia	E78.0		
Familial hypercholesterolemia (used for exclusion)	E78.0A		
Pure hyperglyceridemia	E78.1		
Mixed hyperlipidemia	E78.2		
Hyperchylomicronemia	E78.3		
Other hyperlipidemia	E78.4		
Hyperlipidemia, unspecified	E78.5		
HMG-CoA reductase inhibitors		C10AA	
Fibrates		C10AB	
Combinations of various lipid-modifying agents		C10BA	
Nicotinic acid and derivatives		C10AD	
Other lipid-modifying agents		C10AX	
Bariatric weight-loss surgery			
Volume-restricting surgery on the ventricle in combination with obesity	E66		JDF

Abbreviations: ATC, anatomical therapeutic chemical; HMG-CoA, β -hydroxy β -methylglutaryl-CoA; ICD-10, International Classification of Diseases, 10th Revision.

eTable 2. Additional Exclusion Criteria

Outcome	Additional exclusion criteria	Number excluded from the BORIS cohort	Number excluded from the general population
Type 2 diabetes	Type 1 diabetes or other types of diabetes	40	293
	Type 2 diabetes before 18 years of age	320	26
Hypertension	Potential secondary hypertension	115	40
	Hypertension before 18 years of age	153	111
Dyslipidemia	Inherited lipid disorders	8	15
	Dyslipidemia before 18 years of age	139	21
Depression or anxiety	Other psychiatric disorders	65	246
Fractures	Diseases related to pathological fractures	104	399

Abbreviation: BORIS, Swedish Childhood Obesity Treatment Register.

eTable 3. Characteristics of Included Individuals Stratified by Those who Were Aged 12-17 Years at Treatment Initiation Based on Percentage Change in BMI

Characteristic	Obesity remission (n = 599)	≤-5% change in BMI (n = 345)	-5% to 5% change in BMI (n = 1022)	≥5% change in BMI (n = 1468)	Individuals aged 12-17 years at treatment initiation (n = 3434)
Male sex	359/599 (59.9)	189/345 (54.8)	559/1022 (54.7)	873/1468 (59.5)	1980 (57.7)
Age at treatment initiation	13.87 (12.76-15.06)	14.90 (14.01-15.89)	14.67 (13.45-15.68)	13.86 (12.87-15.01)	14.20 (13.1-15.3)
BMI at treatment initiation	30.01 (28.54-31.89)	36.14 (33.91-39.55)	33.53 (31.11-37.13)	32.04 (29.81-35.29)	32.50 (30.1-36.0)
Obesity class I	513/599 (85.6)	64/345 (18.6)	485/1022 (47.5)	855/1468 (58.2)	1917
Obesity class II	78/599 (13.0)	185/345 (53.6)	379/1022 (37.1)	447/1468 (30.5)	1089
Obesity class III	8/599 (1.3)	96/345 (27.8)	158/1022 (15.5)	166/1468 (11.3)	428
Years of treatment	2.41 (1.59-3.54)	2.02 (1.33-2.91)	1.75 (1.17-2.67)	2.88 (1.94-4.05)	2.32 (1.5-3.5)
Change in BMI	-10.7 (-17.4-[-5.1])	-8.8 (-12.8--6.6)	0.8 (-1.5-2.9)	12.4 (8.3-19.1)	3.10 (-4.3-11.0)
Non-Nordic background ^a	191/599 (31.9)	101/345 (29.3)	296/1022 (29.0)	420/1468 (28.6)	1088
Socioeconomic position					
Low	127/599 (21.2)	102/345 (29.6)	245/1022 (24.0)	342/1468 (23.3)	816 (23.8)
Medium-low	206/599 (34.4)	145/345 (42.0)	450/1022 (44.0)	617/1468 (42.0)	1418 (41.3)
Medium-high	196/599 (32.7)	78/345 (22.6)	260/1022 (25.4)	385/1468 (26.2)	919 (26.8)
High	70/599 (11.7)	18/345 (5.2)	61/1022 (6.0)	119/1468 (8.1)	268 (7.8)
Missing	0/599 (0.0)	2/345 (0.6)	6/1022 (0.6)	5/1468 (0.3)	13 (0.4)

Abbreviations: BMI, body mass index; IQR, interquartile range.

Data are n/N (%) or median (IQR).

^aMigration background was categorized into two groups: "Nordic" if a child and at least a parent was born in a Nordic country (ie, Sweden, Finland, Norway, Denmark, or Iceland) or if a child was born outside the Nordic countries and both parents were born in the Nordic countries, and "non-Nordic" for all other children.

eTable 4. Causes of Deaths for the Pediatric Obesity Cohort and General Population Comparators

	Obesity cohort	General population comparators
Chronic/Congenital disease	0	5
Acquired disease	8	15
External causes	6	16
Suicide or intoxication with unknown intention	7	27
Other/Unknown	0	6

Chronic/Congenital disease include e.g. cystic fibrosis and congenital heart disease.

Acquired disease include e.g. malignancies, viral infections, and cardiovascular events.

External causes include vehicle accidents and murders.

Suicide or Intoxication with unknown intention include e.g. intentional harm and overdoses with unknown intentions.

Other/Unknown include e.g. legal interventions involving firearm, exposure for unspecified factors, and deceased abroad with no/limited information on cause of death.

eTable 5. Unadjusted Incidence Rates (per 100 000 Person-Years) Based on Percentage Change in BMI in Individuals Aged 12-17 Years at Treatment Initiation

Outcome and treatment category	n/N (%)	Incidence rate per 100 000 person-year (95% CI)	P value
Type 2 diabetes			
General population	41/16 472	43.5 (32.0-59.1)	<.001
≤-5% or remission	9/890	185.0 (96.3-355.6)	.002
-5% to +5%	24/964	465.3 (311.9-694.2)	.357
≥+5%	43/1366	665.0 (493.2-896.7)	ref
Hypertension			
General population	191/16 566	198.2 (172.0-228.4)	<.001
≤-5% or remission	33/910	613.1 (435.9-862.4)	.264
-5% to 5%	38/981	645.8 (469.9-887.5)	.379
≥+5%	64/1389	862.7 (675.2-1102.2)	ref
Dyslipidemia			
General population	37/16 623	38.9 (28.2-53.7)	<.001
≤-5% or remission	6/931	117.6 (52.8-261.7)	.027
-5% to 5%	9/1000	164.8 (85.8-316.8)	.084
≥+5%	25/1419	364.1 (246-538.8)	ref
Depression or anxiety			
General population	3523/16 488	4294.4 (4154.9-4438.5)	<.001
≤-5% or remission	297/930	7058.7 (6299.9-7908.9)	.851
-5% to 5%	310/1007	6780.2 (6065.9-7578.6)	.758
≥+5%	455/1448	7736.8 (7057.6-8481.4)	ref
Bariatric surgery			
General population	31/16 639	32.5 (22.9-46.2)	<.001
≤-5% or remission	50/944	958.7 (726.6-1265.0)	.024
-5% to 5%	83/1022	1485.3 (1197.8-1841.8)	.756
≥+5%	114/1468	1593 (1325.9-1914.0)	ref
Mortality			
General population	43/16 639	45.1 (33.4-60.8)	.133
≤-5% or remission	2/944	38.3 (9.6-153.3)	.312
-5% to 5%	4/1022	71.6 (26.9-190.7)	.753
≥+5%	7/1468	97.8 (46.6-205.2)	ref
Fractures			
General population	1086/16 422	1244.6 (1172.7-1320.8)	.175
≤-5% or remission	48/927	986.1 (743.2-1308.6)	.458
-5% to 5%	64/1003	1263.8 (989.2-1614.7)	.194
≥+5%	76/1448	1145.4 (914.8-1434.1)	ref

Abbreviations: BMI, body mass index; CI, confidence interval; ref, reference.

eTable 6. HRs Based on Percentage Change in BMI (for Every 5% Decrease in BMI During Pediatric Obesity Treatment) for Each Outcome in Individuals Aged 12-17 Years at Treatment Initiation

Outcome	Unadjusted HR (95% CI)	P value	Adjusted HR ^a (95% CI)	P value
Type 2 diabetes	0.85 (0.78-0.91)	<.001	0.82 (0.75-0.89)	<.001
Hypertension	0.90 (0.83-0.95)	.001	0.90 (0.83-0.95)	.001
Dyslipidemia	0.88 (0.79-0.98)	.021	0.85 (0.76-0.96)	.010
Depression or anxiety	0.99 (0.97-1.01)	.421	0.98 (0.96-1.01)	.167
Bariatric surgery	0.94 (0.89-0.98)	.005	0.90 (0.86-0.95)	<.001
Mortality	0.84 (0.70-1.01)	.065	0.82 (0.67-1.00)	.048
Fractures	0.98 (0.93-1.03)	.392	0.99 (0.93-1.04)	.605

Abbreviations: BMI, body mass index; CI, confidence interval; HR, hazard ratio.

^aAdjusted for sex, socioeconomic position, migration background, age, and degree of obesity at treatment initiation. For fractures and depression or anxiety, the model was also adjusted for the corresponding outcome before 18 years of age.