

ECONOMIC COST OF EXCESS BODY WEIGHT AMONG ADULTS IN ESTONIA

Johann Saavaste, Aleksei Baburin, Mall Leinsalu, Rainer Reile

Department of Epidemiology and Biostatistics, National Institute for Health Development, Tallinn, Estonia

Cent Eur J Public Health 2026; 34 (2): 72–79

<https://doi.org/10.21101/cejph.a8761>

Data Sources

This study made use of individual-level survey data collected during the Estonian National Mental Health Study (10) in 2021. The treatment cost as a sum of the cost for medical services and related drug prescriptions involved medical bills and prescriptions data linked with the survey participants for the year 2020 from the Estonian Health Insurance Fund (EHIF). Since prescription data was missing the retail price of the drug purchased for some cases, data on the maximum price based on the ATC code from EHIF was used. Data on number of cases by primary diagnosis

code from EHIF was used to extrapolate the treatment costs across whole population. For sick leave and care benefits, publicly available data (11) from EHIF was used as an input.

Publicly available death statistics by ICD-10 code was gathered from the National Institute for Health Development (13). The average taxable income per person stratified by sex, which was the main factor in estimating the indirect costs, was calculated based on the net income derived from the Estonian Social Insurance Board data linked with the sample. Population data from the Statistics Estonia (12) was used to present the per capita costs for the results.

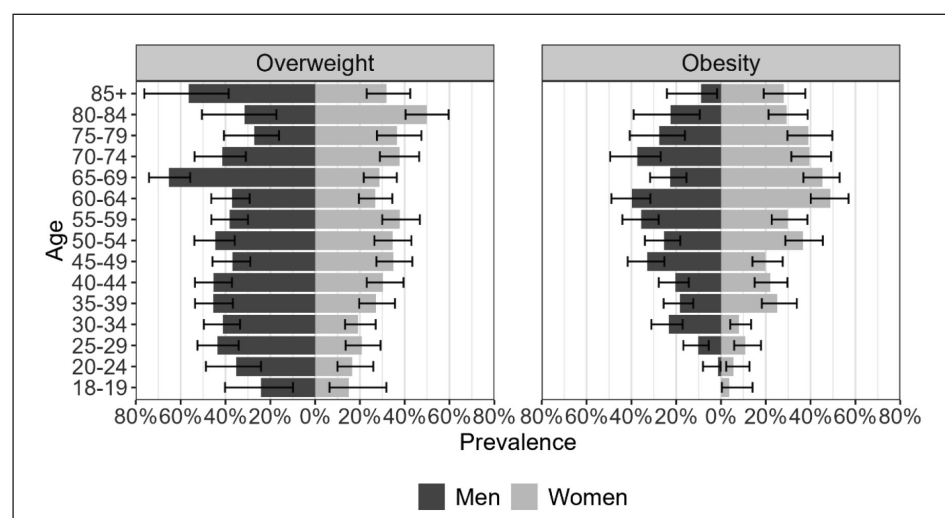


Fig. S1. Prevalence of overweight and obesity by sex and age group.

Table S1. Number of annual prevalent cases associated with excess body weight

Health condition	Overweight		Obesity	
	Total cases (n)	Per 100,000 adults	Total cases (n)	Per 100,000 adults
Cancers	1,270	118.47	1,517	141.50
Cardiovascular diseases	52,240	4,873.84	76,861	7,170.92
Musculoskeletal diseases and injuries	18,489	1,724.95	25,645	2,392.63
Non-insulin dependent (type 2) diabetes mellitus	25,918	2,418.11	37,966	3,542.17
Other diseases (excl. type 2 diabetes)	2,752	256.76	5,485	511.73
Total	100,669	9,392.13	147,474	13,758.95

Table S2. Annual costs of overweight for every associated disease

Health condition	PAF	Direct cost (EUR)	Indirect cost (EUR)	Total cost (EUR)
Cancers				
Oesophageal	10.0	279,466.68	36,616.31	316,082.99
Stomach	0.2	12,040.50	1,738.96	13,779.46
Colorectal	3.9	498,557.84	72,467.60	571,025.43
Liver	2.2	18,737.85	9,350.78	28,088.62
Gallbladder or biliary tract	7.4	84,970.64	3,664.46	88,635.10
Pancreas	2.7	114,004.11	21,867.97	135,872.08
Breast	2.3	278,472.05	54,044.71	332,516.77
Cervix	9.9	179,047.17	40,030.34	219,077.52
Uterus	12.2	374,459.06	44,289.47	418,748.53
Ovarian	1.2	36,286.03	7,802.54	44,088.56
Prostate	5.5	570,507.28	66,352.45	636,859.73
Kidney/renal	8.1	93,982.05	44,406.18	138,388.24
Thyroid gland	5.6	100,047.81	4,151.38	104,199.20
Non-Hodgkin lymphoma	4.7	235,405.26	25,487.09	260,892.35
Multiple myeloma	4.6	413,678.87	9,195.53	422,874.40
Leukaemia	3.6	131,500.37	19,439.64	150,940.01
Cardiovascular diseases				
Ischemic heart disease	10.3	2,786,891.77	574,859.73	3,361,751.50
Intracerebral haemorrhage	11.3	1,440,585.99	212,208.06	1,652,794.05
Ischaemic stroke	14.9	335,270.78	121,213.61	456,484.39
Hypertension	19.4	17,168,360.31	830,263.86	17,998,624.17
Pulmonary embolism	16.5	1,917,663.85	1,521.06	1,919,184.91
Musculoskeletal diseases and injuries				
Arthrosis	22.9	5,010,914.02	1,779,404.66	6,790,318.67
Gout	0.0	0.00	0.00	0.00
Back pain	3.3	466,791.71	577,734.95	1,044,526.65
Other diseases				
Non-insulin dependent (type 2) diabetes	20.8	11,018,541.21	156,405.97	11,174,947.17
Asthma	6.5	344,069.12	31,229.05	375,298.17
Chronic kidney disease	14.4	867,226.26	11,727.75	878,954.01
Cholelithiasis	7.2	434,562.20	61,067.54	495,629.73
Depression	4.6	154,799.33	132,192.82	286,992.15
Total		45,366,840.11	4,950,734.47	50,317,574.58

Table S3. Annual costs of obesity for every associated disease

Health condition	PAF (%)	Direct cost (EUR)	Indirect cost (EUR)	Total cost (EUR)
Cancers				
Oesophageal	14.7	409,033.65	53,592.45	462,626.09
Stomach	6.2	440,568.73	63,629.46	504,198.18
Colorectal	5.6	714,498.25	103,855.49	818,353.74
Liver	14.3	118,842.23	59,306.02	178,148.25
Gallbladder or biliary tract	10.8	124,364.91	5,363.39	129,728.30
Pancreas	3.9	166,858.96	32,006.44	198,865.40
Breast	3.4	411,868.30	79,933.71	491,802.01
Cervix	5.4	98,635.92	22,052.46	120,688.38
Uterus	22.4	687,231.42	81,282.90	768,514.32
Ovarian	2.2	66,053.04	14,203.30	80,256.34
Prostate	1.1	117,375.14	13,651.23	131,026.38
Kidney/renal	11.8	137,554.22	64,993.88	202,548.10
Thyroid gland	8.1	144,398.43	5,991.67	150,390.09
Non-Hodgkin lymphoma	8.7	436,422.87	47,251.07	483,673.94
Multiple myeloma	10.2	918,295.56	20,412.49	938,708.04
Leukaemia	5.2	188,092.62	27,805.65	215,898.27
Cardiovascular diseases				
Ischaemic heart disease	15.1	4,100,201.35	845,759.66	4,945,961.01
Intracerebral haemorrhage	16.5	2,108,473.69	310,592.44	2,419,066.13
Ischaemic stroke	21.7	489,584.28	121,213.61	666,588.32
Hypertension	28.4	25,115,854.85	1,214,605.61	26,330,460.45
Pulmonary embolism	33.2	3,870,827.47	3,070.28	3,873,897.74
Musculoskeletal diseases and injuries				
Arthrosis	27.3	5,958,944.22	2,116,055.69	8,074,999.91
Gout	18.8	308,747.94	86,716.90	395,464.85
Back pain	4.8	683,206.72	845,585.72	1,528,792.44
Other diseases				
Non-insulin dependent (type 2) diabetes	30.5	16,140,556.87	229,111.94	16,369,668.81
Asthma	12.8	677,045.04	61,451.23	738,496.28
Chronic kidney disease	21.1	1,267,254.25	17,137.44	1,284,391.69
Cholelithiasis	17.4	1,050,057.61	147,561.00	1,197,618.61
Depression	10.9	370,060.65	316,017.91	686,078.56
Total		67,320,909.19	7,066,001.44	74,386,910.63