

Supplement

S1: Unit costs

Cost category	Unit	Price per unit (2011)
Direct costs		
General practitioner	Per contact	€ 20.06
Internist	Per contact	€ 65.44
Gynaecologist	Per contact	€ 30.13
Ophthalmologist	Per contact	€ 34.78
Orthopaedist	Per contact	€ 25.42
Otolaryngologist	Per contact	€ 26.40
Psychiatrist/ Neurologist	Per contact	€ 44.72
Psychologist/ Psychotherapist	Per contact	€ 78.08
Surgeon	Per contact	€ 43.39
Dermatologist	Per contact	€ 18.89
Urologist	Per contact	€ 24.70
Paediatrician	Per contact	€ 34.34
Radiologist	Per contact	€ 80.59 ¹
Anaesthetist	Per contact	€ 56.04 ¹
Dentist	Per contact	€ 55.87
Other physicians	Per contact	€ 40.06 ²
Outpatient clinic	Per contact	€ 40.06 ²
Speech-language pathologist	Per contact	€ 38.59
Occupational therapist	Per contact	€ 37.51
Physiotherapy, manual therapy, massage	Per contact	€ 16.42
Other medical specialists	Per contact	€ 19.98 ²
Outpatient rehabilitation	Per day	€ 46.68
Inpatient rehabilitation	Per day	€ 121.85
Hospital	Per day	€ 593.04
Indirect costs		
Average wage rate	Per hour	€ 27.88

Sources: Direct costs, if not otherwise specified: Bock et al 2015; indirect costs: Statistisches Bundesamt 2012, 2014.

¹ internal database

² arithmetic mean of all other unit costs within the same cost category

S2: Health care service utilization items from the DEGS questionnaire

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Healthcare services you have used

7 When was the last time you went to see a doctor (not a dentist) or made use of his/her staff's services?

During the last 4 weeks.....

Between 1 and 3 months ago

Between 4 and 12 months ago

Between 12 months and 5 years ago.....

More than 5 years ago

8 Do you have a family doctor you consult first when you have a health problem?

Yes.....

No

9 Please state how many times in the last 12 months you have seen a doctor practising in the following fields.
Please include house calls.

	Yes	Number of times
General practitioner	<input type="radio"/>	<input type="text"/> <input type="text"/>
Internist (e. g. cardiologist, pneumologist, diabetologist)	<input type="radio"/>	<input type="text"/> <input type="text"/>
Gynaecologist	<input type="radio"/>	<input type="text"/> <input type="text"/>
Eye specialist (Ophthalmologist)	<input type="radio"/>	<input type="text"/> <input type="text"/>
Orthopaedist	<input type="radio"/>	<input type="text"/> <input type="text"/>
Ear-nose-throat specialist	<input type="radio"/>	<input type="text"/> <input type="text"/>
Psychiatrist, neurologist.....	<input type="radio"/>	<input type="text"/> <input type="text"/>
Practising psychotherapist.....	<input type="radio"/>	<input type="text"/> <input type="text"/>
Surgeon	<input type="radio"/>	<input type="text"/> <input type="text"/>
Dermatologist.....	<input type="radio"/>	<input type="text"/> <input type="text"/>
Radiologist.....	<input type="radio"/>	<input type="text"/> <input type="text"/>
Urologist.....	<input type="radio"/>	<input type="text"/> <input type="text"/>
Other specialist,	<input type="radio"/>	<input type="text"/> <input type="text"/>
please specify (not including therapists): <input type="text"/>		
Dentist, orthodontist.....	<input type="radio"/>	<input type="text"/> <input type="text"/>
I have not seen a doctor in the last 12 months.	<input type="radio"/>	

Healthcare services you have used

10 Have you been to a hospital emergency or outpatients department or a medical treatment centre in the last 12 months?
Not including overnight stays.

Yes No ➔ Please proceed to question 11

↓

If yes, how many times?

11 Have you received medical advice about your health in the last 12 months?

Yes No ➔ Please proceed to question 12

↓

If yes, was it about...
You can cross as many boxes as you wish.

- ...your eating habits?
- ...your weight?
- ...your sporting activities?
- ...your smoking?
- ...your immunisations?
- ...your alcohol intake?
- ...coping with stress?
- ...your dental hygiene?
- ...your general personal circumstances?
- ...your career situation?
- ...your use of drugs?
- ...your sex habits?
- ...something else?

Please specify:

Healthcare services you have used

12 Which of the following kinds of therapists (excluding psychotherapists) have you seen in the last 12 months and how many times?

	Yes	Number of times
Alternative medicine practitioner	<input type="radio"/>	<input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/>
Physiotherapist.....	<input type="radio"/>	<input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/>
Other.....	<input type="radio"/>	<input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/>
Please specify: <input style="width: 450px; height: 20px;" type="text"/>		
I have not seen a therapist in the last 12 months.		<input type="radio"/>

13 How many days altogether in the last 12 months have you been so ill that you have not been able to get on with your normal life?

Please include any days spent in hospital.

Approx. days

None

14 If you are employed, how many working days in the last 12 months have you been officially off work sick?

Please include any days spent in hospital.

Approx. working days

None

Not applicable

Healthcare services you have used

15 How many nights in the last 12 months have you spent as an inpatient in hospital?

Approx. nights

None

16 Have you had any rehabilitation treatment (as an in- or outpatient) in the last 3 years?
This refers to rehabilitation measures and follow-up treatments approved by your health, pension or accident insurance.

Yes No ➔ Please proceed to question 17

⬇

If yes, when was the last time (year)?

⬇

Were you treated as an:

Outpatient ("day clinic")

Inpatient

S3: Overview of excluded observations

Reasons for excluding observations	Amount of excluded observations
Missing values in the diagnosis of depression	n=97
Observations with depressive symptoms in the control group	n=822
Missing values in the costs (utilization of health care services and productivity losses)	n=1740
Missing values in the social subgroups	n=183
Missing values in the covariates for the group adjustment	n=546

S4: Estimated median annual costs of individuals with medically diagnosed depression (12-month prevalence) compared to individuals without medically diagnosed depression (in Euro, 2019)

Cost category	Depression (N=223)		Control (N=223)	
	Median	IQR	Median	IQR
Total costs	2800.3	12165.0	1322.3	3335.1
Direct costs	1608.3	3697.0	732.3	1491.9
Outpatient costs	661.9	1036.3	381.0	478.4
<i>Physicians</i>	<i>549.1</i>	<i>791.7</i>	<i>322.8</i>	<i>367.8</i>
<i>Psychiatrist/Neurologist</i>	<i>0</i>	<i>148.3</i>	<i>0</i>	<i>0</i>
<i>Psychotherapist</i>	<i>0</i>	<i>259.0</i>	<i>0</i>	<i>0</i>
<i>General practitioner</i>	<i>88.7</i>	<i>88.7</i>	<i>66.5</i>	<i>88.7</i>
<i>Other physicians</i>	<i>249.5</i>	<i>304.1</i>	<i>238.1</i>	<i>295.6</i>
<i>Non-physicians</i>	<i>0</i>	<i>108.9</i>	<i>0</i>	<i>88.4</i>
<i>Outpatient clinic</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Outpatient rehabilitation</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Inpatient costs	0	0	0	0
<i>Hospital</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Inpatient rehabilitation</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Medication costs	342.0	673.6	178.0	523.0
Indirect costs	0	3698.9	0	1331.6
Early retirement	0	0	0	0
Sick leave	0	1233.0	0	863.1

n=4540 observations in the control group were down weighted in order to match the group of individuals with depression.

S5: Sociodemographic determinants of annual excess costs of individuals with medically diagnosed depression (12-month prevalence) compared to individuals without medically diagnosed depression (in Euro, 2019)

Sociodemographic determinants	Sample size ¹	Depression	Control	Excess costs		
		Mean (SE)	Mean (SE)	Absolute Difference [95%-CI]	p-value	Relative Difference ² [95%-CI]
Total costs						
Sex						
Male	71	8392 (1443)	5758 (921)	2635 [-720 - 5990]	0.124	1.5 [0.9 - 2.3]
Female	152	10074 (1116)	3907 (294)	6167 [3904 - 8429]	<0.001	2.6 [2.0 - 3.4]
Age (by age group)						
18-29	24	9770 (3098)	1815 (214)	7955 [1868 - 14042]	0.010	5.4 [2.8 - 10.4]
30-44	34	13213 (3308)	3654 (698)	9560 [2933 - 16187]	0.005	3.6 [2.0 - 6.7]
45-64	122	9790 (1084)	5857 (513)	3932 [1582 - 6282]	0.001	1.7 [1.3 - 2.2]
65+	43	5791 (1209)	3624 (516)	2168 [-408 - 4743]	0.099	1.6 [1.0 - 2.6]
Partner						
No	69	9509 (1409)	4978 (810)	4530 [1346 - 7715]	0.005	1.9 [1.2 - 2.9]
Yes	154	9552 (1124)	4414 (332)	5138 [2841 - 7436]	<0.001	2.2 [1.6 - 2.8]
Socioeconomic status						
Low	43	8673 (1527)	3278 (478)	5395 [2259 - 8530]	0.001	2.6 [1.7 - 4.1]
Medium	137	10179 (1223)	5025 (443)	5154 [2605 - 7703]	<0.001	2.0 [1.5 - 2.7]
High	43	8365 (1933)	3717 (478)	4648 [745 - 8550]	0.020	2.3 [1.3 - 3.8]
Social Support						
Low	48	13608 (2430)	8454 (3492)	5154 [-3184 - 13492]	0.226	1.6 [0.7 - 3.9]
Moderate/High	175	8422 (900)	4193 (252)	4230 [2397 - 6062]	<0.001	2.0 [1.6 - 2.6]
First-generation/second-generation migrants						
No	181	10447 (1044)	4719 (367)	5729 [3559 - 7899]	<0.001	2.2 [1.7 - 2.8]
Yes	42	5622 (1277)	3801 (1007)	1820 [-1367 - 5008]	0.263	1.5 [0.7 - 2.9]
Direct costs						
Sex						
Male	71	3978 (925)	2426 (311)	1552 [-360 - 3464]	0.112	1.6 [1.0 - 2.8]
Female	152	4641 (694)	2022 (156)	2619 [1225 - 4012]	<0.001	2.3 [1.7 - 3.2]
Age (by age group)						
18-29	24	4968 (1917)	1032 (144)	3936 [169 - 7704]	0.041	4.8 [2.2 - 10.8]
30-44	34	6128 (2187)	1309 (214)	4819 [512 - 9126]	0.028	4.7 [2.2 - 10.1]
45-64	122	3404 (569)	2162 (220)	1242 [47 - 2437]	0.042	1.6 [1.1 - 2.3]
65+	43	5697 (1208)	3598 (516)	2099 [-475 - 4674]	0.110	1.6 [1.0 - 2.6]
Partner						

		Depression	Control	Excess costs		
Sociodemographic determinants	Sample size ¹	Mean (SE)	Mean (SE)	Absolute Difference [95%-CI]	p-value	Relative Difference ² [95%-CI]
No	69	4827 (976)	2159 (290)	2667 [673 - 4662]	0.009	2.2 [1.4 - 3.6]
Yes	154	4252 (678)	2117 (164)	2135 [767 - 3503]	0.002	2.0 [1.4 - 2.8]
Socioeconomic status						
Low	43	4711 (1086)	1586 (195)	3126 [964 - 5288]	0.005	3.0 [1.8 - 5.0]
Medium	137	4403 (731)	2360 (218)	2043 [548 - 3538]	0.007	1.9 [1.3 - 2.7]
High	43	4236 (1324)	2203 (299)	2033 [-626 - 4693]	0.134	1.9 [1.0 - 3.7]
Social Support						
Low	48	5803 (1582)	3787 (1498)	2015 [-2255 - 6286]	0.355	1.5 [0.6 - 3.9]
Moderate/High	175	4054 (559)	2099 (128)	1954 [830 - 3079]	0.001	1.9 [1.4 - 2.6]
First-generation/second-generation migrants						
No	181	4659 (658)	2229 (160)	2430 [1104 - 3757]	<0.001	2.1 [1.5 - 2.9]
Yes	42	3441 (833)	2268 (750)	1174 [-1023 - 3370]	0.295	1.5 [0.7 - 3.4]
Indirect costs						
Sex						
Male	71	4415 (1062)	3332 (660)	1083 [-1368 - 3533]	0.387	1.3 [0.7 - 2.4]
Female	152	5433 (757)	1885 (197)	3548 [2014 - 5082]	<0.001	2.9 [2.0 - 4.1]
Age (by age group)						
18-29	24	4802 (2168)	783 (114)	4019 [-235 - 8273]	0.064	6.1 [2.4 - 15.5]
30-44	34	7085 (1716)	2345 (544)	4741 [1211 - 8270]	0.008	3.0 [1.6 - 5.8]
45-64	122	6385 (877)	3695 (370)	2690 [824 - 4556]	0.005	1.7 [1.2 - 2.4]
65+	43	94 (79)	26 (14)	68 [-89 - 226]	0.393	3.7 [0.5 - 25.8]
Partner						
No	69	4682 (1110)	2819 (648)	1863 [-656 - 4382]	0.147	1.7 [0.9 - 3.2]
Yes	154	5300 (743)	2296 (205)	3003 [1492 - 4515]	<0.001	2.3 [1.7 - 3.2]
Socioeconomic status						
Low	43	3962 (1221)	1693 (377)	2269 [-235 - 4773]	0.076	2.3 [1.1 - 4.9]
Medium	137	5776 (826)	2665 (294)	3111 [1393 - 4829]	<0.001	2.2 [1.5 - 3.1]
High	43	4129 (1331)	1515 (407)	2614 [-114 - 5343]	0.060	2.7 [1.2 - 6.2]
Social Support						
Low	48	7805 (1393)	4666 (2075)	3139 [-1760 - 8037]	0.209	1.7 [0.7 - 4.3]
Moderate/High	175	4369 (678)	2093 (183)	2276 [899 - 3652]	0.001	2.1 [1.5 - 3.0]
First-generation/second-generation migrants						
No	181	5788 (727)	2490 (255)	3298 [1789 - 4808]	<0.001	2.3 [1.7 - 3.2]
Yes	42	2180 (838)	1534 (479)	647 [-1246 - 2539]	0.503	1.4 [0.5 - 3.8]

SE – robust standard error

95%-CI – 95% confidence Intervals

¹ Observations in the control group were down weighted in order to match the group of individuals with depression.

² Exponentiated coefficients and corresponding confidence intervals.

Weighted covariates using entropy balancing: Age³, sex⁴, marital status⁵, income⁶, community size, physicians density, recognized disability, body mass index, contraceptive pill use, smoker status, use of vision aids, arthrosis/degenerative joint disease, cancer, chronic inflammatory bowel disease, diabetes, epilepsy, gastroduodenal ulcer, hypertension, joint pain, migraine, thyroid disease, not specified other diseases.

³The covariate “sex” was removed from the sex subgroups.

⁴The covariate “age” was removed from the age subgroups.

⁵The covariate “marital status” was removed from the partnership subgroups.

⁶The covariate “income” was removed from the SES subgroups.

S6: Sensitivity analyses

Annual excess costs of individuals with diagnosed depression (12-month prevalence) compared to individuals without depression (in Euro, 2019):

Model 1): Different assessment of indirect costs: Productivity was stratified by full time/part time or marginal part-time work and by age, gender and education (instead of total average).

Model 2): Unweighted analysis: Without balancing differences between depression and control group in social and clinical covariates.

Annual excess costs of individuals with depressive symptoms (PHQ-9 ≥ 10) compared to individuals without current depressive symptoms (in Euro, 2019):

Model 3): Weighted using entropy balancing with the covariates from the main analysis (in reprocessed dataset).

Model 4): Weighted using entropy balancing with new covariates (in reprocessed dataset; same selection process as before, resulting in inclusion of the following covariates in the balancing scheme: *Age, sex, education, income, marital status, community size, region, physicians density, recognized disability, body mass index, contraceptive pill use, use of hearing aids, physical activity, smoker status, use of vision aids, arthrosis/degenerative joint disease, bladder weakness, cancer, chronic inflammatory bowel disease, diabetes, epilepsy, hepatic cirrhosis, hepatitis, hypertension, injury/poisoning, joint pain, kidney failure, migraine, prostate hyperplasia, rheumatoid arthritis, thyroid disease, not specified other diseases.*

Model 5): Unweighted analysis (in reprocessed dataset).

Absolute difference in means

Dataset:	Dataset from main analysis			Reprocessed datasets		
Depression identifier:	Depression (12-month-prevalence)			Depressive symptoms (PHQ-9 ≥10)		
Cost category	Main analysis	Model 1) ¹	Model 2) ²	Model 3) ³	Model 4) ⁴	Model 5) ⁵
Total costs	5047***	4750***	6850***	3750***	3594***	4902***
Direct costs	2212***	2212***	3043***	1978***	1944***	2483***
Outpatient costs	498***	498***	651***	335***	327***	440***
Physicians	465***	465***	579***	271***	267***	350***
Psychiatrist/Neurologist	103***	103***	107***	43***	40***	46***
Psychotherapist	317***	317***	322***	151***	151***	157***
General practitioner	30***	30***	49***	33**	32***	52***
Other physicians	16	16	100***	44*	45*	96***
Non-physicians	32	32	63***	5	1	23*
Outpatient clinic	8	8	14	60	59	64
Outpatient rehabilitation	-8	-8	-5	-1	-0	3
Inpatient costs	1345**	1345**	1804***	1327*	1292*	1619**
Hospital	1285**	1285**	1650***	1276*	1245*	1509**
Inpatient rehabilitation	59	59	154*	51	48	110*
Medication costs	370	370	589	316	325	424
Indirect costs	2835***	2538***	3807***	1772***	1650***	2418***
Early retirement	1686***	1517**	2252***	1077**	1008**	1334***
Sick leave	1149*	1021*	1555***	695*	642	1084***

Significance level: * for p<.05, ** for p<.01, and *** for p<.001

¹ Model 1): Different assessment of indirect costs: Productivity was stratified by full time/part time or marginal part-time work and by age, gender and education (instead of total average).

² Model 2): Unweighted analysis: Without balancing differences between depression and control group in social and clinical covariates.

³ Model 3): Depression identifier: PHQ-9 ≥10. Weighted analysis using entropy balancing with the covariates from the main analysis.

⁴ Model 4): Depression identifier: PHQ-9 ≥10. Weighted analysis using entropy balancing with newly selected covariates.

⁵ Model 5): Depression identifier: PHQ-9 ≥10. Unweighted analysis.

Relative difference in means

Dataset:	Dataset from main analysis			Reprocessed datasets		
Depression identifier:	Depression (12-month-prevalence)			Depressive symptoms (PHQ-9 ≥ 10)		
Cost category	Main analysis	Model 1) ¹	Model 2) ²	Model 3) ³	Model 4) ⁴	Model 5) ⁵
Total costs	2.1***	2.1***	3.5***	2***	1.9***	2.8***
Direct costs	2***	2***	3.2***	2***	2***	2.8***
Outpatient costs	1.9***	1.9***	2.6***	1.7***	1.6***	2.1***
Physicians	2.1***	2.1***	2.8***	1.7***	1.7***	2.1***
Psychiatrist/Neurologist	11.2***	11.2***	22.4***	6.4***	5.4***	10.2***
Psychotherapist	16.1***	16.1***	21.1***	7.9***	7.8***	10.8***
General practitioner	1.3***	1.3***	1.8***	1.4**	1.4***	1.8***
Other physicians	1	1	1.4***	1.2*	1.2*	1.4***
Non-physicians	1.4	1.4	2.3***	1.1	1	1.5*
Outpatient clinic	1.4	1.4	2.2	4.8	4.4	6.3
Outpatient rehabilitation	0.5	0.5	0.6	0.9	1	1.3
Inpatient costs	2.2**	2.2**	3.7***	2.4*	2.4*	3.5**
Hospital	2.3**	2.3**	3.8***	2.5*	2.6*	3.5**
Inpatient rehabilitation	1.4	1.4	3.4*	1.4	1.4	2.7*
Medication costs	1.7	1.7	2.8	1.7	1.8	2.3
Indirect costs	2.2***	2.1***	3.9***	1.9***	1.8***	2.9***
Early retirement	2.8***	2.6**	7.5***	2.8**	2.6**	4.9***
Sick leave	1.8*	1.8*	2.6***	1.5*	1.5	2.1***

Significance level: * for $p < .05$, ** for $p < .01$, and *** for $p < .001$

¹ Model 1): Different assessment of indirect costs: Productivity was stratified by full time/part time or marginal part-time work and by age, gender and education (instead of total average).

² Model 2): Unweighted analysis: Without balancing differences between depression and control group in social and clinical covariates.

³ Model 3): Depression identifier: PHQ-9 ≥ 10 . Weighted analysis using entropy balancing with the covariates from the main analysis.

⁴ Model 4): Depression identifier: PHQ-9 ≥ 10 . Weighted analysis using entropy balancing with newly selected covariates.

⁵ Model 5): Depression identifier: PHQ-9 ≥ 10 . Unweighted analysis.