

## **Online supplements**

Table S1. Unit costs

Table S2. Baseline characteristics of caregivers (N=224)

Figure S1. Distribution of per capita annual cost (N=695)

Table S3. Association between agitation symptoms and per capita annual cost: adjusted analyses, full results (N=695)

Table S4. Calculation of excess costs associated with agitation in people with Alzheimer's disease

**Table S1. Unit costs**

<b>Cost component</b>	<b>Unit cost<sup>a</sup></b>	<b>Unit</b>	<b>Reference</b>
General Practitioner (GP)	36	Per surgery consultation	17
Practice nurse/District nurse	60	Per hour	17
Dietician	35	Per hour	17
Community psychiatric nurse	50	Per hour	17
Occupational therapist	82	Per hour	17
Home help	27	Per hour	17
Meals on wheels	6.	Per meal	17
Physiotherapist	34	Per hour	17
Chiropodist	31	Per hour	17
Optician	57	Per contact	18
Dentist	92	Per contact	18
Audiologist	67	Per contact	18
Psychiatrist	418	Per contact	17
Psychologist	135	Per hour	17
Day centre	34	Per visit	17
Hospital outpatient visit	100	Per visit	17
Hospital inpatient stay	321	Per day	17
Residential respite care	105	Per overnight stay	17
Day respite care	96	Per day	17
Residential care home	519	Per week	17
Nursing care home	741	Per week	17
Sheltered housing	155	Per week	17
Hospital awaiting placement	321	Per day	17

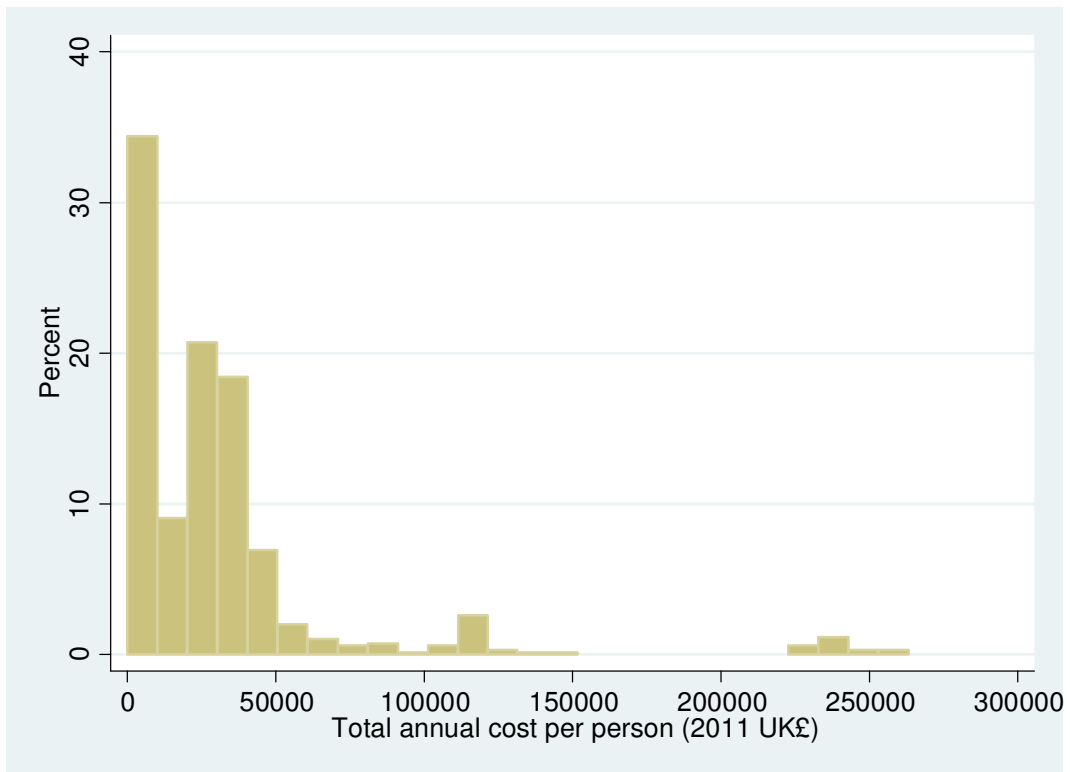
<sup>a</sup>2011 UK£.

**Table S2. Baseline characteristics of caregivers (N=224)**

Characteristic	Baseline value (N=224)
Age (years)	
Mean (SD)	63 (14)
Gender (%)	
Male	31
Female	69
Marital status (%)	
Single/unmarried	9
Married	69
Co-habiting	2
Widowed	5
Separated/divorced	7
Not known	8
Number of children at home (%)	
0	75
1	8
2	7
3	2
4	1
Not known	7
Living with person with AD (%)	
Yes	56
No	43
Not known	1
Relationship to person with AD (%)	
Husband/partner	17
Wife/partner	20
Child	35
Friend	4
Other relative	9
Paid carer	14

Abbreviation: AD, Alzheimer's disease

**Figure S1. Distribution of per capita annual cost (N=695)**



Tests for normality: Shapiro–Wilk normality test:  $P < 0.01$ . Shapiro–Francia normality test:  $P < 0.01$ .

**Table S3. Association between agitation symptoms and per capita annual cost<sup>a</sup>: adjusted analyses, full results (N=695)**

	Adjusted mean (95% CI)		
<b>NPI agitation scores</b>			
0	28 983	( 24 364 to 33 603 )	
1	43 910	( 30 618 to 57 203 )	
2	31 196	( 22 903 to 39 490 )	
3	35 120	( 25 592 to 44 648 )	
4	35 458	( 26 843 to 44 074 )	
6	25 138	( 17 918 to 32 358 )	
8	36 568	( 25 590 to 47 545 )	
9	38 568	( 11 867 to 65 269 )	
12	57 023	( 31 861 to 82 186 )	
<i>P</i> value	0.01		
<b>Gender*age category (years)</b>			
Male*60-69	106 172	( 22 527 to 189 816 )	
Male*70-79	20 838	( 14 560 to 27 116 )	
Male*80-89	27 740	( 18 508 to 36 971 )	
Male*90-99	37 134	( 9778 to 64 490 )	
Female*50-59	58 633	( -23 297 to 140 563 )	
Female*60-69	20 663	( 8848 to 32 477 )	
Female*70-79	30 443	( 22 400 to 38 487 )	
Female*80-89	43 813	( 34 943 to 52 683 )	
Female*90-99	36 165	( 23 067 to 49 264 )	
<i>P</i> value	<0.001		
<b>Marital status</b>			
Single	61 977	( 32 527 to 91 427 )	
Married	22 821	( 18 359 to 27 283 )	
Separated	33 384	( 6357 to 60 411 )	
Divorced	28 087	( 13 377 to 42 797 )	
Widower	36 598	( 30 183 to 43 013 )	
Other	72 443	( 14 808 to 130 077 )	
<i>P</i> value	0.002		
<b>Ethnic group</b>			
White British	31 901	( 27 905 to 35 896 )	
White Irish	28 072	( 16 285 to 39 859 )	
White other	37 326	( 23 133 to 51 518 )	
Greek	2763	( -960 to 6486 )	
Black Caribbean	59 761	( 25 301 to 94 220 )	
Black other	35 488	( -912 to 71 888 )	
Indian	4226	( 166 to 8286 )	
Pakistani	63 600	( 23 645 to 103 556 )	
Other	39 098	( 14 420 to 63 776 )	
<i>P</i> value	<0.001		
<b>Highest level of education</b>			
Primary	32 855	( 3512 to 62 198 )	
Secondary	33 992	( 29 155 to 38 829 )	
Tertiary	36 291	( 16 018 to 56 565 )	
Other	3136	( 1207 to 5065 )	
Not known	22 863	( 17 604 to 28 122 )	
<i>P</i> value	<0.001		
<b>Previous employment</b>			
Manager/Administrator	39 121	( 20 144 to 58 098 )	
Professional	21 740	( 12 042 to 31 438 )	
Associate professional	28 380	( 9253 to 47 507 )	
Clerical worker/Secretary	33 826	( 25 944 to 41 708 )	
Skilled labourer	31 487	( 23 055 to 39 918 )	

Services/Sales	38 584	( 28 147 to 49 020 )
Factory worker	27 280	( 17 251 to 37 310 )
Other	35 395	( 21 644 to 49 146 )
Don't know	40 168	( 7614 to 72 723 )
<i>P</i> value	0.37	
Rurality		
Urban	33 298	( 29 453 to 37 143 )
Rural	22 908	( 13 076 to 32 739 )
<i>P</i> value	0.10	
Diabetes		
No	32 531	( 28 909 to 36 152 )
Yes: IDDM	31 176	( 10 046 to 52 307 )
Yes: NIDDM – medically controlled	30 498	( 17 161 to 43 835 )
Yes: NIDDM – diet controlled	62 095	( 19 912 to 104 278 )
<i>P</i> value	0.26	
Stroke		
No	32 006	( 28 266 to 35 747 )
Yes	38 756	( 25 394 to 52 118 )
<i>P</i> value	0.30	
Hypertension		
No	33 479	( 28 254 to 38 704 )
Yes	30 746	( 24 510 to 36 982 )
<i>P</i> value	0.55	
Heart disease		
No	32 346	( 28 739 to 35 953 )
Yes	36 216	( 19 148 to 53 285 )
<i>P</i> value	0.64	
Total NPI score		
0	23 593	( 13 823 to 33 363 )
1	15 907	( 8882 to 22 932 )
2	22 190	( 11 085 to 33 294 )
3	24 164	( 12 457 to 35 871 )
4	46 735	( 28 502 to 64 969 )
5	30 567	( 14 160 to 46 974 )
6	22 628	( 10 565 to 34 690 )
7	40 133	( 16 714 to 63 552 )
8	35 762	( 24 854 to 46 671 )
9	27 722	( 18 587 to 36 857 )
10	50 437	( 27 556 to 73 318 )
11	43 285	( 20 729 to 65 841 )
12	35 797	( 25 150 to 46 444 )
13	39 215	( 20 201 to 58 229 )
14	37 723	( 21 893 to 53 554 )
15	23 841	( 17 017 to 30 665 )
16	34 838	( 22 421 to 47 255 )
17	21 277	( 9213 to 33 341 )
18	31 299	( 17 852 to 44 745 )
19	23 970	( 16 782 to 31 157 )
20	55 337	( 20 991 to 89 682 )
21	28 149	( 17 217 to 39 081 )
22	40 379	( 22 795 to 57 964 )
23	56 096	( 30 241 to 81 951 )
24	13 821	( 7610 to 20 032 )
25	18 446	( 10 328 to 26 563 )
26	18 959	( 2224 to 35 693 )
27	40 681	( 5711 to 75 651 )
28	29 549	( 13 015 to 46 083 )
29	43 221	( 20 283 to 66 159 )

30	20 897	( 9537	to	32 256	)
31	46 870	( -868	to	94 608	)
32	24 717	( 15 551	to	33 884	)
33	23 252	( 4477	to	42 027	)
34	32 839	( 862	to	64 816	)
35	18 022	( 2413	to	33 632	)
36	45 720	( -12 125	to	103 564	)
37	14 944	( 5308	to	24 579	)
38	36 810	( 23 078	to	50 542	)
39	20 524	( 6476	to	34 572	)
40	22 872	( 14 496	to	31 248	)
41	12 418	( 1653	to	23 183	)
42	42 246	( 7638	to	76 854	)
43	38 972	( 4391	to	73 552	)
44	91 489	( 50 078	to	132 900	)
45	35 315	( 11 478	to	59 153	)
46	86 883	( 7744	to	166 022	)
47	32 128	( -5314	to	69 569	)
48	27 034	( 10 312	to	43 757	)
49	25 890	( 7565	to	44 215	)
50	36 616	( 40	to	73 192	)
51	15 263	( 6986	to	23 540	)
52	24 059	( 1751	to	46 368	)
53	21 026	( 5762	to	36 291	)
54	14 641	( 5653	to	23 629	)
57	169 936	( -24 228	to	364 099	)
59	54 625	( 28 475	to	80 775	)
60	29 625	( 16 477	to	42 773	)
61	30 444	( -27 798	to	88 685	)
64	1673	( 672	to	2674	)
65	1725	( 531	to	2918	)
66	24 912	( 9101	to	40 722	)
67	52 075	( 13 525	to	90 626	)
69	47 684	( -5887	to	101 256	)
79	7651	( 1391	to	13 910	)
82	7435	( 1774	to	13 096	)
<i>P</i> value	<0.001				
MMSE score					
0	70 323	( 54 271	to	86 375	)
1	39 663	( 26 441	to	52 885	)
2	36 960	( 20 551	to	53 370	)
3	45 878	( 25 791	to	65 964	)
4	30 985	( 14 793	to	47 177	)
5	53 935	( 25 859	to	82 010	)
6	39 690	( 16 784	to	62 596	)
7	22 396	( 15 634	to	29 158	)
8	64 027	( 35 175	to	92 878	)
9	35 884	( 16 215	to	55 553	)
10	15 640	( 5322	to	25 958	)
11	23 619	( 13 114	to	34 124	)
12	30 401	( 18 028	to	42 775	)
13	20 569	( 12 682	to	28 456	)
14	14 157	( 6889	to	21 424	)
15	27 900	( 16 776	to	39 024	)
16	24 417	( 14 756	to	34 078	)
17	20 616	( 13 845	to	27 387	)
18	31 333	( 19 682	to	42 984	)
19	11 466	( 5544	to	17 388	)

20	18 803 ( 10 219 to 27 388 )
21	15 315 ( 9553 to 21 078 )
22	15 672 ( 9053 to 22 291 )
23	6427 ( 3235 to 9618 )
24	9784 ( 5026 to 14 542 )
25	7937 ( 3633 to 12 242 )
26	6250 ( 3165 to 9334 )
27	2901 ( 1308 to 4493 )
28	9377 ( 4141 to 14 612 )
29	11 295 ( 3436 to 19 155 )
30	2931 ( 1413 to 4449 )
<i>P</i> value	<0.001
Follow-up	
Baseline	35 161 ( 28 575 to 41 748 )
18 months	34 223 ( 28 028 to 40 418 )
30 months	31 898 ( 26 252 to 37 544 )
42 months	31 045 ( 25 696 to 36 395 )
54 months	29 432 ( 23 358 to 35 507 )
<i>P</i> value	0.78

Abbreviations: NPI, Neuropsychiatric Inventory; IDDM, insulin dependent diabetes mellitus; NIDDM, non-insulin dependent diabetes mellitus; MMSE, mini-mental state examination; CI, confidence interval. ©2011 UK£.



**Table S4. Calculation of excess costs associated with agitation in people with Alzheimer’s disease**

<b>NPI agitation score</b>	<b>Percent observations across N=695</b>	<b>Adjustment mean per capita annual cost<sup>a</sup></b>
0	45.2	28 983
1	9.8	43 910
2	8.6	31 196
3	7.3	35 120
4	8.6	35 458
6	8.2	25 138
8	6.5	36 568
9	1.7	38 568
12	4.0	57 023

Abbreviations: NPI, Neuropsychiatric Inventory. <sup>a</sup> 2011 UK£.

Annual expected cost per person with AD based on percent with each NPI agitation score =  $45.2\% \times \pounds 28\,983 + 9.8\% \times \pounds 43\,910 + 8.6\% \times \pounds 31\,196 + 7.3\% \times \pounds 35\,120 + 8.6\% \times \pounds 35\,458 + 8.2\% \times \pounds 25\,138 + 6.5\% \times \pounds 36\,568 + 1.7\% \times \pounds 38\,568 + 4.0\% \times \pounds 57\,023 = \pounds 33\,075$

Annual cost per person with AD with no agitation symptoms (NPI agitation score =0) =  $\pounds 28\,983$ .

Mean excess cost associated with agitation per person with AD each year =  $\pounds 33\,075 - \pounds 28\,983 = \pounds 4091$ .

Number of people with dementia in the UK = 800 000; around 62% (= 496 000) are accounted for by AD.

Excess cost associated with agitation in people with AD in the UK each year =  $\pounds 3265 \times 800\,000 \times 0.62 = \pounds 2.0$  billion.