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An estimate of the total worldwide societal costs of dementia in 2005

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Abstract

Background: The aim of this report was to estimate the worldwide cost of dementia in 2005 from a societal viewpoint.

Methods: Costs were estimated by combining prevalence estimates, country and region specific data on Gross Domestic Product per person, and average wage with results from previously published cost-of-illness studies in different countries. Direct medical and nonmedical costs as well as costs for informal care were included.

Results: The total worldwide societal cost of dementia, on the basis of a dementia population of 29.3 million persons, was estimated to be US\$315.4 billion in 2005, including US\$105 billion for informal care (37%). Seventy-seven percent of the total costs occurred in the more developed regions, with 46% of the prevalence.

Conclusions: Worldwide costs for dementia are enormous, and informal care constitutes a major cost component, in particular in less developed regions. The health economics of dementia is a highly relevant area for further research.

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Keywords:

Dementia; Alzheimer's disease; Costs; Economics; Prevalence; Informal care

1. Introduction

Because of the “graying of the world” and the increasing number of persons suffering from dementia, costs of care and nursing of demented persons have an enormous economic impact on the health care and social services systems. The worldwide direct costs of dementia care are estimated to have been US\$156 billion for 27.7 million demented persons in 2003 [1], and it has been questioned whether it will be possible to care for and treat all persons with dementia [2].

In addition, anyone engaged in dementia care is aware of the extensive amount of informal care these patients receive. Despite the fact that the caregivers often are under stress, which can be described in terms of burden, stress, depression, or coping, their contributions also represent an economic value from a societal viewpoint [3,4]. Furthermore, because there is an interaction between the formal and informal care systems, it is of interest to know

the magnitude also of informal care [5]. If costs of informal care are not considered, a shift from formal long-term care to informal care at home (eg, if nursing homes are closed down, there will probably be a need for increased informal and formal home care) will extensively underestimate the societal costs of this shift of burden [6]. The proportion of formal care and informal care varies between countries as a result of how care is organized and financed but also as a result of traditions and cultural aspects. However, in a simplified way there is more formal care in countries in which the Gross National Product (GDP) is high, which is illustrated by the relationship between per capita GDP and expenditures on health care [7,8].

There is also a close relationship between average wage per hour and GDP per person. Thus, it should be possible to build a model of the costs of informal care from a worldwide perspective if the amount of informal care is known. The purpose of this article is therefore to estimate the worldwide costs of informal dementia care and to combine these data with an estimate of the worldwide direct costs in 2005.

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Table 1
Key assumptions for the base case

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- Worldwide demographics are based on UN statistics
 - Worldwide region classifications are based on the IMF and the UN
 - The age specific dementia prevalence is similar worldwide
 - Worldwide direct cost estimate is based on a relation between costs per demented person and GDP per person
 - 73% of demented in developed countries live at home
 - 90% of demented in developing countries live at home
 - Informal caregiving time is based on basic ADLs (1.6 hours per day)
 - Cost of informal care is based on average wage
 - 57% of informal caregivers are retired spouses
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2. Methods

The cost estimates that we present here are based on several assumptions with their own uncertainties. The assumptions for the base case (presented below) are summarized in Table 1. Furthermore, the underlying assumptions are also varied in a sensitivity analysis. The results are presented in terms of world figures but also according to International Monetary Fund (IMF)/World Economic Outlook's (WEO) terminology, such as "Advanced economies" and "Other emerging market and developing countries" [8] as well as the United Nations (UN) terms, such as More Developed Regions (MDR) and Less Developed Regions (LDR) [9]. Figures are also presented for the OECD (Organisation for Economic Co-operation and Development) area and the European Union (EU25). Most of the articles on which the assumptions of the analysis are based were identified in the systematic literature search that was undertaken as part of the Swedish Council on Technology Assessment in Health Care (SBU) dementia project [10].

2.1. Prevalence

The cost-of-illness calculations presented in this article are prevalence-based. It is therefore important to estimate the worldwide prevalence of dementia and how the worldwide dementia population is distributed worldwide. The base case age-specific dementia percentages are based on figures presented by Fratiglioni and Rocca [11] (which are based on a comprehensive review of worldwide prevalence papers): 1% for age 60–64 years, 1.5% for 65–69, 3% for 70–74, 6% for 75–79, 13% for 80–84, 24% for 85–89, 34% for 90–94, and 45% for 95+. We assume that the distribution is similar worldwide. This is an issue for debate, particularly regarding Africa. In the sensitivity analysis we also present cost estimates based on alternatives prevalence sources [12–14].

2.2. Direct costs

The direct costs are estimated with the same methods as presented in our previous article, [1] but the figures here are based on the situation in 2005. In short, we assume that there is a relationship between costs per demented person and GDP per person (Purchase Power Parities [PPP] based) in different

countries [15]. This ratio is known from key countries and extrapolated to other countries in which this ratio not is known.

2.3. Informal care

The distinction between direct costs (resources used) and indirect costs (resources lost) is not straightforward when assessing costs of informal care. In a sense these costs are direct, because they represent the use of a resource (caregiver time). However, because there is often no market value for caregiver time, the principles used for valuation often resemble those used to value indirect costs. Informal care is classified in group 07900 in the UN classification of working activities [16]. Because the number of demented persons varies in the countries from which the figures are derived, and some included studies are from the same country, the impact of each study used in the analyses is weighted versus the number of demented persons in the specific countries.

Two issues need quantification when the amount of informal care is analyzed. First issue is the proportion of the demented persons who live at home, and second is how many hours per day of informal care are being provided to the demented persons who live at home.

Informal care can be divided into 3 basic types: support in personal activities of daily life (PADL), instrumental ADL (IADL) (eg, preparing food, shopping, laundry), and supervision/surveillance [17]. In an article from the 10/66 Dementia research group it was concluded that caregiver strain was at least as high in developing countries as in developed countries [18]. Even from a worldwide perspective, PADL can be regarded as a rather stable and quantifiable dimension of informal care (it can be assumed that it takes a similar time to help a demented person to dress irrespective of where in the world this action take place), whereas IADL and supervision are much more dependent on context and culture. Thus, we only use informal support in PADL in the base option (we are aware of the underestimation of informal care as a result of this restriction).

On the basis of 11 studies from the MDR [19–29], the weighted institutionalization rate was 27%, and consequently, 73% are assumed to live at home with informal care in some way (the low amount of informal care given in institutions is excluded here). The proportion of home-dwelling demented persons is reduced from 73% to 50% in a sensitivity analysis.

Twenty-seven studies (26 studies from advanced economies) were identified in which the amount of informal care was presented in different ways (combinations of PADL, IADL, and supervision) [17,21,25,26,29–51]. The study from India showed a similar pattern as the studies from the advanced economies [30]. The figures in these studies were classified to get an estimate of the daily amount of support in PADL. The weighted amount of support in total ADL was 3.7 hours per day. The proportion of PADL versus all ADL (from studies with such figures available [17,21,36,41]) was 44%, resulting

in a figure of 1.6 hours for PADL, which is used in the base option. Thus, we assume in the base case that 1.6 hours per day of informal care in terms of PADL is provided to 73% of the demented persons in the advanced economies. In a sensitivity analysis, figures for PADL plus IADL (3.7 hours per day) and all informal care (7.4 hours per day; all informal care including also supervision) are also tested.

In the “other emerging market and developing countries” (WEO terminology) or LDR countries (UN terminology) or “non Western countries”, the literature is very limited, but in general, long-term institutional care is very scarce, and it is not possible to make an estimate on the basis of published studies. In a study from Korea (an advanced economy but not a Western country), 96% of the demented persons lived in the community [52]. We assume that 90% of demented persons in LDR countries live at home (99% in the sensitivity analysis), receiving 1.6 hours per day of informal care as above.

2.4. Costing informal care

Costing informal care and unpaid work is indeed a controversial and complicated issue, and several methods have been proposed [49,53–56]. Informal care should be valued by the opportunity cost of the caregivers' time; however, identifying this opportunity cost is not straightforward [57]. Market prices are not available except for caregivers of working age, and in many cases it is not apparent what is the best alternative use of the caregivers' time. The main providers of informal care are spouses and children/children-in-law to the demented persons. The proportion of these two types varies in the literature. In an OECD report of nine member states [6], the proportion of spouses as caregivers varied between 18% (France) to 81% (Sweden). The weighted spouse share, on the basis of this report and nine other studies [29,36,39,42,58–62], was 57%, representing countries in North America, Europe, Asia, and

Australia. We assume that the other part, 43%, is provided by children, children-in-law, and other people of working age. For informal caregivers of working age, an opportunity cost based on wage is logical, whereas informal care for retired people and also on leisure time is more difficult to estimate.

The base option for caregivers of working age is based on the human capital approach, which values informal care by the average wage by country [63]. Because not all figures were expressed as an hourly cost, a division factor of 8 was used for per day wage figures, 40 for weekly and 160 for monthly wage figures. Average wage figures were available for countries corresponding to 80% of the worldwide population and 87% of the demented persons.

For the countries with missing data (or outliers: Mongolia, Republic of Korea, and Indonesia), imputation was based on the average wage for nearby countries with a similar GDP per person and year.

For retired people (the spouses are assumed to be retired), three options are used: an opportunity cost of 100% of average wage (base option) and of 50% and 14% [64] (in the sensitivity analysis).

In the sensitivity analysis, another approach is also presented (also with 1.6 hours/day in PADL), on the basis of opportunity costs presented in 21 studies (in the advanced economies) [21,25,26,29,31–37,40–42,45,49,61,65–68], resulting in a weighted average cost of US\$12.33/hour. If only USA-based studies [11] were included, the figure was US\$12.44/hour. This hourly cost was adjusted according to GDP per person in 2005 for the different countries (base, USA).

All costs are expressed as US\$ in 2005 (currency transformations by the use of PPPs [15], and the Consumer Price Index (CPI) for each source country was used for the time transformation of costs to the year of 2005 [15].

Table 2
Estimate of the costs of informal care (base case) in 2005

	Costs of informal care		Costs of informal care per demented (US\$)
	Billions US\$	Percent	
Africa	2.5	2.4	1756
Latin America	6.0	5.7	2989
Northern America	23.1	22.0	6775
Asia	32.0	30.4	2254
Europe	39.9	38.0	4949
Oceania	1.5	1.5	6328
WORLD	105.0	100	3506
WEO			
Advanced economies	68.7	65.4	6234
Other emerging market and developing countries	36.3	34.6	1983
UN			
MDR	74.7	71.2	5530
LDR	30.3	28.8	1915
European Union	34.0	32.4	5951
OECD	71.5	69.0	5945

Abbreviations: WEO, World Economic Outlook, UN, United Nations, MDR, More Developed Regions, LDR, Less Developed Regions, OECD, Organisation for Economic Co-operation and Development.

3. Results

In the base case, the worldwide costs of informal care are estimated at US\$105 billion (Table 2). About 70% of the costs occur in the advanced economies, irrespective of whether the WEO or UN classification is used. Except for the worldwide and region cost estimates, we also present specific costs for all countries worldwide in the Dementia Worldwide Cost database (DWCD) (see Appendix 1). As seen in the sensitivity analysis (Table 3), the potential variation in costs is wide, and in particular, the number of hours of informal care has a great impact on the costs of informal care. If IADL and supervision are included, the costs increase considerably. If the value of informal care provided by retired spouses is assumed to be lower (50% and 14%, respectively), the total costs decrease substantially.

The direct costs are estimated to have been US\$210 billion in 2005. If the costs of informal care are combined with the total direct costs, the total worldwide costs are estimated to be US\$315 billion (Table 4). The highest costs occur in North America and Europe; in individual countries, the total cost is highest in the USA by far (US\$76 billion), followed by Japan (US\$34 billion) and China (US\$30 billion), with the greatest dementia population in the world of about 5.6 million persons). If the most cost-driving options in the sensitivity analysis are applied on the USA (informal care with IADL and supervision added, respectively), the costs for informal care in the US increase from US\$21 billion to US\$48 billion and US\$97 billion, respectively, resulting in an increase in the total costs from US\$76 billion to US\$103 billion and US\$152 billion, respectively. These higher figures are in line with other published US articles [25,41]. In the base case, about 75% of the total costs occur in the advanced economies (Table 5). In the sensitivity analysis of the total costs (Table 6), the variation in the prevalence estimates has a rather great impact, whereas the use of current prices instead of PPPs as well as the use of health expenditures has a rather small effect on the total estimated cost. Using the age-specific prevalence figures by Ferri et al [14] and World Health Organization's regional classification results in somewhat lower costs, US\$303.4 billion, on the basis of 27.1 million demented persons (updated to 2005) (not shown in table). The total estimated cost for Africa (with lower dementia prevalence) was US\$2.9 billion with the prevalence figures of Ferri et al. The lowest cost estimate is based on prevalence figures by Lobo et al [13] (world prevalence 24.2 millions), whereas the Eurodem figures [12] result in almost identical costs.

4. Discussion

The worldwide societal costs of dementia, estimated to be more than US\$300 billion yearly, are enormous. However, cost-of-illness figures do not say anything about the quality of care because no such measurement is included.

Table 3
Sensitivity analysis of informal care costs (billions US\$)

	Base case (PADL, 1.6 hours/day)	PADL + IADL (3.7 hours per day)	PADL + IADL + Supervision (7.4 hours per day)	99% live at home in the other emerging market and developing countries	50% live at home in the advanced economies	Opportunity cost per hour: US\$ 12.44/hour adjusted vs GDP/person and year in countries	Retired spouses 50% of average wage	Retired spouses 14% of average wage
Africa	2.5	5.8	11.6	2.8	2.5	0.8	1.8	1.3
Latin America	6.0	13.8	27.6	6.6	6.0	3.2	4.3	3.0
Northern America	23.1	53.5	107.0	23.1	15.8	20.0	16.5	11.8
Asia	32.0	73.9	147.9	34.1	28.5	21.0	22.90	16.3
Europe	39.9	92.3	184.6	40.6	29.5	27.6	28.5	20.4
Oceania	1.5	3.5	7.1	1.5	1.1	1.0	1.1	0.8
WORLD	105.0	242.9	485.0	108.7	83.4	73.6	75.1	53.5

Abbreviations: PADL, Personal activities of daily life, IADL, Instrumental ADL, GDP, Gross Domestic Product.

Table 4
Summary of worldwide costs of dementia care (base cases, in 2005)

Major areas/regions	Prevalence (×1000)	Direct costs (billions US\$)	Informal care (billions US\$)	Total costs (billions US\$)	% of total costs	Total costs per demented (US\$)
Africa	1428	1.9	2.5	4.4	1.4	3091
Eastern	372	0.2	0.3	0.5		1280
Middle	174	0.1	0.1	0.2		1312
Northern	403	0.9	0.6	1.5		3675
Southern	89	0.4	0.7	1.1		12433
Western	391	0.2	0.9	1.1		2885
Latin America	2000	7.8	6.0	13.8	4.4	6905
Caribbean	199	0.7	0.6	1.3		6485
Central America	461	1.8	0.9	2.7		5869
South America	1340	5.3	4.5	9.8		7323
Northern America	3413	60.5	23.1	83.6	26.5	24501
Asia	14185	56.7	32.0	88.7	28.1	6250
Eastern	7743	44.5	23.9	68.4		8833
South Central Asia	4302	6.5	4.0	10.5		2439
South Eastern Asia	1552	3.5	2.4	5.9		3813
Western Asia	588	2.2	1.7	3.8		6542
Europe	8067	80.5	39.9	120.4	38.2	14922
Eastern Europe	2578	12.1	6.2	18.3		7089
Northern Europe	1252	16.7	8.2	25.0		19936
Southern Europe	1844	19.9	10.1	30.1		16292
Western Europe	2392	31.8	15.3	47.1		19682
Oceania	243	3.0	1.5	4.5	1.4	18576
Australia and New Zealand	227	3.0	1.5	4.4		19609
Other Oceania	16	0.02	0.04	0.1		3680
WORLD	29336	210.3	105.0	315.4	100	10751

Whether the greater availability of long-term nursing home care in the advanced economies reflects a better care for demented persons than informal care in both advanced economies and the developing countries cannot be answered in a study like this.

Country-specific cost-of-illness studies for different diseases are rather frequent in the literature. However, to our knowledge, a worldwide cost-of-illness estimate regarding dementia like this has never been published before, and it is therefore difficult to make comparisons. As a comparison with another chronic disorder, Jönsson [69] estimated the worldwide costs of diabetes to be US\$55 to US\$105 billion in 1990, with an expected increase to US\$71 to US\$136 billion in 2010.

In our previous article, we estimated the total direct costs to be US\$156 billion in 2003, and in a congress presentation, we estimated the total costs to about US\$250 billion in 2003 [70]. The figures presented here are higher. One reason is the increase in number of demented persons, particularly in the developing countries (from about 27.7 million in 2003 to more than 29 million in 2005). Another reason is that GDP per person and average wage, which are two of the basic sources in the cost model, have increased also, particularly in the many developing countries.

The income elasticity of health care expenditures has been found to be equal to or above unity in most studies with cross-national data, implying that care costs can be expected to rise more than proportionally to an increase in

Table 5
Worldwide costs of dementia care (base cases) in different economic areas

Major areas/regions	Direct costs (billions US\$)	Informal care (billions US\$)	Total costs (billions US\$)	% of total costs	% of prevalence	Total costs per demented (US\$)
WEO						
Advanced economies	158.4	68.7	227.1	72	62	20606
Other emerging market and developing countries	52.1	36.3	88.4	28	38	4827
UN						
MDR	168.1	74.7	242.8	77	46	17964
LDR	42.3	30.3	72.6	23	54	4588
European Union	68.9	34.0	102.9	33	19	18007
OECD	162.7	71.5	234.2	74	41	19464
WORLD	210.3	105.0	315.4	100	100	10751

Table 6
Sensitivity analysis of the total costs (billions US\$)

	Base option (PPP based)	US\$ (current prices)	Health expenditures	Prevalence: Lobo et al [13]	Prevalence: Eurodem
Africa	4.4	3.3	3.6	3.6	4.5
Latin America	13.8	10.3	11.8	11.3	13.9
Northern America	83.6	84.6	109.9	68.6	81.5
Asia	88.7	71.0	63.5	73.2	89.2
Europe	120.4	123.6	110.6	100.5	118.8
Oceania	4.5	4.8	4.4	3.7	4.4
WORLD	315.4	297.6	303.8	260.9	312.3

Abbreviation: PPP, Purchase power parities.

GDP per capita. A recent analysis of OECD data indicates, however, lower elasticity values in the range of 0.2 to 0.5, when adjusting for factors influencing supply and demand [71]. Still there is consistent evidence of a positive relationship between health care expenditures and income.

Nevertheless, a worldwide cost estimate has methodologic limitations, although we regard the assumptions as based on the best available data. The drawbacks in the direct cost estimates were described in more detail in the previous article [1], particularly the basic assumption that the known relationship between GDP per person and expenditures on health is also applicable on dementia (where a great part of care is nonmedical).

The question whether there are any significant differences in prevalence in different parts of the world still remains unanswered. Although some authors argue that this indeed is the case [14], a very comprehensive report from SBU, which is based on a systematic review of the worldwide literature, concludes that this still is a controversial issue [10].

Regarding informal care, both components in a cost equation, the quantity vector q (the number of hours) and the price vector p (the cost per hour), need to be discussed. Because of the variability in methods in the source articles for the time estimates of informal care, it is not possible to identify a net caregiving time, which might lead to an overestimate.

The uncertainty regarding included components of informal care (PADL, IADL, and supervision) is illustrated in the sensitivity analysis. With such a great range with a factor of about 10 in the cost estimates, one might ask whether such cost figures are of any value. However, the reasons for the variation are obvious (variation of caregiver time and its costing).

Thus, if the background for the variation in results is transparent, it is not a disqualifying factor per se, but the great range illustrates the methodologic issues regarding informal care.

More problematic is that most sources for the time estimates are from the advanced economies, mainly from the Western world. However, studies from India [30] and Korea [52] indicate that the patterns of informal care might be

rather similar also in other parts of the world. Regarding IADLs, the influence of cultural differences is nevertheless obvious [72], and the concept of supervision, although of great importance, can be regarded as vague and difficult to quantify. We regard PADL as a more uniform concept from a worldwide perspective, but as a consequence, the base case is probably an underestimation. As mentioned earlier, the costing of informal care is also controversial. Our base case (retired persons hourly cost is similar to 100% of average wage) can be regarded as an overestimate and rather similar to the replacement cost approach for caring staff. The variation in the sensitivity analysis (50% and 14% of average wage for retired people) illustrates the range downwards.

We consider the perspective in this cost-of-illness study as being societal because it is based on direct costs and informal care. However, the indirect costs of patients as a result of production losses and premature mortality are not included. The vast majority of persons with dementia are retired, and therefore this component of costs can be regarded as rather small.

In conclusion, the total worldwide costs of dementia are enormous, and demographic changes with increasing numbers of elderly pose a challenge for care systems and societies worldwide. Research into the field of dementia is therefore of high relevance and has the potential to affect the lives of great numbers of people. Basic research has given us the first generation of symptomatic anti-dementia drugs. Clinical research and nursing research have already resulted in better possibilities to improve quality of life for these patients. Further research into the health economics of dementia is highly relevant, and results from studies should be applied to promote efficient resource use in dementia care. It should be stressed that even small steps forward in the treatment of dementia might have a great socioeconomic impact, as well as improving quality of life for our patients and their next of kin.

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Appendix 1

Classification of countries/states is complicated, and there are many countries with small populations, making calculations not meaningful. In the following list, we only include countries with a dementia population greater than 10,000 persons; thus, the total sum is somewhat lower than the total figures (but it covers >99% of prevalence and costs). Zimbabwe has a dementia population greater than 10,000, but it is excluded because of the hyperinflation. The figures of prevalence and costs seem to be rather exact (it is due to the modeling method), but they should of course be rounded off. All cost figures are expressed as US\$ of 2005. There are three alternatives for the total costs: total costs 1 (base case) in which the costs of informal care are based on 1.6 hours/day, total costs 2 are based on 3.7 hours/day, and total costs 3 are based on 7.4 hours per day.

Country 2005 (>10,000 demented persons)	No. of demented persons	Direct costs	Informal care 1.6 h/day	Total costs 1	Per demented person	Informal care 3.7 h/day	Total costs 2	Per demented person	Informal care 7.4 h/day	Total costs 3	Per demented person
Africa											
Eastern Africa											
Ethiopia	97804	35.1	16.7	51.8	530	38.6	73.7	754	77.2	112.3	1148
Kenya	49299	31.1	45.5	76.5	1552	105.1	136.2	2762	210.2	241.3	4894
Madagascar	26090	10.3	26.3	36.7	1406	60.9	71.3	2732	121.9	132.2	5067
Malawi	15908	4.1	3.0	7.1	449	7.0	11.1	698	13.9	18.1	1135
Mozambique	32425	19.5	21.0	40.5	1250	48.6	68.1	2100	97.2	116.7	3600
Somalia	13894	3.6	10.4	14.0	1010	24.1	27.7	1993	48.1	51.8	3725
Uganda	24318	15.9	15.3	31.2	1282	35.3	51.2	2105	70.5	86.4	3555
Tanzania	49699	15.7	29.9	45.5	916	69.1	84.8	1705	138.2	153.8	3095
Middle Africa											
Angola	20732	25.4	19.1	44.5	2149	44.2	69.6	3359	88.4	113.8	5491
Cameroon	33060	34.9	30.5	65.4	1978	70.5	105.4	3188	141.0	175.9	5320
Chad	14803	9.8	11.3	21.1	1427	26.2	36.0	2430	52.3	62.1	4198
Dem Rep of Congo	86886	26.5	16.1	42.7	491	37.3	63.8	735	74.6	101.2	1164
Northern Africa											
Algeria	65686	205.9	67.2	273.1	4157	155.3	361.2	5499	310.6	516.5	7863
Egypt	161587	304.1	261.9	566.0	3503	605.6	909.7	5630	1211.1	1515.3	9377
Libya	11958	60.6	35.6	96.2	8047	82.4	143.0	11957	164.8	225.4	18846
Morocco	73238	143.8	133.8	277.6	3790	309.3	453.1	6187	618.7	762.5	10411
Sudan	56240	61.9	49.5	111.4	1981	114.6	176.4	3137	229.1	291.0	5174
Tunisia	33421	120.3	34.3	154.6	4626	79.4	199.6	5973	158.7	279.0	8348
Southern Africa											
South Africa	76225	404.1	647.3	1051.5	13794	1496.9	1901.1	24940	2993.8	3398.0	44578
Western Africa											
Benin	10311	5.3	19.8	25.0	2428	45.7	51.0	4943	91.4	96.6	9372
Burkina Faso	17017	9.5	32.5	42.0	2470	75.2	84.7	4977	150.3	159.8	9394
Cote d'Ivoire	24422	16.1	46.4	62.5	2558	107.3	123.4	5052	214.6	230.7	9446
Ghana	39916	46.0	93.3	139.3	3489	215.7	261.7	6555	431.3	477.3	11958
Guinea	11310	10.0	31.4	41.5	3668	72.7	82.8	7317	145.4	155.5	13747
Mali	31816	16.0	59.1	75.1	2361	136.7	152.7	4800	273.4	289.4	9096
Niger	15020	5.7	33.3	39.0	2599	77.1	82.8	5511	154.1	159.8	10642
Nigeria	197671	102.4	482.9	585.3	2961	1116.7	1219.2	6168	2233.5	2335.9	11817
Senegal	10803	8.3	19.9	28.2	2609	46.0	54.3	5027	92.0	100.3	9287
Asia											
Eastern Asia											
China	5562401	17457.6	12956.1	30413.7	5468	29960.9	47418.5	8525	59921.8	77379.4	13911
China Hong Kong SAR	59543	869.1	260.6	1129.7	18973	602.6	1471.7	24717	1205.2	2074.3	34837
Dem People's Rep of Korea	92445	68.5	227.3	295.8	3200	525.6	594.2	6427	1051.3	1119.8	12113
Japan	1809133	24148.9	10203.7	34352.6	18988	23596.0	47744.9	26391	47192.1	71341.0	39434
Republic of Korea	210480	1889.6	269.8	2159.4	10259	623.9	2513.5	11942	1247.8	3137.4	14906
Southeast Asia											
Afghanistan	36717	21.0	55.3	76.2	2076	127.8	148.8	4052	255.6	276.6	7532
Bangladesh	243600	213.6	254.1	467.7	1920	587.6	801.2	3289	1175.1	1388.7	5701
India	3150792	4561.5	2461.5	7023.0	2229	5692.2	10253.7	3254	11384.5	15946.0	5061
Iran	203339	707.5	424.3	1131.8	5566	981.3	1688.8	8305	1962.5	2670.0	13131
Kazakhstan	76110	276.0	130.2	406.2	5337	301.1	577.1	7582	602.1	878.2	11538
Kyrgyzstan	17651	16.1	16.6	32.6	1848	38.3	54.4	3080	76.6	92.7	5250
Nepal	49047	35.8	49.2	85.0	1734	113.8	149.6	3050	227.6	263.4	5370
Pakistan	324552	375.3	397.2	772.6	2380	918.6	1294.0	3987	1837.3	2212.6	6817
Sri Lanka	86614	165.5	59.8	225.3	2601	138.2	303.7	3507	276.4	442.0	5103
Tajikistan	19132	11.6	20.2	31.7	1659	46.6	58.2	3043	93.3	104.9	5481
Turkmenistan	12436	43.9	23.6	67.5	5426	54.5	98.4	7913	109.0	152.9	12295
Uzbekistan	76010	63.6	91.9	155.5	2046	212.5	276.2	3633	425.0	488.7	6429
Southeast Asia											
Cambodia	20218	21.1	26.6	47.8	2362	61.5	82.7	4089	123.1	144.2	7132
Indonesia	600145	1166.8	961.6	2128.4	3546	2223.6	3390.4	5649	4447.2	5614.0	9354
Lao People's Dem Republic	10619	9.8	15.1	24.9	2343	34.9	44.7	4205	69.7	79.5	7487
Malaysia	62177	303.7	207.4	511.0	8219	479.5	783.2	12596	959.0	1262.7	20308
Myanmar	132582	97.9	20.0	117.8	889	46.1	144.0	1086	92.3	190.1	1434
Philippines	174063	373.6	227.5	601.1	3453	526.0	899.6	5168	1052.0	1425.6	8190
Singapore	21371	264.3	126.4	390.7	18281	292.2	556.5	26042	584.4	848.7	39715
Thailand	252699	921.9	408.4	1330.3	5264	944.4	1866.3	7386	1888.8	2810.7	11123
Vietnam	276424	364.6	386.0	750.6	2715	892.7	1257.2	4548	1785.4	2149.9	7778

Country 2005 (>10,000 demented persons)	No. of demented persons	Direct costs	Informal care 1.6 h/day	Total costs 1	Per demented person	Informal care 3.7 h/day	Total costs 2	Per demented person	Informal care 7.4 h/day	Total costs 3	Per demented person
Western Asia											
Armenia	18533	34.5	14.7	49.2	2657	34.1	68.6	3701	68.2	102.7	5539
Azerbaijan	38174	76.6	49.6	126.2	3305	114.7	191.3	5011	229.4	306.0	8016
Georgia	43856	68.6	39.9	108.5	2474	92.3	160.9	3668	184.6	253.2	5773
Iraq	52985	41.6	193.8	235.4	4443	448.3	489.8	9245	896.5	938.1	17705
Israel	51342	525.5	272.4	797.9	15541	630.0	1155.5	22505	1260.0	1785.5	34776
Jordan	12661	28.1	28.0	56.1	4434	64.8	92.9	7338	129.5	157.7	12454
Lebanon	11206	32.6	27.0	59.7	5325	62.5	95.1	8491	125.0	157.7	14069
Saudi Arabia	40830	271.1	100.5	371.6	9101	232.4	503.5	12332	464.8	735.9	18024
Syrian Arab Republic	29799	50.0	69.0	119.0	3994	159.6	209.6	7034	319.2	369.2	12390
Turkey	238847	827.9	754.8	1582.7	6626	1745.4	2573.3	10774	3490.8	4318.7	18081
Yemen	24614	8.1	26.2	34.2	1391	60.5	68.6	2786	121.0	129.1	5244
Europé											
Eastern Europé											
Belarus	88604	297.9	134.1	432.0	4875	310.1	607.9	6861	620.1	918.0	10360
Bulgaria	79776	320.8	140.2	461.1	5779	324.3	645.1	8087	648.6	969.5	12152
Czech Republic	97161	776.9	357.6	1134.5	11677	826.9	1603.8	16507	1653.8	2430.7	25018
Hungary	100264	735.4	398.3	1133.7	11307	921.0	1656.5	16521	1842.0	2577.5	25707
Poland	313630	1776.9	1220.1	2996.9	9556	2821.4	4598.3	14662	5642.9	7419.7	23658
Republic of Moldova	26359	29.0	2.5	31.5	1196	5.8	34.8	1321	11.6	40.6	1540
Romania	180474	691.3	357.4	1048.6	5811	826.5	1517.7	8410	1652.9	2344.2	12989
Russian Federation	1173598	5649.6	2439.5	8089.1	6893	5641.3	11290.9	9621	11282.7	16932.3	14428
Slovakia	42118	294.6	133.7	428.2	10168	309.1	603.7	14333	618.3	912.8	21673
Ukraine	475846	1496.4	1021.2	2517.6	5291	2361.6	3858.0	8108	4723.2	6219.7	13071
Northern Europé											
Denmark	68500	1037.5	819.1	1856.6	27104	1894.1	2931.6	42798	3788.2	4825.8	70449
Estonia	12143	86.9	43.8	130.7	10765	101.3	188.2	15500	202.6	289.5	23844
Finland	63509	864.1	233.5	1097.6	17283	540.0	1404.1	22109	1079.9	1944.0	30611
Ireland	33666	596.1	212.3	808.4	24012	490.9	1087.0	32288	981.9	1577.9	46871
Latvia	21731	120.0	49.0	169.0	7776	113.2	233.2	10733	226.5	346.5	15943
Lithuania	34126	210.7	88.9	299.5	8777	205.5	416.2	12195	411.0	621.7	18218
Norway	62975	1163.2	501.9	1665.1	26441	1160.6	2323.8	36901	2321.3	3484.5	55331
Sweden	141232	1842.8	738.4	2581.2	18276	1707.6	3550.3	25138	3415.1	5257.9	37229
United Kingdom	811673	10771.0	5527.8	16298.7	20080	12783.0	23553.9	29019	25566.0	36336.9	44768
Southern Europé											
Albania	12932	30.5	15.7	46.2	3572	36.4	66.8	5168	72.7	103.2	7980
Bosnia and Herzegovina	12932	30.5	15.7	46.2	3572	36.4	66.8	5168	72.7	103.2	7980
Croatia	41412	222.5	200.6	423.2	10219	464.0	686.5	16578	928.0	1150.5	27782
Greece	142928	1395.4	706.2	2101.5	14703	1633.0	3028.4	21188	3266.0	4661.4	32614
Italy	849957	10574.1	5332.6	15906.7	18715	12331.6	22905.7	26949	24663.2	35237.3	41458
Portugal	113039	952.9	261.9	1214.8	10747	605.6	1558.5	13787	1211.2	2164.1	19145
Serbia and Montenegro	81645	190.4	123.2	313.5	3840	284.8	475.2	5820	569.7	760.0	9309
Slovenia	18891	179.6	114.6	294.2	15575	265.0	444.7	23538	530.1	709.7	37568
Spain	541895	6218.6	3240.9	9459.5	17456	7494.6	13713.2	25306	14989.2	21207.8	39136
TFYR Macedonia	12770	43.1	21.9	65.1	5096	50.7	93.9	7350	101.4	144.6	11321
Western Europé											
Austria	95130	1386.6	692.7	2079.3	21858	1601.9	2988.5	31415	3203.8	4590.4	48254
Belgium	132855	1809.8	963.3	2773.1	20873	2227.6	4037.4	30390	4455.2	6265.0	47157
France	796228	10132.5	3522.6	13655.1	17150	8146.0	18278.5	22956	16292.0	26424.5	33187
Germany	1086789	14489.7	7936.3	22426.1	20635	18352.8	32842.5	30220	36705.5	51195.3	47107
The Netherlands	181303	2439.5	1314.4	3753.9	20705	3039.5	5479.0	30220	6078.9	8518.5	46985
Switzerland	95373	1354.4	872.9	2227.2	23353	2018.5	3372.9	35365	4037.0	5391.4	56530
Latin America and Caribbean											
Caribbean											
Cuba	86543	132.1	97.1	229.2	2649	224.6	356.7	4122	449.3	581.4	6718
Dominican Republic	26686	75.9	155.6	231.5	8674	359.8	435.7	16326	719.6	795.5	29810
Haiti	17286	13.5	42.9	56.4	3260	99.1	112.6	6514	198.2	211.7	12248
Jamaica	14692	28.1	33.9	62.0	4221	78.5	106.6	7253	157.0	185.1	12596
Puerto Rico	34352	280.1	214.4	494.5	14395	495.8	775.9	22587	991.7	1271.8	37021
Central America											
Costa Rica	15061	68.5	42.7	111.3	7387	98.8	167.4	11112	197.7	266.2	17674
El Salvador	21782	42.9	32.3	75.2	3452	74.7	117.6	5397	149.3	192.2	8825
Guatemala	25538	46.3	52.9	99.2	3884	122.4	168.7	6605	244.8	291.1	11398
Honduras	16057	21.1	33.1	54.2	3376	76.6	97.7	6085	153.3	174.3	10857
Mexico	358900	1593.9	662.0	2255.8	6285	1530.8	3124.7	8706	3061.6	4655.5	12972
Nicaragua	10965	17.4	24.9	42.2	3852	57.5	74.9	6827	114.9	132.3	12068
Panama	11758	37.3	24.8	62.1	5281	57.3	94.6	8045	114.5	151.8	12914

Country 2005 (>10,000 demented persons)	No. of demented persons	Direct costs	Informal care 1.6 h/day	Total costs 1	Per demented person	Informal care 3.7 h/day	Total costs 2	Per demented person	Informal care 7.4 h/day	Total costs 3	Per demented person
South America											
Argentina	253069	1556.7	1054.1	2610.8	10316	2437.5	3994.3	15783	4875.1	6431.8	25415
Bolivia	20555	24.4	50.2	74.6	3630	116.1	140.5	6835	232.2	256.6	12483
Brazil	576689	2152.4	1951.3	4103.7	7116	4512.3	6664.8	11557	9024.7	11177.1	19382
Chile	82437	429.0	260.2	689.2	8361	601.7	1030.7	12503	1203.4	1632.4	19802
Colombia	153424	490.1	412.6	902.6	5883	954.1	1444.1	9413	1908.1	2398.2	15631
Ecuador	43466	81.8	85.6	167.4	3852	198.0	279.8	6437	396.0	477.8	10993
Paraguay	13121	28.0	27.9	55.9	4257	64.5	92.5	7047	129.0	157.0	11962
Peru	87024	227.0	196.6	423.7	4868	454.7	681.8	7834	909.5	1136.5	13060
Uruguay	32865	153.6	106.7	260.3	7921	246.8	400.4	12184	493.6	647.2	19693
Venezuela	73811	199.1	309.4	508.5	6889	715.5	914.6	12391	1431.1	1630.2	22086
Northern America											
Canada	356241	5323.3	2227.3	7550.6	21195	5150.7	10474.0	29401	10301.3	15624.6	43860
USA	3057068	55180.5	20897.5	76078.1	24886	48325.6	103506.1	33858	96651.2	151831.7	49666
Oceania											
Australia	188599	2540.6	1251.6	3792.2	20108	2894.3	5435.0	28818	5788.7	8329.3	44164
New Zealand	38215	413.2	242.2	655.3	17149	560.1	973.2	25467	1120.1	1533.3	40122