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Economic Costs of Dementia in Low and Middle Income Countries

Liu, Zhaorui

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Economic Costs of Dementia in Low and Middle Income Countries

Zhaorui Liu PhD

Supervisors

**Professor Paul McCrone
Dr Emiliano Albanese**

Statement of the candidate's own personal share

In the project, the data analysis was based on the main database of the 10/66 dementia project conducted in seven countries.

I contributed to data collection in China from 2003 to 2005. Informed consent was obtained from participants, and in the case of incapacity a family member or carer gave agreement. The institutional review boards of the Institute of Psychiatry, King's College London (in London) and of the Institute of Mental Health, Peking University (in Beijing) approved the study protocol. A one-phase cross-sectional survey of all elderly (65 years and over) people residing in two defined catchment areas (the urban district of Xicheng in the heart of old Beijing close to Tiananmen square and the villages of Daxing, a rural district 20-50 kilometres from the centre of Beijing) was conducted. Community health doctors from the community health services in the two areas were trained by myself and my colleagues and then carried out the interviews applying the 10/66 standardised protocol, usually at the participants' households.

I conducted the analyses included in this thesis under the guidance of my supervisors (Professor Paul McCrone and Dr Emiliano Albanese). Professor Martin Prince led the overall 10/66 project and supervised my role in that study, but did not provide formal supervision of this thesis.

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Contents

Abstract.....	12
Section1. Background.....	13
1.1. <i>What is dementia</i>	13
1.2. <i>Prevalence of dementia</i>	14
1.3. <i>Care for dementia people</i>	15
1.4. <i>Cost of dementia</i>	16
1.5. <i>Rationale for investigating the costs of dementia</i>	16
1.6. <i>Key issues in cost of illness studies of dementia</i>	17
1.7. <i>Review of previous cost of dementia studies</i>	20
1.8. <i>Rationale for the current study</i>	33
1.9. <i>Aim and objectives of the current study</i>	34
Section 2. General Methodology and Study Design.....	35
2.1. <i>Study design</i>	35
2.2. <i>Setting</i>	36
2.3. <i>Participants and sample</i>	50
2.4. <i>Procedure of the study</i>	50
2.5. <i>Measurements</i>	51
2.6. <i>Diagnosis of psychiatric and physical diseases</i>	54
2.7. <i>General information of the sample in the study</i>	55
Section 3. Methodology for estimating the costs of medical care and social care.....	73
3.1. <i>Medical care costs</i>	73
3.2. <i>Social care</i>	101
3.3. <i>Total cost</i>	120
Section 4. Findings from the analysis of medical care and social care costs.....	122
4.1. <i>Total cost</i>	122
4.2. <i>Medical care</i>	132
4.3. <i>Social care</i>	149
Section 5. Costs of care for participants with dementia and predictors of cost.....	167
5.1 <i>Methodology</i>	167
5.2 <i>Results</i>	173
Section 6. Attributable cost of dementia.....	223
6.1. <i>Methodology</i>	223
6.2. <i>Results</i>	226
Section 7. Sensitivity analyses.....	232
7.1. <i>Percentage method</i>	232
7.2. <i>GDP ratio method</i>	237
7.3. <i>10/66 salary method</i>	241
7.4. <i>Replacement cost method</i>	246
7.5. <i>Leisure time method</i>	246
7.6. <i>Carers characteristics method</i>	249
7.7. <i>All informal care method</i>	261
Section 8. Discussion.....	265
8.1. <i>Summaries of the cost estimation in this study</i>	265

8.2. <i>The 10/66 algorithm and the CDR</i>	283
8.3. <i>The quality of the database</i>	283
8.4. <i>Implications of the study results</i>	285
8.5. <i>Limitations</i>	286
8.6. <i>Next steps</i>	289
Glossary of terms	291
References	296
Appendix	304

Contents of tables

Table 2.1. Summary of settings in the 10/66 project.....	35
Table 2.2. The geographic information and population in 10/66 project countries.....	37
Table 2.3. Population health status of the 10/66 project countries.....	38
Table 2.4. Political and economic status in 10/66 project countries	39
Table 2.5. Social security and health care system in 10/66 catchment areas	41
Table 2.6. Health financing in 10/66 project countries	46
Table 2.7. Health service accessibility in 10/66 catchment areas	49
Table 2.8. Socio-demographic characteristics of participants in the 10/66 study, by site	57
Table 2.9. Care arrangements and dependency of participants in the 10/66 study, by site	59
Table 2.10. Health status of participants in the 10/66 study, by site	60
Table 2.11. Socio-demographic characteristics and health status of carers in the 10/66 study, by site.....	62
Table 2.12. Socio-demographic characteristics of participants with dementia in the 10/66 study, by site.....	64
Table 2.13. Care arrangements and dependency levels of participants with dementia in the 10/66 study, by site.....	66
Table 2.14. Severity and subtype of dementia and other health status of participants with dementia in the 10/66 study, by site.....	69
Table 2.15. Socio-demographic characteristics and health status of carers of participants with dementia in the 10/66 study, by site	71
Table 3.1. UK unit costs for health and social care services (2002-2010)	78
Table 3.2. NHS trust and Primary Care Trust reference cost in different years	79
Table 3.3a. Unit costs for inpatient services in the WHO-CHOICE database among project countries and UK in 2007	81
Table 3.3b. Unit costs for inpatient services in the WHO-CHOICE database among project countries and UK in 2008	82
Table 3.4a. Unit costs for outpatient services in the WHO-CHOICE database among project countries and UK in 2007	83
Table 3.4b. Unit costs for outpatient services in the WHO-CHOICE database among project countries and UK in 2008	84
Table 3.5a. PPPs in International Monetary Fund World Economic Outlook Database (2002-2010)	86
Table 3.5b. PPPs in WHO Global Health Expenditure Database (2002-2010).....	87
Table 3.6a. CPIs contained in the International Labour Organisation Labour Statistics Database (2002-2010).....	88
Table 3.6b. CPI in World Economic Outlook Database (2002-2010).....	90
Table 3.7. Interviewed date in the project countries.....	91
Table 3.8a. Distribution of time spent in contact with health professionals (in minutes)	93
Table 3.8b. Distribution of travel time (in minutes).....	93
Table 3.8c. Distribution of number of visits in last 3 months	94
Table 3.9. Conversion coefficient in 10/66 project countries and the UK	95
Table 3.10. Unit cost of health services in UK.....	95
Table 3.11a. Ratios between the project countries and the UK, based on the WHO-Choice database.....	97
Table 3.11b Simplified ratios between the project countries and the UK, based on the WHO-Choice database.....	98
Table 3.12. Country specific unit costs (in I\$) in 2008 (based on WHO-CHOICE ratio)	98
Table 3.13. The classifications for economic activities in the wage database of LABORSTA....	105
Table 3.14. Information provided in LABORSTA wage database for 7 countries.....	106
Table 3.15. Cost of hiring a maid in seven 10/66 project countries	106
Table 3.16. Monthly minimum wages in local currencies, 2002-2009	107
Table 3.17. Monthly average wages in local currencies, 2002-2009	109
Table 3.18a. Average wages in local currency in China for different occupations.....	109
Table 3.18b. Average wages in local currency in Cuba for different occupations	110

Table 3.18c. Average wages in local currency in Dominican Republic for different occupations	110
Table 3.18d. Wages in local currency in India	111
Table 3.18e. Average wages in local currency in Mexico for different occupations.....	111
Table 3.18f. Average wages in local currency in Peru for different occupations (salaries employees in urban areas).....	112
Table 3.18g. Average wages in local currency in Venezuela for different occupations.....	112
Table 3.19. List of job type in 10/66 study.....	113
Table 3.20. Monthly minimum wages in project different counties in 2008.....	115
Table 3.21. Monthly average wages in different counties in 2008.....	118
Table 4.1. Number (%) of participants incurring costs at the private level, by site	123
Table 4.2. Annual mean and SD cost of care per capita at private level in 2008 international dollars, by site	125
Table 4.3. Annual mean and SD cost of care per capita at private level in 2008 international dollars for different participant characteristics, by site	126
Table 4.4. Number (%) of participants incurring costs at the public level, by site	128
Table 4.5. Annual mean and SD cost of care at public level in 2008 international dollars, by site	130
Table 4.6. Annual mean and SD cost of care at public level in 2008 international dollars for different participant characteristics, by site.....	131
Table 4.7. Number (%) of participants using health services in the last 3 months, by site	133
Table 4.8. Mean and SD number of contacts by those using health services in the last 3 months, by site.....	136
Table 4.9. Direct medical costs at the private level in 2008 international dollars, by site	137
Table 4.10. Costs for medical care at the private level in 2008 international dollars, by site and gender.....	138
Table 4.11. Costs for medical care at the private level in 2008 international dollars, by site and age group	139
Table 4.12. Costs for medical care at private level in 2008 international dollars, by site and dementia status.....	140
Table 4.13. Costs for medical care at the private level in 2008 international dollars, by site and number of physical diseases.....	143
Table 4.14. Direct medical cost at the public level in 2008 international dollars, by site (based on UK unit cost method).....	144
Table 4.15. Costs for medical care at the public level in 2008 international dollars, by site and gender (based on UK unit cost method).....	145
Table 4.16. Costs for medical care at the public level in 2008 international dollars, by site and age group (based on UK unit cost method)	146
Table 4.17. Costs for medical care at the public level in 2008 international dollars, by site and dementia status (based on UK unit cost method).....	147
Table 4.18. Costs for medical care at the public level in 2008 international dollars, by site and number of physical diseases, by UK unit cost method	148
Table 4.19. Number (%) of participants receiving social care, by site.....	150
Table 4.20 a. Hours of informal care received per day among users, by site.....	151
Table 4.20 b. Hours of paid home care received per week among users, by site	151
Table 4.21. Cost of informal care at the private level in 2008 international dollars by site.....	153
Table 4.22. Cost of paid home care at the private level in 2008 international dollars, by site.....	153
Table 4.23. Cost of social care at the private level in 2008 international dollars, by site and gender	154
Table 4.24. Cost of social care at the private level in 2008 international dollars, by site and age group	155
Table 4.25. Cost of social care at the private level in 2008 international dollars, by site and dementia status.....	156
Table 4.26. Cost of social care at the private level in 2008 international dollars, by site and number of physical diseases.....	158
Table 4.27. Cost of informal care at the public level in 2008 international dollars using the ILO average wage method, by site	160
Table 4.28. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and gender	161
Table 4.29. Cost of social care at the public level in 2008 international dollars in 2008 using the	

ILO average wage method, by site and age	162
Table 4.30. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and dementia status	163
Table 4.31. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and number of physical diseases	165
Table 5.1. Distribution of number of assets, cumulative percentage by site	169
Table 5.2. Number (%) of participants with dementia incurring private-level costs, by site	174
Table 5.3. Private level mean and standard deviation costs in 2008 international dollars among participants with dementia, by site	175
Table 5.4. Number (%) of participants with dementia incurring public-level costs, by site	178
Table 5.5. Public level mean and standard deviation costs in 2008 international dollars among participants with dementia, by site	179
Table 5.6. Cost differences (in 2008 international dollars) between female and male participants with dementia, by site	182
Table 5.7. Cost differences (in 2008 international dollars) between participants with dementia in different age groups, by site	183
Table 5.8. Cost differences (in 2008 international dollars) between participants with dementia with different education levels, by site	184
Table 5.9. Cost differences (in 2008 international dollars) between participants with dementia in different marital status groups, by site	186
Table 5.10. Cost differences (in 2008 international dollars) between participants with dementia with and without income, by site	187
Table 5.11. Cost differences (in 2008 international dollars) between participants with dementia with different levels of household assets, by site	188
Table 5.12. Cost differences (in 2008 international dollars) between participants with dementia with and without memory impairment, by site	189
Table 5.13. Cost differences (in 2008 international dollars) between participants with dementia with different numbers of impaired cognitive domains (excluding memory), by site	190
Table 5.14. Cost differences (in 2008 international dollars) among participants with dementia with different BPSD severity scores, by site	192
Table 5.15. Cost differences (in 2008 international dollars) between participants with different levels of dementia, by site	193
Table 5.16. Cost differences (in 2008 international dollars) between participants with different subtypes of dementia, by site	194
Table 5.17. Cost differences (in 2008 international dollars) between participants with different numbers of physical impairments, by site	196
Table 5.18. Cost differences (in 2008 international dollars) between participants with dementia with and without depression, by site	198
Table 5.19. Cost differences (in 2008 international dollars) among participants with dementia who received different level of ADL care, by site	199
Table 5.20. Cost differences (in 2008 international dollars) between participants with dementia who received different level of IADL care, by site	200
Table 5.21. Cost differences (in 2008 international dollars) among participants with dementia who receive or do not receive supervision, by site	201
Table 5.22. Linear regression model of private level medical care cost	202
Table 5.23. Linear regression model of public level medical care cost	204
Table 5.24. Linear regression model of private level informal care cost	206
Table 5.25. Linear regression model of public level informal care costs	209
Table 5.26. Linear regression model of private level social care costs	211
Table 5.27. Linear regression model of public level social care costs	213
Table 5.28. Linear regression model of paid home care	215
Table 5.29. Linear regression model of private level total costs	219
Table 5.30. Linear regression model of public level total cost	221
Table 6. 1. Mean cost per year attributable to dementia in 2008 international dollars	226
Table 6.2. Mean attributable cost of dementia by level of severity in 2008 international dollars	227
Table 6.3. Mean cost attributable to the presence of different conditions in 2008 international dollars	228
Table 6.4. Total attributable cost of dementia in 2008 international dollars at the country level	229
Table 6.5. Total attributable cost of dementia by severity level in 2008 international dollars at the	

country level.....	230
Table 7.1. Health expenditure in project countries (2002-2010).....	234
Table 7.2.Out of pocket expenditure as percentage of total health expenditure for project countries	235
Table 7.3a.Total cost of health services in 2008 international dollar among all participants using the percentage method, by site.....	236
Table 7.3b.Total cost of health services in 2008 international dollars among participants with dementia using the percentage method, by site.....	236
Table 7.4a. GDP per capita from the World Bank (2002-2010).....	237
Table 7.4b. GDP per capita in WHO-CHOICE database (2007-2008).....	237
Table 7.4c. GDP per capita from WHO Global Health Expenditure Database (2002-2010)	238
Table 7.4d. GDP per capita from IMF World Economic Outlook Database (2002-2010).....	239
Table 7.5. Ratio between the project country cost and UK costs based on GDP method and WHO-CHOICE method.....	240
Table 7.6. PPP based unit costs of health and social care services in 2008 international dollars based on ratios generated from GDP method.....	240
Table 7.7a. Total cost of health services in 2008 international dollars among all participants using the GDP ratio method, by site	242
Table 7.7b. Total cost of health services in 2008 international dollars among participants with dementia using the GDP ratio method, by site	242
Table 7.8. Average income per month recorded in 10/66 study, in 2008 international dollars	243
Table 7.9a.Public level social care costs and total costs in international dollars among all participants estimated using 10/66 salary method, by site	244
Table 7.9b. Public level social care costs and total costs in international dollars among participants with dementia estimated using 10/66 salary method, by site	245
Table 7.10a. Public level social care costs and total costs in international dollars among all participants estimated using the replacement cost method, by site	247
Table 7.10b. Public level social care costs and total costs in international dollars among participants with dementia estimated using the replacement cost method, by site	248
Table 7.11a. Public level social care costs and total costs in international dollars among all participants estimated using different unit costs for loss of working time and loss of leisure time, by site.....	250
Table 7.11b. Public level social care costs and total costs in international dollars among participants with dementia estimated using different unit costs for loss of working time and loss of leisure time, by site	251
Table 7.12. Gender differences in average wage in China, Cuba, Dominican Republic, and India.....	252
Table 7.13. Monthly average wages for men and women in different countries in 2008.....	252
Table 7.12a.Public level social care costs and total costs in international dollars among all participants estimated using different average wage for male and female carers, by site.....	254
Table 7.12b.Public level social care costs and total costs in international dollars among participants with dementia estimated using different average wage for male and female carers, by site.....	255
Table 7.13a.Public level social care costs and total costs in international dollars among all participants estimated using different average wage for carers in working age and not in working age, by site	256
Table 7.13b.Public level social care costs and total costs in international dollars among participants with dementia estimated using different average wage for carers in working age and not in working age, by site	257
Table 7.14a.Public level social care costs and total costs in international dollars among all participants estimated using different average wage for different working age male and female carers, by site.....	258
Table 7.14b.Public level social care costs and total costs in international dollars among participants with dementia estimated using different working age male and female carers, by site	259
Table 7.15.Changing of the total costs when adjusted by gender only, age only and both, by site	260
Table 7.16a.Public level social care costs and total costs in international dollars among all participants estimated by including ‘other informal care’, by site.....	263
Table 7.16b.Public level social care costs and total costs in international dollars among	

participants with dementia estimated by including ‘other informal care’, by site.....	264
Table 8.1. Comparison of costs derived from Wimo et al and the current study.....	269
Table 8.2. Key differences in the cost of dementia among 10/66 study sites.....	275
Table A1.1. Amount of receiving health service uses in the last 3 months, by site and dementia status	304
Table A1.2. Hours of receiving informal care per day, by site and dementia status.....	305
Table A1.3. Hours of receiving paid home care per week, by site and dementia status.....	307
Table A2.1. Variables in Services.....	308
Table A2.2. Variables in hospital admission and medication	308
Table A2.3. Variables in social care	309
Table A3.1. Linear regression model of cost of dementia and other chronic diseases in Cuba ...	310
Table A3.2. Linear regression model of cost of dementia for each level of severity in Cuba.....	313
Table A3.3. Linear regression model of cost of dementia and other chronic diseases in the Dominican Republic	316
Table A3.4. Linear regression model of cost of dementia in each level of severity in the Dominican Republic	319
Table A3.5. Linear regression model of cost of dementia and other chronic diseases in Peru.....	322
Table A3.6. Linear regression model of cost of dementia in each level of severity in Peru	326
Table A3.7. Linear regression model of cost of dementia and other chronic diseases in Venezuela	330
Table A3.8. Linear regression model of cost of dementia in each level of severity in Venezuela	333
Table A3.9. Linear regression model of cost of dementia and other chronic diseases in Mexico.....	336
Table A3.10. Linear regression model of cost of dementia in each level of severity in Mexico..	339
Table A3.11. Linear regression model of cost of dementia and other chronic diseases in China.....	342
Table A3.12. Linear regression model of cost of dementia in each level of severity in China	345
Table A3.13. Linear regression model of cost of dementia and other chronic diseases in India..	348
Table A3.14. Linear regression model of cost of dementia in each level of severity in India.....	351
Table A3.15. Linear regression model of cost of dementia and other chronic diseases in Whole Sample.....	354
Table A3.16. Linear regression model of cost of dementia in each level of severity in Whole Sample.....	357
Table A4.1. Comparison between crude cost and attributable cost in 2008 international dollars.....	360
Table A4.2. Total crude cost of dementia in 2008 international dollars at the country level	361
Table A5. Mean cost attributable to different levels of dementia severity in 2008 international dollars	362

Contents of figures

Figure 1. Summary of private medical care cost calculation	96
Figure 2. Summary of public medical care cost calculation	99
Figure 3. Summary of cost calculation for social care in private and public level	119
Figure 4. Distribution of cost at the private level.....	170
Figure 5. Distribution of cost at the public level.....	171
Figure 6. Total mean private level cost of care for participants with dementia, by site	176
Figure 7. The distribution of private level care costs for participants with dementia, by site.....	176
Figure 8. The distribution of private level informal care costs for participants with dementia, by site.....	176
Figure 9. Total mean public level cost of care for participants with dementia, by site	180
Figure 10. The distribution of public level care costs for participants with dementia, by site.....	180
Figure 11. The distribution of public level informal care costs for participants with dementia, by site.....	180

Abstract

The aim of the study is to assess the impact of dementia in low and middle income countries (LAMICs) on service and family costs and to assess the impact of dependency and other factors on costs.

A prevalence-based bottom up cost-of-illness study was carried out using the database of the 10/66 dementia project in seven LAMICs (11sites, n=15,022). The total cost was divided into cost of medical care, informal care and paid home care. The perspective of costs included both the public and private level. Cost of medical care at the private level was the out-of-pocket expenses. Health service use was valued according to country specific unit cost based on UK unit costs and WHO-CHOICE ratios. Cost of informal care at the private level was valued based on real salary loss and on average wages at the public level. Regression models were used to identify predictors of cost and attributable costs of dementia.

The results showed that the average total costs for people with dementia were I\$1887 at the private level and I\$6750 at the public level. At the public level, 94% of total costs were due to social care, and 90.4% of social care costs were due to informal care. Physical impairment and Behavioural and psychological symptoms of dementia (BPSD) led to higher costs of informal care, but not for medical care. Average attributable costs of dementia were I\$5164, and were higher than for depression and other chronic diseases. Costs increased with dementia severity.

Estimates of total dementia costs are substantial and most of the care is due to support from unpaid family members. Interventions should be introduced both for dementia patients and their carers in the early stages of the condition dementia, so as to decrease the cost as well as improving quality of life.

Section1. Background

1.1. What is dementia

Dementia is a severe loss of mental ability. The main symptoms of dementia include memory loss, impaired abstraction and planning, language and comprehension disturbances, poor judgment, impaired orientation ability, decreased attention and increased restlessness, behavioural changes, being passive depressed or anxious, having delusions, suspicion, paranoia, hallucinations or sleep disturbances. Not surprisingly, these problems usually interfere with normal activities of daily living. Dementia is not an inevitable part of aging, but the majority of patients are older people. In this thesis, the focus is on dementia which occurs in later life (65 years and over).

The cause of dementia is usually the degeneration in the cerebral cortex. This region in the brain is responsible for thoughts, memories, actions, and personality. The cognitive impairment is the result from death of brain cells in this region. When dementia is diagnosed the main symptom is memory loss, but should be accompanied by at least one other cognitive deficit, including aphasia (language), apraxia (tasks), agnosia (pattern recognition), or executive function (decisions/planning). All these should lead to functional decline in terms of activities of daily life (ADLs) and instrumental activities of daily life (IADLs). ADLs include dressing, bathing, personal care, finding their way around home, and eating. IADLs include working, shopping, cleaning the house, handling money, using the phone, driving, transportation, or maintaining the home. Behavioural and psychological symptoms of dementia also occur in some patients. Behavioural problems refer to agitation, screaming, restlessness, wandering, sexual disinhibition, hoarding, or cursing. Psychological symptoms include anxiety, depression, hallucinations, delusions and apathy.

Alzheimer's disease (AD) is the most common subtype and represents over 50% of all dementia cases. Evidence shows AD prevalence doubles every five years after 60 years old. Patients have different stages of cognitive impairment, function loss and

psychiatric problems. Vascular dementia (VD) is the second most common dementia, which usually follows stroke or transient ischemic attack (TIA). Some patients have urinary incontinence quite early in the course of VD and have focal neurologic signs or cognitive signs. Dementia with Lewy Bodies (DLB) is a further subtype of dementia. Patients usually have symptoms of Parkinsonism and visual hallucinations. Finally, there is frontotemporal dementia (FTD). Patients often have executive dysfunction, disinhibition and apathy. Some patients have mixed dementia, such as AD and VD.

1.2. Prevalence of dementia

The prevalence of dementia is difficult to determine. This is because of the differences in definition and methodology used in different studies. Another reason is that there is often normal decline in functional ability with age. Current studies of the prevalence of dementia show that there are clear differences between areas. Recently, a study (Ferri et al., 2005) assessed the global prevalence of dementia using a Delphi method and results showed that the prevalence ranged from 1.6% in Africa to 6.4% in North America among people aged 65 years and over. The population based study carried out by the 10/66 Research Group (on which this thesis is based) found differences between seven low and middle income countries (LAMICs). According to the definition and criteria of DSM-IV, among people aged 65 years and over the prevalence was less than 1% in India and rural Peru, while it was 6.3% in Cuba (Llibre Rodriguez et al., 2008). The 10/66 study also indicated that the prevalence might be underestimated because of underreporting by relatives.

Many investigations have indicated that the prevalence in high income countries is higher than that in LAMIC (Fratiglioni et al., 1999; Kalaria et al., 2008; Llibre Rodriguez et al., 2008). A meta analysis in 11 European countries (Lobo et al., 2000) showed the standardised prevalence of dementia among people aged 65 years and over was 6.4%. An American study (Brookmeyer et al., 1998) showed that the prevalence in people aged 75 to 79, 80 to 84, 85 to 89 and 90 years and over were 4.3%, 8.5%, 16.0% and 28.5% respectively.

In the World Alzheimer Report of 2009 (Prince and Jackson, 2009), it was estimated that there were 35.6 million people living with dementia worldwide in 2010, increasing to 65.7 million by 2030 and 115.4 million by 2050. Although the prevalence of dementia is higher in high income countries, the number of people with dementia is not small in LAMICs. According to a report from the World Health Organisation (WHO) (WHO, 2002), three-quarters of people aged 60 and over live in LAMICs. Furthermore, new dementia cases are estimated at 4.6 million per year, mainly in China and south Asia (Kalaria et al., 2008). The Delphi study (Ferri et al., 2005) showed that in 2040, 71% of people with dementia will live in LAMICs. Therefore, it is clear that the number of people with dementia is set to increase in the next decades, especially in LAMICs.

1.3. Care for dementia people

Currently, there is no way to distinguish between people who will develop dementia and those who will not. Although several drugs may slow the progression of dementia, there is no effective medicine or intervention which can prevent or cure the disease. There is clear evidence that the mortality hazard among dementia patients is much higher than for those without dementia (Nozari et al., 2009; Prince et al., 2012a). The importance of care for dementia is clear because of the features of the disease, i.e. unclear cause, no prevention, no effective treatment and fatal outcome.

However, care for a person with dementia is difficult and complex and the caregiver burden for a patient with dementia is much higher than for those without it (Cotter, 2007; Dunkin and Anderson-Hanley, 1998; Grafstrom and Winblad, 1995). People with dementia have to overcome limitations in functional and cognitive domains, while their caregivers have increasing responsibility for providing help relating to activities of daily life and have to cope with the increasing dependency of the patient. Caregiver burden is substantial especially when the person with dementia has behavioural and psychological symptoms of dementia (BPSD) (Matsumoto et al., 2007).

In high income countries, many dementia patients are in nursing homes or institutions

(Grafstrom and Winblad, 1995; Schulz et al., 2004), and this may reduce some of the burden on caregivers (Zarit and Whitlatch, 1992). Compared with high income countries, more dementia patients are living at home and taken care of by unpaid family members in LAMICs, which leads to high costs of informal care in these countries (Prince, 2004; Wimo and Prince, 2010).

1.4. Cost of dementia

According to recent estimates in the World Alzheimer's Report 2010 (Wimo and Prince, 2010), the worldwide costs of dementia are around US\$604 billion. These costs are equivalent to about 1% of the world's Gross Domestic Product (GDP). The costs of informal care and social care contribute most to this figure. The cost of informal care accounts for 58% of dementia costs in low income countries, 65% in lower-middle income countries and 40% in high income countries. Current estimates of dementia costs are substantial and these costs are expected to increase particularly in low and middle income countries (LAMICs), where population aging will be more pronounced (WHO, 2002) and so there will be relatively larger increases in the number of people with dementia (Wimo et al., 1997). Informal care represents a significant proportion of the total cost, especially in LAMICs (Gauthier and Touchon, 2005; Petersen et al., 1997). More details of current evidence regarding the costs of dementia will be summarised below and limitations of studies will also be discussed.

1.5. Rationale for investigating the costs of dementia

The health and welfare systems in LAMICs are not developed sufficiently to treat chronic conditions and in most cases are not able to adequately assist the elderly (Prince, 1997). Only a few governments have made dementia a health care priority (Brodaty et al., 2011). Assessing the costs of dementia using a robust methodology can provide policy makers with key information. First, by providing evidence on the cost of dementia it will be possible to see what savings could occur if there is an intervention to reduce the prevalence of the disease, or to reduce severity or slow down progression. As mentioned before, currently, there is no cure for dementia but

by estimating costs for different stages of dementia, the amount that would be saved if progression was delayed can be indicated. Second, a cost of illness study may help policy makers to realise that dementia utilises a high level of resources, which are not matched by research investment (Lowin et al., 2001). Third, although cost of illness studies do not provide sufficient information to identify efficient resource allocation (Byford et al., 2000; Rice et al., 2001), and may even “confuse, mask and mislead decision-makers” (Shiell et al., 1987), they can help identify the resources which should be included in economic evaluations (Behrens and Henke, 1988; Hodgson, 1989), which may assist policy makers in carrying out health/social care reforms (Knapp, 2007). Moreover, cost of illness studies can contribute to developing new strategies for dealing with conditions. For example, the United Kingdom and Australia released national reports (Alzheimer's Australia, 2011; Knapp et al., 2007) of dementia recently and establishing the cost of dementia was a key aspect of these reports. Following the UK report, new policy strategies (Department of Health UK, 2009) have been outlined to improve the services for the dementia patients.

Cost of illness studies do though often have methodological limitations. For example, if comorbidity is neglected then the costs assigned to a particular condition may be artificially high (McCrone, 1998). There is also debate about the most common method for valuing lost work and caregiver time in cost of illness studies - the human capital approach. This uses the average or age-gender specific wage but these may not truly represent productivity because of imperfectly functioning labour markets. Another approach for valuing informal care, the replacement cost method, has also been criticised. This uses a market price to value informal care based on what one would have to pay to replace the carers if they were not available. The method neglected the differences between formal and informal care in terms of efficiency, quality and any emotional input by informal carers (Koopmanschap et al., 2008).

1.6. Key issues in cost of illness studies of dementia

The prevalence approach or incidence approach

Two approaches can be used for conducting a cost-of-illness study for dementia: the prevalence approach or incidence approach (Wimo and Prince, 2010). The prevalence

approach usually uses cross-sectional data and the cost in one specific year is calculated for people with a specific condition such as dementia. This also allows the total cost for a country or a region to be estimated at a given time. The incidence approach uses a prospective design. New cases are identified and followed up over a period of time (usually lifetime) to show the cost over the disease course. Results generated using the incidence approach can demonstrate the economic consequences of care needs at an individual levels. Not surprisingly, the two approaches can produce very different findings.

One of the key objectives of this study is to assess the economic impact of dementia and to provide evidence as to the costs to policy makers. The prevalence approach to conducting a cost-of-illness study was considered to be most appropriate. It is easier as data are collected at one point in time rather than over the course of dementia.

In recent years, the 10/66 Dementia Research Group has conducted population-based surveys of dementia prevalence, incidence and impact in several LAMICs (Prince et al., 2008a; Prince et al., 2004b). The name ‘10/66’ reflects the fact that about 66% of people with dementia live in LAMICs, while only 10% of the research that is conducted is based on these populations (Prince et al., 2007). The prevalence study across seven countries was finished by 2007 and the database was released for public use (Llibre Rodriguez et al., 2008). The work of the 10/66 Dementia Research Group provided a good opportunity to carry out a cost-of-illness study of dementia based on the prevalence approach.

Top-down method and or bottom-up method

For the calculation of costs in a cost-of-illness study, either a ‘top-down’ method or ‘bottom-up’ method can be used. The top-down method is uses cost data at collected at a macro or national level (e.g. from national registers) and costs can be distributed across different conditions. An example of a cost-of-illness study using the top-down method can be found from the Netherlands (Meerding et al., 1998). The study collected information on healthcare use from 22 healthcare sectors, and total cost was separated into 34 diagnostic groups. The results showed dementia was the leading cost among people aged 65 years and over, accounting for 9.5% of total health care costs among people aged 65-84 years and 22.2% among people 85 years and over.

But one of the problems with the top-down approach is that it can be difficult to allocate some costs to specific conditions.

The bottom-up method collects cost information at the individual level and the data is aggregated to generate the total cost for a condition. One of the problems is that the cost of care for people with (in this case) dementia may incorporate costs that are due to other conditions. It can be, therefore, difficult to distinguish the cost that is attributable to the condition of interest (Wimo and Prince, 2010). Examples of studies using the bottom-up method are summarised below.

Categorisation of cost and classification for developing countries

In economic analyses, costs are often categorised as direct costs and indirect costs. Broadly, direct cost refers to resources used, while indirect cost refers to resources lost (Wimo et al., 2007). Direct costs include any paid activities (Chisholm et al., 2000a) or behaviours which can be estimated directly from the market value or expenditure on services (Kang et al., 2007; Ostbye and Crosse, 1994). Direct costs can be divided into direct medical costs and direct non-medical costs (such as transportation costs) (Meltzer, 2001). Indirect costs largely refer to loss of productivity (Meltzer, 2001) or other impacts including costs due to being unable to engage in leisure (Chisholm et al., 2000a), and the decline in quality of life for the patient and emotional impact on caregivers (Knapp, 2007; Ostbye and Crosse, 1994). .

However, there is controversy surrounding the direct and indirect cost classification. For example, how best to categorise the cost of unpaid time spent on providing health and social care and support from family members and friends has been debated. Some researchers assume this is direct cost (Chisholm et al., 2000a) because they indicate the use of a resource (caregiver time), while others insist this is a type of indirect cost (Ostbye and Crosse, 1994) and it may more appropriate to treat it as lost productivity or leisure time. In the World Alzheimer Report 2010 (Wimo and Prince, 2010), the cost of unpaid family caregivers was classified as an indirect cost.

From literature reviews of the definitions of direct and indirect cost, it is clear that there is an overlap between the two. The main focus is how to categorise costs from

unpaid family members, which in some studies have been shown to account for about one-half of the total costs of dementia in Europe (Jonsson and Berr, 2005) and at least one-tenth of the total costs of dementia in LAMICs (Kang et al., 2007).

In this thesis, the cost of dementia is divided into two categories: the cost of medical care and the cost of social care. The cost of medical care includes costs of direct medical inputs, costs of direct non-medical inputs and indirect cost. Cost of direct medical care refers to the cost incurred through medical diagnoses, assessments and provision of treatment. Cost of direct non-medical inputs includes non-medical activities undertaken when receiving medical care, such as transportation costs. Indirect costs here include the productivity loss from carers that arises when accompanying the patient to receive medical care. Productivity losses for the participants themselves were not included as most of them were retired and the costs were considered to be very low (Wimo et al., 2011). The cost of social care refers to costs related to social welfare and support systems, as well as costs of family inputs. As informal care is an important component of total cost and is an interesting topic all over the world, it will be estimated separately within the category of social costs. Another component of social care in this thesis is paid home care, which does not refer to professional home care but refers to general household aid.

Perspective of costs

Cost can be estimated from different perspectives and these generate different results (Meltzer, 2001). Most cost of dementia studies have estimated cost at a societal level while others have used a more narrow perspective, such as costs for patients and their families (Jonsson and Berr, 2005). Both perspectives are important to evaluate the economic burden of dementia. In this thesis costs are reported at the public (government funded services) level and private (family and patient costs) level.

1.7. Review of previous cost of dementia studies

A review of how to estimate the cost of dementia in developing countries was conducted. At the same time, results from cost of dementia studies were also reviewed. Papers were identified using Pubmed. The search terms were (“cost” or

“cost-of-illness” or “expenditure” or “economic”) and (“dementia” or “Alzheimer’s disease”). Economic evaluations, which did not describe cost estimates in detail, were excluded. Papers which were not published in English were also excluded.

Cost-of-illness studies for dementia have been conducted in many (mainly high income) countries. National or regional reports have been published for the UK (Knapp et al., 2007), Europe as a whole (Jonsson and Berr, 2005; Wimo et al., 2011), the United States (Alzheimer's Association, 2012), and Canada (Alzheimer Society of Canada, 2010). In 2010, Alzheimer’s Disease International released the World Alzheimer’s Report 2010 (Wimo and Prince, 2010), which focused on the global economic impact of dementia. In addition to these comprehensive reports, much research has been carried out in specific high income countries, including Sweden, Denmark, Norway, and Finland (Jonsson et al., 2006), Korea (Kang et al., 2007), Germany (Kiencke et al., 2010), Hungary (Ersek et al., 2010), and Taiwan (Kuo et al., 2010). Evidences is also accumulating in middle and low-middle income countries, including Turkey (Zencir et al., 2005), Argentina (Allegri et al., 2007) and China (Wang et al., 2008).

In reviewing relevant cost of dementia studies it is apparent that there are two key ways to obtain relevant information: (i) collecting primary data directly from patients and (ii) using secondary data sources. The first approach can be facilitated by conducting primary surveys among people with dementia, while the second approach is to conduct analyses using summaries of the results contained in published studies.

Many cost of dementia studies calculate costs using information collected directly from (or relating specifically to) people with dementia. This approach can be easily carried out and is quite straightforward if a valid diagnosis can be obtained. However, this method is often carried out regardless of whether the costs relate specifically to dementia, and so it may over-estimate the costs of dementia. This may be a serious problem in this area as a large proportion of people with dementia are likely to have co-morbid conditions (Akobundu et al., 2006). Considering this problem, some studies (Wang et al., 2008) have attempted to collect cost information that relates only to the disease. However, this is hard to distinguish if the person has many co-morbid conditions. Moreover, dementia can increase the risk of some co-morbid conditions,

such as hip fractures, but costs of hip fractures may be not included in the cost of dementia. In this situation, the cost of dementia might be underestimated. Attributable cost, sometimes called the net cost (Ostbye and Crosse, 1994; Wimo and Prince, 2010), refers to the costs that arise specifically from dementia. A review studies estimating attributable cost will be provide below after a review of studies that have included all care costs.

Primary data studies to estimate cost of care for people with dementia

A study conducted in Sweden, Denmark, Norway and Finland included 272 patients (and caregivers) using memory clinics (Jonsson et al., 2006). Cost data were obtained using the Resource Utilization in Dementia (RUD) instrument, which has been shown to be a valid and reliable instrument for estimating resource use, especially caregiver time (Wimo and Nordberg, 2007). The perspective of this study was the societal level. Unit costs were collected from the opportunity cost of the resource. In this study, cost was divided into the costs of medical care and informal care. Cost for medical care included inpatient services and prescriptions. Informal care time was collected and the opportunity cost for the time was estimated separately for lost production time and lost leisure time. The value of lost production was defined as the value of the average salary, while the value of lost leisure was taken from a previous study carried out by the Swedish Road Authority. Money was presented in Swedish Kronor (SEK) (1 US\$=8.09 SEK (September 2003)), but inflated using the standard consumer price index for other non-Swedish countries. Total annual costs per patient were about 172,000 SEK (21,260 US\$). The average cost for people with severe dementia was higher than that for mild ones dementia (375,000 SEK (46,354 US\$) and 60,700 SEK (7503 US\$) respectively). Informal care time and its cost were associated with the Mini Mental State Examination (MMSE) rating. MMSE is a questionnaire to evaluate the cognitive impairment of dementia patients. The study showed the more severe the cognitive impairment was, the higher the patient costs. In general, the cost for community care represented about half of the total cost (51%), and costs for informal care and medical care were 27% and 22% of the total cost respectively.

A similar study conducted in Germany used data from a health insurance company (Kiencke et al., 2010). This study demonstrated that the average annual cost for a patient with dementia was from €7,028 (memantine group) to €13,549 (psychotropic

drugs and hypnotics/sedatives group) in 2005, and about half of the costs were due to professional paid home care.

A Hungarian study conducted in 2008 with 88 patients with dementia and their carers, recruited in a cross-sectional non-population based study, was conducted by Ersek et al. (2010). Bottom-up cost-of-illness calculations were used to estimate the cost of care for patients living at home. Official reimbursements were used as the costs for patients living in nursing homes. The findings showed that the average annual cost for people with dementia living at home was slightly higher than the cost for patients who lived in nursing homes (€6432 vs €6086). Costs were estimated at €846.8 million for the whole population. More than a half of the cost was due to direct care and 36% of the cost was a result of informal care.

A study carried out in Spain (Coduras et al., 2010) showed different distributions of costs of informal care, paid care and medical care. The study followed up 560 patients for one year. Patients were selected from neurology clinics by retrospective sampling procedures. Information on the use of health services were extracted from medical records, and data on the use of non-health resources were collected by interviewing caregivers. Total cost was divided into indirect, direct healthcare and direct non-healthcare cost. Indirect costs were the costs of work absence for informal caregivers. The unit costs of this were derived from the salary reported by interviewed caregivers, according to human capital method. Direct healthcare included medication, medical consultations, hospital admissions due to AD, medical testing, attendance at day centres, admission to residential care, and institutionalisation. Prices of healthcare services were obtained from a published database. Direct non-healthcare included both professional and informal caregiving involved in basic and instrumental activities of daily living and supervision. Unit costs of the time spent providing informal care and supervision was based on the median level of caregiver income. Costs of other items, consumables, and structural changes to the home due to AD, as well as patient transportation for healthcare needs were also included in the total cost, and were obtained from the patient/caregiver or by using official rates for patients whose information was not available. Time spent providing care and supervision by professional caregivers was priced using an average cost from a sample of companies and/or associations offering this service.

Other patient out-of-pocket expenses were determined by patient/caregiver reports. The results showed monthly average costs per patient were €1426, and these increased 10% over one year. The main increase was attributed to drugs, nursing home utilisation and institutionalisation. Most cost corresponded to care and supervision provided by unpaid family members (68% at baseline and 52% at one year follow-up). This decrease in the proportion of informal care was due to the increase of paid care and medical care.

The increase of total cost shown above was also revealed in another study from Spain (Turro-Garriga et al., 2010). This followed up 169 dementia outpatients and their caregivers for one year and found the cost increased 29% over time. It was reported that the increase was associated with physical and cognitive disability, age of the patients, and whether this was the only caregiver.

Costs estimated from a further Spanish study (Lopez-Bastida et al., 2006) were higher than those reported by Coduras's et al. Primary family caregivers for 237 AD patients were interviewed in 2001. Costs of direct health care included hospital admissions and emergency visits due to problems related to AD, and the unit costs were based on the Spanish Database on Medical Costs (SOIKOS), a relatively comprehensive database of health care unit costs in Spain. The costs of direct non-health care in this study referred to the informal care and were valued using the wage for a domestic cleaner. Indirect costs were the production loss caused by early retirement of the patients. Results from the study showed the average annual cost per patients with AD was €28,198 (about €2350 per month).

In the United States, 195 patients with dementia living in the community were recruited from three sites (Zhu et al., 2008c). Information on patients' use of direct medical care, direct nonmedical care and informal care were collected in the study. Direct medical care included hospitalisation, outpatient treatment and procedures, assistive devices, and medications. Direct non-medical care included home health aides, respite care, and adult day care. Unit costs for direct care were obtained from a public database (Zhu et al., 2006b) released by the Healthcare Cost and Utilization Project (HCUP). The project provided a national information resource on patient-level health care data in the United States, including cost and other data about

health services (US Department of Health and Human Services, 2012). For informal care part, carer hours for help with ADLs (including eating, dressing, and personal care) and IADLs (including shopping, chores, personal business, and transportation) were recorded. Unit costs of informal care were estimated from national average hourly wages. All cost values were adjusted by the medical care component of the Consumer Price Index of 2004. The results showed the average annual costs for Lewy bodies (DLB) patients and AD patients were about \$35,000 and \$25,000 each. The non-medical costs were higher among AD patients (\$1,478 vs \$947) and indirect costs were higher among DLB patients (\$23,036 vs \$17,136).

In Taiwan, cost information on 140 patients living in the community and those in institutions were collected from 2007 to 2008 (Kuo et al., 2010). Direct costs included medical care (such as outpatient services, inpatient stays, emergency service contacts, pharmacotherapy, and other therapies related to dementia) and personal care (such as nutritional supply, diapers, assistive devices, and clothing). The cost of medical care was estimated from out-of-pocket costs to families. Personal care service costs and transportation were also estimated. Indirect costs included the time costs to patients and caregivers for receiving the medical services, and the productivity loss in terms of reduced paid and unpaid economic activity. The value of the time spent by family members was assumed to be equivalent to the market value of home helps. The value of the productivity loss for informal caregivers was calculated according to their previous salary. The findings showed annual direct cost of institution-living patients was higher than the cost of community-living patients (464,193 New Taiwanese Dollar (NTD) (14,750 US\$) vs 144,047 NTD (4577 US\$)) and the main contributor to the total was the cost for care services. The indirect cost was higher in the home care group compared with the institutional care group (287,904 NTD (9149 US\$) vs 35,665 NTD (1070 US\$)) and the main component of this was the cost of family time spent in caring and travelling.

A study in Korea (Kang et al., 2007) recruited and interviewed 609 dementia patients and both direct and indirect costs were estimated. Direct cost referred to the costs which could be calculated using market values for diagnosis, treatment, care and rehabilitation. The direct cost was also further divided into medical costs (including costs for inpatient and outpatient services and related medication expenses), and

non-medical costs (out-of pocket expenses for alternative services, supplies, home care, transportation, accommodation and food). Indirect cost was based on production losses of patients and their caregivers, represented by the loss of salary or income. Average incomes or salaries were used where it was difficult to obtain actual data. The results showed that the average total cost per dementia patient was \$7462, consisting of direct costs of \$6626 and indirect costs of \$836. The cost increased with increasing degrees of limitation in the patient's ADL. The total annual cost for the country was estimated to be 1.3-3.3 billion US dollars. Indirect costs accounted for only 11% of the total cost and this differed from an earlier study in Korea which found costs of informal care and missed work of caregivers were 55% of total annual cost (Suh et al., 2006). In this other study, informal care was valued according to the replacement cost approach by using the market price of paid professionals.

In addition to evidence from high income countries, information on costs can also be obtained from some developing countries. An observational study was carried out among 42 AD patients and their caregivers in Turkey (Zencir et al., 2005). The direct costs included medication and outpatient visits, and the indirect costs came from caregiver time to help with ADL and IADL. Medication was included but only drugs related to AD, with the unit cost of the medicine based on the average market price. Cost of outpatient visits was based on the average price of a private and public physician visit. Indirect costs were valued based on the wage of a nurse working at a public institution. The results showed the average annual cost per patient was between US\$1766 for mild decline of cognitive function and US\$4930 for severe cases. Medication costs were the most important cost among patients with mild or moderate decline of cognitive function, while costs for caregiver were the highest components among patients with severe decline of cognitive function. Cost of outpatient visits among patients with severe decline of cognitive function was the lowest among all patients.

Another example of a cost study for dementia in a LAMIC was from Argentina (Allegri et al., 2007). The investigators recruited 80 dementia patients from the community, 20 from institutions, and 25 people without dementia. The total costs of dementia were divided into direct costs and indirect cost. Direct costs included costs related to the care for the patients, such as medical care and other non-medical costs

incurred for receiving care. Unit costs of medical care service were estimated from official figures while the cost of prescriptions was obtained from pharmacy shops. Payments to salaried caregivers were based on self-report by relatives. The indirect costs in this study referred to informal care costs. Hourly wages were used to estimate the cost of informal care. The results showed the annual total cost of dementia was \$8130 per patient living in the community and \$14,860 for institutionalised patients. The research group further compared the costs among dementia sub-types (Rojas et al., 2011) and found no significant difference between the total costs among these.

Wang et al investigated 67 AD patients who attended AD clinic visits in a general hospital in Shanghai, China and their caregivers (Wang et al., 2008). Patients and caregivers were asked for information about resource utilisation during the past year. Direct costs were estimated from drug treatment provided, number of outpatient visits, inpatient admissions, transport, and formal or professional care. Indirect costs referred to unpaid caregiving. Unit costs were derived from published prices of licensed drugs, local taxi price guidelines and market prices for home care and home help services. Indirect costs were valued according to the minimum hourly wage. For health care costs, only costs related to AD were recorded. The results showed the average direct cost and indirect cost per year was 8432 Chinese Renminbi (RMB) (1058 USD) and 10,568RMB (1326 USD) respectively.

Primary data studies to estimate cost of care attributable to dementia

Cost of dementia studies that seek to capture all costs for people with the condition have been described in the former section. This subsequent section will review studies that have sought to estimate *attributable* cost of dementia. Typically, these kinds of study recruit not only dementia patients but also people with normal cognitive status, so as to estimate the additional cost of dementia. The advantage of the attributable cost approach is that the cost should not be greatly influenced by other chronic conditions, which also lead to costs of medical care and social care. As such, this approach allows a better estimate of the ‘true’ cost of dementia.

However, this method also has disadvantages. As Wimo and Prince suggest (Wimo and Prince, 2010), it is difficult to distinguish the real attributable cost. For example, if a patient is totally dependent because of other physical problems acquired before

dementia, he or she may already receive sufficient care. The amount of the care may not increase because of a dementia diagnosis. However, that does not negate the reality that the patients do need care because of dementia and therefore some cost would occur due to it. In this situation, the attributable cost is difficult to define.

Certain methodological challenges therefore exist in the estimation of attributable costs (Akobundu et al., 2006). The attributable cost can be estimated by subtracting costs from matched controls considering important socio-demographic characteristics and co-morbid conditions. However, this method may overestimate the cost which may be influenced not only by matched factors. Another method for calculating the attributable cost is to run regression models by controlling for confounding factors. Both the subtraction method and the regression method have been used in published papers.

A Canadian study (Ostbye and Crosse, 1994) collected data from 10,263 people aged 65 years and over. Direct costs and indirect costs were estimated in the study. Direct costs referred to those that could be assessed directly from the market value of services, while indirect costs meant the costs related to unpaid care from family members. Costs were estimated for patients in different settings including the community and long-term care institutions. The cost of direct care per control subject was subtracted from the cost for those with dementia. The net cost for informal care was calculated by multiplying the net average hours per patient by a low estimation of the cost of professional caregiver time (\$10). The annual net economic cost of dementia for Canada was estimated to be at least \$3.9 billion. Care in long-term institutions and assistance with ADLs by professionals, family and friends in the community were the most significant components of the total.

A cost of dementia study in Denmark (Andersen et al., 1999) investigated costs for 245 people with dementia and 490 controls matched according to age and gender from the Danish Population Register system. The net cost of dementia was estimated using the subtraction method. However, resources identified in this study only included services from physicians, hospitals, community services, and specialised equipment. It did not include the cost of unpaid care by family members. The results showed that the estimated annual net cost of dementia per person was DKK 77,000

(11,473 US\$). About three years later, a total of 465 people with and without dementia were interviewed again to show the influence of disease progression on changes in costs of health care (Andersen et al., 2003). The results showed health care costs increased with disease progression, particularly because of the decline of functional abilities.

A US study (Joyce et al., 2007) recruited 2475 AD patients and 4950 matched controls to examine the attributable direct costs of medical care for patients newly diagnosed with AD. Cost information was collected from inpatient, outpatient and pharmacy services both at the pre-diagnosis and follow-up period. This study found AD patients had costs that were four times higher than those for matched controls. However, informal care costs were not included.

An Israeli study (Beeri et al., 2002a) included 71 AD patients living in the community, 50 patients from institutions and 50 healthy subjects to explore the attributable cost of dementia. The difference in costs between AD patients and healthy controls was assumed to represent the attributable cost of AD. Direct costs included hospitalisation, visits to doctors, social services and medications. Caregivers were asked to report what extra services or help was needed by patients because they had dementia. The cost for the extra services or help was treated as the attributable indirect cost of dementia. The results showed the total costs for community-living patients were similar to the costs for institutionalised patients (about \$17,000 per patient). However, indirect costs accounted for 60% of the total for community-living patients, while direct costs accounted for 85% of the total for institutionalised patients.

Another study from the US (Hill et al., 2005) recruited 6075 patients with dementia (broken down into sub-types) and/or cerebrovascular disease, and 14,023 people without dementia or cerebrovascular disease to act as controls. All costs related to health care services. The costs attributed to dementia patients were estimated from regression models controlling for demographic factors and comorbidities. The results showed costs for medical care among VD patients were the highest, followed by AD, other dementias (OD), and cerebrovascular disease without dementia (CVD).

Kuo et al examined the net cost attributable to AD in the US (Kuo et al., 2008). A

total of 25,109 AD patients were identified from a database and for each case three demographically matched controls were also selected. Costs were generated according to diagnostic cost group (DCG) models by using specific software to predict cost according to patients' demographic profiles and diagnosis (DxCG, 2003). The incremental cost of AD (i.e. the net cost) was calculated according to a regression model controlling for illness burden. Results showed that the estimated net cost of dementia was \$2307 per year, and the key driver of the cost was inputs from the outpatient pharmacy.

Secondary data studies to estimate the costs of dementia

Two influential papers that have used the second approach were published in 2006 and 2007 (Wimo et al. 2007; Wimo et al. 2006). In these studies, age-specific dementia rates were estimated based on comprehensive literature reviews. The authors assumed the distribution of prevalence to be similar worldwide. They also assumed a relationship between dementia costs and GDP per person. This ratio could be calculated for some countries and was then used to estimate costs in other countries where dementia costs had not been calculated. For informal care costs, the authors reviewed about 40 studies to estimate the proportion of patients living at home and hours per day of informal care provided to them. The estimated worldwide cost of dementia was US\$315 billion in 2005 with about 75% of the total costs occurring in high income countries. The highest costs were in the USA (US\$76 billion), followed by Japan (US\$34 billion) and China (US\$30 billion). The lowest costs were in Malawi (US\$7.1 million), Somalia (US\$14.0 million) and Chad (US\$21.1 million). The figures were updated in 2009 (Wimo et al., 2010) and these showed the cost of dementia at the societal level increased by 34% from 2005 to 2009. The greatest increases occurred in LAMICs.

The World Alzheimer's Report 2010 (Wimo and Prince, 2010) gave a comprehensive summary of the worldwide costs of dementia. The estimates of these costs were based on a gross cost-of-illness study using the prevalence approach from a societal perspective. Information was extracted from various sources and published papers. The global prevalence of dementia was based on an estimation from the World Alzheimer's Report in 2009, in which a systematic review was conducted. Costs in this report were divided into direct costs and costs for informal care. The direct costs

consisted of costs for medical care and costs for social care (in long-term residential or nursing home care facilities). Imputations for countries without data on direct costs were based on information from 21 countries where direct costs were available. Regional imputations were firstly conducted for local similar countries and the costs in the remaining countries were estimated using the GDP ratio method described above. For informal care, the proportions of patients living at home were estimated from a worldwide questionnaire survey conducted by Alzheimer's Disease International (ADI). Information was collected for ADLs, IADLs, and supervision and this could be linked to 63% to 73% of the worldwide dementia population. Data for the remaining countries were imputed using the same procedure as in the estimation of direct costs. Costs were valued using average wages from the International Labour Organization (ILO) LABORSTA database. Imputation was conducted for countries without wage information according to countries with a similar GDP per person in the same WHO region. Average wages for males and females were used separately based on the estimation of caregiver gender distribution. The total worldwide costs of dementia were estimated to be US\$604 billion in 2010 and 70% of the costs were from Western Europe and North America. The cost per patient with dementia was the highest in North America (US\$48,605) and lowest in South Asia (US\$903) and Western Sub-Saharan Africa (US\$969). Findings from the report emphasised the difference in the care patterns in developed and LAMICs. In particular, it is apparent that the direct costs of care are key in high income countries, while costs for informal care are crucial in LAMICs.

Besides the above work of Wimo and colleagues, there have been country-specific estimates based on secondary data. A cost study on brain disorders in Finland (Sillanpaa et al. 2008) showed that dementia costs were highest among 12 selected conditions. This study reviewed evidences from the literature and estimated the costs to be nearly €1 billion for the whole country and about €20,000 per patient in 2004. There were four cost studies which used the same methodology as the study in Finland, being conducted in Belgium (Schoenen et al., 2006), Denmark (Olesen et al., 2008), Italy (Pugliatti et al., 2008), and Norway (Stovner et al., 2010). The results showed that dementia was one of the most costly diseases in the four countries: €2.2 billion for Belgium (€16,000 per patient), €800 million for Denmark (€15,000 per patient), €8.6 billion for Italy (€15,000 per patient), and €700 million for Norway

(€17,000 per patient). However, none of these studies clearly reported the indirect cost of dementia. Most studies (Olesen et al., 2008; Schoenen et al., 2006; Sillanpaa et al., 2008; Stovner et al., 2010) have also only reported cost for direct health care and direct non-medical cost. A similar study was carried out in Austria (Wancata et al., 2007) but because of language barriers, the full paper this was not reviewed.

Wimo and colleagues provided an updated estimate of the economic impact of dementia in the 27 countries of the European Union in 2008 (Wimo et al., 2011). Data were based on published European cost of illness studies. The costs were estimated to be €160 billion (€22,000 per patient per year). Across the European Union costs for informal care were 20% higher than for direct costs.

The economic and social cost of dementia was also investigated in Ireland based on secondary data analysis (O'Shea and O'Reilly, 2000). Economic impacts included mortality and life years lost, inpatient services, family care, community care and long term care. The loss of life was presented in years, and other effects were estimated in monetary units. The results showed that the costs for family care contributed most to the overall cost (IR£123 million, 50% of the total), followed by the cost of residential care (IR£81 million, 33% of the total) and community care (IR£24 million, 10% of the total). Inpatient care only accounted for 7% of total costs.

Predictors of costs

A number of studies have explored the predictors of cost. For example Bianchetti and colleagues carried out a longitudinal study from 1994 to 1996 in Italy among 103 patients living at home, and found that worse functional status of IADL and male gender predicted higher costs (Bianchetti et al. 1998). The study carried out in three sites in the US found patient dependence explained most variation in nonmedical costs, and functional impairment was the variable most associated with caregiving time (Zhu et al., 2008a; Zhu et al., 2008b). The study based in Sweden, Denmark, Norway and Finland (Jonsson et al., 2006) found lower cognitive function, worse behavioural disturbances, longer time since diagnosis, and higher dependency to predict higher costs. The study conducted in Shanghai, China (Wang et al., 2008) found total cost of dementia was associated with severity measured by cognitive function and ADL.

In another study, a sample of 1222 patients was recruited from Spain, Sweden, the UK, and the US (Gustavsson et al., 2011). The aim of the study was to identify predictors of the cost of care for people with AD. The findings revealed that ability to perform ADL was the most powerful predictor of costs for community residents in all countries. Other studies have also examined the relationship between severity and cost (Allegri et al., 2007; Gustavsson et al., 2011; Herrmann et al., 2010; Hux et al., 1998; Kang et al., 2007; Wimo et al., 1997; Wimo et al., 2007) and found a positive relationship. A very recent study only focused on the quantity of informal care among adults with cognitive impairment (Okura and Langa, 2011). The results showed the more severe the neuropsychiatric symptoms the patients had, the more hours of informal caregiver time were provided. This result demonstrated that neuropsychiatric symptoms are key predictors of cost in dementia patients.

1.8. Rationale for the current study

It is clear that until now most cost of dementia studies have come from high income countries, especially from Europe and North America. Some countries, such as the US have also produced comprehensive dementia reports that include information on the use and costs of health care services, long-term care services and hospital care (Nozari et al., 2009). Compared with high income countries, the evidence is lacking from large-sample population-based studies on the care of dementia and associated costs in LAMICs. Before 2008, the only study from South America which could be found was from Argentina (Allegri et al. 2007). Later the research group expanded the project and publish another paper (Rojas et al., 2011). Recently, there was a paper published from China, focusing on the cost of dementia (Wang et al., 2008). However, these studies were not all community based and very few patients were recruited.

Current estimations from secondary data for developing counties are indirect and rely on several assumptions. Some important parameters employed during the cost estimates, such as the prevalence of dementia and informal care time, have to be based on various assumptions. Cost estimations for LAMICs that rely on fewer assumptions are therefore warranted.

In summary, further research into the economics of dementia care in LAMICs is highly relevant, because:

- Dementia is a disease that is becoming increasingly prevalent and affects the elderly in LAMICs where the welfare systems are least able to cope.
- Findings on the cost of dementia based on robust methodologies will highlight a large and growing problem and provide policy makers with important information.
- Evidence on the costs of dementia, as well as the predictors of cost, are lacking in LAMICs.

1.9. Aim and objectives of the current study

This PhD project is based on analyses of data from an international collaborative dementia study, the 10/66 Dementia Research Group (<http://www.alz.co.uk/1066>). The 10/66 study describes the prevalence of dementia, explores its etiology, and describes care provided to patients.

The main aim of this PhD is to assess the impact of dementia in low and middle income countries (LAMICs) on service and family costs and to assess the impact of dependency and other factors on costs. Specific objectives are to (i) calculate the costs of dementia in LAMICs based on recognised cost-of-illness methods, (ii) to estimate the cost that can be attributed to the dementia, and (iii) to identify demographic and clinical predictors of dementia costs in LAMICs.

Section 2. General Methodology and Study Design

This section describes the general methodology and study design of the 10/66 Dementia Research Group (DRG) population-based survey. The title of the 10/66 Dementia Research Group refers to 66% of people with dementia living in developing countries while less than one-tenth of population based research has been carried out in those settings. General information on the sample is also reported in this section.

2.1. Study design

Cross-sectional comprehensive one-phase surveys were conducted of all residents aged 65 and over in geographically defined catchment areas in seven developing countries from 2002 to 2007. Detailed information and response rates are shown in Table 2.1. Each of the studies used the same cross-culturally validated assessments, including dementia diagnosis and subtypes, mental disorders, physical health, anthropometry, demographics, extensive non-communicable disease risk factor questionnaires, disability/functioning, health service utilisation, care arrangements and caregiver strain.

Table 2.1. Summary of settings in the 10/66 project

Country	Site	Setting	Achieved sample (completed interviews)	Response rate
China	Xicheng, Beijing	Urban	1160	74%
	Daxing, Beijing	Rural	1002	96%
India	Chennai	Urban	1005	72%
	Vellore	Rural	999	98%
Mexico	Mexico City	Urban	1003	84%
	Morelos	Rural	1000	86%
Peru	Lima	Urban	1381	80%
	Canete	Rural	552	88%
Cuba	Havana/Matanzas	Urban	2944	94%
Dominican Republic	Santo Domingo	Urban	2011	95%
Venezuela	Caracas	Urban	1965	83%
Overall	11 sites	7 urban, 4 rural	15,022	

2.2. Setting

The field studies were carried out in both urban and rural settings in China, India, Mexico and Peru, but were only implemented in urban areas in Cuba, the Dominican Republic and Venezuela. To interpret the findings from a multi-site cost-of-illness study, it is important to understand the economic and healthcare systems in each setting as they are potential key determinants of care arrangements and costs.

Table 2.2 provides general information about each country included. China has the largest population in the world and is the country with biggest area among all 10/66 project countries. Cuba and China have a relatively higher proportion of older citizens, and this is similar to more developed countries. Urbanisation in the Latin American countries is quite high compared with the Asian countries, with Venezuela having the highest figure. The female-to-male ratio among people aged 65 years and over in each country is lower than for those aged 15-64 years old. The Cuban population has much higher education attainment compared with the other 10/66 project countries.

Table 2.3 compares three indicators (maternal mortality rate, infant mortality rate, and life expectancy at birth) which describe the health status of the population among all project countries. With regard to all three indicators, people in Cuba, China and Mexico have relatively higher health status compared with the other countries, while India has the worst health status. Table 2.3 also includes two indicators describing the availability of health resources in each country. Cuba stands out compared to other countries. Mexico and China have relatively more resources compared with the Dominican Republic, India, Peru and Venezuela.

Table 2.4 describes some aspects of the political and economic system in each country. Cuba and China are officially communist states, while the others are republics. China, Mexico and India have relatively market oriented economic systems. The Dominican Republic and Venezuela rely relatively less on the agricultural economy. The Cuban economy is quite firmly controlled by central government. China and Peru have relatively large urban and rural differences in terms of GDP per capita. India has the lowest GDP per capita, while Mexico has the highest. China has the highest GDP growth rate. The Dominican Republic and India have higher unemployment rates

Table 2.2. The geographic information and population in 10/66 project countries

Countries	Area	Population (July 2012 estimation)	65 years and over (2012 estimation)	Urbanisation (2010 estimation)	Sex ratio (male/female) (2012 estimation)	School life expectancy ¹	Literacy
China	9,596,961 sq km World ranking: 4	1,343,239,923 World ranking: 1	9.1%	47%	15-64 years: 1.06 65 years and over: 0.92 total population: 1.06	Total: 12 years Male: 11 years Female: 12 years (2009)	Total population: 92.2% Male: 96% Female: 88.5% (2007)
Cuba	110,860 sq km World ranking: 106	11,075,244 World ranking: 74	12%	75%	15-64 years: 1 65 years and over: 0.82 total population: 0.99	Total: 18 years Male: 16 years Female: 19 years (2009)	Total population: 99.8% Male: 99.8% Female: 99.8% (2002)
Dominican Republic	48,670 sq km World ranking: 132	10,088,598 World ranking: 85	6.7%	69%	15-64 years: 1.04 65 years and over: 0.86 total population: 1.03	Total: 12 years Male: 11 years Female: 13 years (2004)	Total population: 87% Male: 86.8% Female: 87.2% (2002)
India	3,287,263 sq km World ranking: 7	1,205,073,612 World ranking: 2	5.6%	30%	15-64 years: 1.07 65 years and over: 0.9 total population: 1.08	Total: 10 years Male: 11 years Female: 10 years (2007)	Total population: 61% Male: 73.4% Female: 47.8% (2001)
Mexico	1,964,375 sq km World ranking: 14	114,975,406 World ranking: 11	6.7%	78%	15-64 years: 0.94 65 years and over: 0.81 total population: 0.96	Total: 14 years Male: 14 years Female: 14 years (2008)	Total population: 86.1% Male: 86.9% Female: 85.3% (2005)
Peru	1,285,216 sq km World ranking: 20	29,549,517 World ranking: 42	6.5%	77%	15-64 years: 0.96 65 years and over: 0.9 total population: 0.97	Total: 14 years Male: 13 years Female: 13 years (2006)	Total population: 92.9% Male: 96.4% Female: 89.4% (2007)
Venezuela	912,050 sq km World ranking: 33	28,047,938 World ranking: 45	5.6%	93%	15-64 years: 0.97 65 years and over: 0.79 total population: 0.98	Total: 14 years Male: 13 years Female: 15 years (2008)	Total population: 93% Male: 93.3% Female: 92.7% (2001)

¹ School life expectancy: the total number of years of schooling that a child can expect to receive.

Source: The World Fact Book, Central Intelligence Agency, <https://www.cia.gov/library/publications/the-world-factbook/>

Table 2.3. Population health status of the 10/66 project countries

Countries	Maternal mortality rate (deaths/100,000 live births in 2010)	Infant mortality rate (deaths/1,000 live births in 2012)	Life expectancy at birth (2012 estimation)	Physicians/1,000 population	Hospital bed /1,000 population
China	37 World ranking: 116	15.62 World ranking: 110	Total population: 74.84 years World ranking: 96 Male: 72.82 years Female: 77.11 years	1.415 (2009)	4.06 (2009)
Cuba	73 World ranking: 85	4.83 World ranking: 182	Total population: 77.87 years World ranking: 60 Male: 75.61 years Female: 80.27 years	6.399 (2007)	5.9 (2009)
Dominican Republic	150 World ranking: 62	21.3 World ranking: 91	Total population: 77.44 years World ranking: 64 Male: 75.28 years Female: 79.69 years	NA	1 (2009)
India	200 World ranking: 54	46.07 World ranking: 49	Total population: 67.14 years World ranking: 161 Male: 66.08 years Female: 68.33 years	0.599 (2005)	0.9 (2005)
Mexico	50 World ranking: 108	16.77 World ranking: 103	Total population: 76.66 years World ranking: 73 Male: 73.84 years Female: 79.63 years	2.893 (2004)	1.6 (2008)
Peru	67 World ranking: 91	21.5 World ranking: 89	Total population: 72.73 years World ranking: 127 Male: 70.78 years Female: 74.76 years	0.92 physicians/1,000 population (2009)	1.5 (2009)
Venezuela	92 World ranking: 78	20.18 World ranking: 95	Total population: 74.08 years World ranking: 111 Male: 70.98 years Female: 77.34 years	1.94 (2001)	1.3 (2007)

Source: The World Fact Book, Central Intelligence Agency, <https://www.cia.gov/library/publications/the-world-factbook/>

Table 2.4. Political and economic status in 10/66 project countries

Countries	Government type	Description of economic system	GDP per capita (ppp)	GDP - real growth rate	Unemployment rate (2011)
China	Communist state	Market oriented economic system. Large difference between urban and rural areas.	\$8,400 (2011) World ranking: 122	9.2% (2011) World ranking: 9	6.5% World ranking: 68
Cuba	Communist state	Balancing the need for loosening state control of economic system against a desire for firm political control	\$9,900 (2010) World ranking: 112	1.5% (2010) World ranking: 169	3.2% World ranking: 27
Dominican Republic	Democratic republic	Service sector has overtaken agriculture as the economy's largest employer, due to growth in telecommunications, tourism, and free trade zones. The economy is highly dependent upon the US, the destination for more than half of exports.	\$9,300 (2011) World ranking: 115	4.5% (2011) World ranking: 84	14.6% World ranking: 146
India	Federal republic	The economic system is developing into an open-market economy, yet traces of its past autarkic policies remain. Scarce access to quality basic and higher education	\$3,700 (2011) World ranking: 165	6.8% (2011) World ranking: 35	9.8% World ranking: 109
Mexico	Federal republic	Free market economy. Highly unequal income distribution.	\$14,700 (2011) World ranking: 86	3.9% (2011) World ranking: 104	5.2% World ranking: 51
Peru	Constitutional republic	Peru's economy reflects its varied geography.	\$10,100 (2011) World ranking: 111	6.9% (2011) World ranking: 33	7.9% World ranking: 93
Venezuela	Federal republic	Highly dependent on oil revenues, higher inflation	\$12,600 (2011) World ranking: 96	4.2% (2011) World ranking: 94	8.2% World ranking: 98

Source: The World Fact Book, Central Intelligence Agency, <https://www.cia.gov/library/publications/the-world-factbook/>

compared with other countries, while Cuba has the lowest.

Table 2.5 describes the pension and health systems in each setting. Cuba has the most generous pension system among all countries. In other settings, pensions cover mainly the population who have worked in the past. China has the largest urban and rural difference in terms of the pension system, as the former working status of older people is very different for these settings. In all settings, health insurance covers the working population and in some countries it also covers their dependents. The urban populations generally have better health protection compared with the rural populations in China, India, Mexico and Peru. In Cuba, the government provides free medical services and no private hospitals exist. In the Dominican Republic, although the delivery of the service is free, prescriptions are covered from out-of-pocket payments.

Table 2.6 contains information on health financing for the project countries. In all countries except Cuba the system comprises multiple financing mechanisms comprising government financial support through taxation, personal out-of-pocket payments, health insurance, and international aid. Cuba has a public system with the funding mainly from the government and very limited personal private expenditure on healthcare. With the exception of Cuba, total health expenditure as a percentage of GDP is similar in the project countries, but there are differences in the proportions of financing from government. India has a very low level of government input with most of the cost covered by out-of-pocket payments. In China, Mexico and Venezuela the input from government is about 50% of the total health expenditure. Peru has a relatively high level of government input, while the Dominican Republic has more private expenditure on health. In Mexico and Venezuela, nearly half of the total health expenditure is from out-of-pocket payments.

The information in Table 2.7 is extracted with permission and adapted from the thesis of the first 10/66 sponsored PhD student (Dr. Renata Sosa) and shows information on the accessibility of health services in each setting. With the exception of rural Mexico, people in all other settings can readily access primary care services. China and Mexico have larger urban and rural differences in term of the accessibility of hospital services.

Table 2.5. Social security and health care system in 10/66 catchment areas

Countries	Pension system for older people	Health insurance system	Care organization
China urban	Pension system is covered for most urban citizens, as most of the urban citizens are working population in public organizations. [1-4]	Health insurance for all urban employees. In Beijing, the scheme has been extended to all residents. [5]	There are three levels of hospital providing services from primary care to high technology services. Most of the care organisations are government-run. Private hospitals are now emerging. [6, 7]
China rural	Virtually no pension system for rural citizens, as most of the rural citizens are farmers who are out of pension system.[8, 9]	New rural cooperative medicine, with coverage for most of rural residents.[10-13]	Primary health facilities are located in each village. Private clinics also can be found in rural areas. Secondary level hospitals are only in the centre of rural districts. There are very few third-level hospitals in rural areas.[14]
Cuba urban	About 90 percent of Cubans have government jobs. If they work for 30 years, then they can have full retirement pension. Private workers have started to join the pension system. [15, 16]	National health system for all citizens, provided by the government. Free medical, hospital and dental care.[17-19]	There are no private hospitals or clinics as all health services are government run.[20]
Dominican Republic urban	Most of the current pensioners are from the public sector and military.[21, 22]	The health service is free at the point of delivery (other than for prescriptions) but has limited facilities, trained staff and medicines.[23]	Certain government-run clinics offer good services. Private clinics are also an option[23]
India urban	Pension schemes are largely the privilege of the workers in public organizations. The rest of the employees in unorganised and informal companies only have limited access to voluntary schemes.[24, 25]	Health insurance for government officers and for factory employees. [25-28]	Provided by publically owned hospitals and clinics. Private clinic are used as a supplement to public services, but only available for those on high incomes. [27]

India rural	Similar to the urban areas.	All rural residents can receive basic free medicine. [29]	Covered by primary health network and rural hospitals. Traditional healers are more popular than rural areas because of the cheaper prices.[29]
Mexico urban	Most pension plans are offered by public institutions and are provided to salaried formal workers and their beneficiaries. [30, 31]	Public health care is provided to all Mexican citizens. All Mexican citizens are eligible for subsidized health care regardless of their work status. Employed citizens and their dependents, however, are further eligible to use another health care program.[32-36]	Provided via public institutions, private entities, or private physicians.[32]
Mexico rural	Similar to the urban areas.	Rural citizens are still facing shortages of health protection.[33, 35]	Similar to the urban areas.
Peru urban	Combined with National Pension System (NPS) and Private Pensions System (PPS). The NPS is managed by the State, operates under a Pay-as-you-Go financial regime. The PPS is managed by some private sectors, and directly depends on the contributions made during pensioner's working life. [22, 37]	Public health insurance system has two sectors. One is called Seguro Integral de Salud (SIS), i.e. Comprehensive Health Insurance, which is mainly for poorest population. The other is called EsSalud (provided by Peruvian Social Security), which is for working families and individuals, and mainly in urban areas. Private health insurance also exists. [38-40]	Dual practices provided by public and private health sectors and a free government health service for the poor.[38]
Peru rural	Similar to the urban areas.	SIS is covered only part of poor rural population based on family income. EsSalud covers very few rural populations. [39]	People live in remote areas where the nearest health service is six or seven hours away. Because of the strong beliefs in traditional medicine, many (about one third) Peruvians are seeking treatment with chamanes, or healers.[40]

Venezuela urban	About 21% of citizen aged 60 years and over can receive pension.[22]	The health system comprises both public and private sectors. The public sector includes the Ministry of Popular Power for Health (MS) and several social security institutions, salient among them the Venezuelan Institute for Social Security (IVSS). The private sector includes providers offering services on an out-of-pocket basis and private insurance companies.[41]	Both public and private health organization provide health services to the people in Venezuela. [42]

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Table 2.6. Health financing in 10/66 project countries

Countries	Health financing	Total health expenditure (THE) as percentage of (GDP) (2008) [1]	General government expenditure on health (GGHE) as percentage of THE (2008) [1]	Private expenditure on health (PvtHE) as percentage of THE (2008) [1]	Out of pocket expenditure as percentage of PvtHE (2008) [1]	Out of pocket expenditure as percentage of THE (2008) [1]
China	Health financing comprises government financial support, health insurance, and personal out-of-pocket expenses. [2-4]	5	50	50	81	40
Cuba	This is a public system, with funding through general taxation, public ownership of all health services, and health professionals who are direct state employees[5, 6]	11	95	5	100	5
Dominican Republic	Besides the government, international organisations offer financing from reimbursable and non-reimbursable sources in the form of donations, specific contributions, and technical cooperation.[7]	6	37	63	66	42
India	Because of the insufficient of public health financing, more private and international funds are integrated to public health system. [8-11]	4	28	72	87	63

Mexico	The major source of funding comes from federal taxes, with complementary contributions by states. Families also prepay a small premium based on their income. The poorest 20% of families are exempt from any contribution. [12-16]	6	47	53	93	49
Peru	The SIS is funded mainly from regular resources from the general budget. The remainder of the fund is from donations and contributions, international aid agencies, contributions from individuals, and public and private institutions. EsSalud is funded by employer contributions.[17-19]	6	62	38	87	33
Venezuela	The MS is financed with federal, state and county contributions. The IVSS is financed with employer, employee and government contributions. [20, 21]	5	45	55	90	49

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Table 2.7. Health service accessibility in 10/66 catchment areas

Centres	Accessibility of primary care centre	Accessibility of hospital services
China urban	Within 1 kilometre.	Within 5 kilometres
China rural	Village clinic within 1 kilometre. Larger primary health centres within 5 kilometres.	About 20 kilometres away
Cuba urban	Less than 250 metres.	About 5 to 10 kilometres away
Dominican Republic urban	Within 1 kilometre.	About 5 to 10 kilometres away
India urban	Mini health centres within 1 kilometre. Government primary health centres within 3 kilometres.	Within 6 to 8 kilometres
India rural	Within 2 kilometres	Within 5 to 7 kilometres.
Mexico urban	Within 1 kilometre	Within 1 kilometre.
Mexico rural	About 2 to 5 kilometres away	About 10 kilometres away
Peru urban	About 5 kilometres away	About 10 kilometres away
Peru rural*	About 5 kilometres away	About 10 kilometres away
Venezuela urban	Within 1 kilometre	About 1 kilometre away

* From personal communication with the principal investigator in Peru

Source: Adapted from a PhD thesis (Renata Sousa, 2010) at the Institute of Psychiatry, King's College London

In summary, Cuba is relatively different to other 10/66 countries as it has a very high percentage of pension coverage, free medical care and relatively higher health status. Compared with other countries, India ranks relatively low in terms of health status, education attainment, and government input to health expenditure. To some extent, China and Mexico are similar in terms of the health status of the population and the level of government input to health expenditure. China and Peru are quite similar in terms of urban and rural difference in GDP per capita. In terms of the pension system, health insurance system and accessibility of hospital services, China has the largest urban and rural difference. In other settings, including India, Peru, and Mexico, the pension and health system are also quite different between urban and rural settings. While it may be of interest to combine the rural areas from all the countries and compare them with the combined urban areas, this is limited by the fact that other key differences (e.g. in terms of the economic system, pension system and health system) exist.

2.3. Participants and sample

All older people aged 65 years and over living in geographically defined catchment areas were invited to participate in the study. Middle-class or professional areas with high-income dwellers were excluded in the definition of urban catchment areas, while rural catchment areas were defined by a traditional agrarian lifestyle and low population density. Catchment area boundaries were precisely defined and all households in that area were identified and located on a map. Households were enumerated to identify possible eligible persons (all those aged 65 years and over) and age was formally determined on revisit for interview.

Precision calculations were implemented to determine the sample size. An overall sample of 2,000 would allow estimation of a typical dementia prevalence of 4.5% with a precision of $\pm 0.9\%$. Rural and urban samples of 1,000 each would allow estimation of the same prevalence with a precision of $\pm 1.2\%$. Ultimately, the sample size for each country was between 1933 and 2944 (generally around 2000, other than in Cuba where the sample size was 2944).

2.4. Procedure of the study

Ethical approvals were obtained from the ethical committees in the Institute of Psychiatry, King's College London, and each participating country.

All centres were extensively trained in the main diagnostic assessments. Two further one-week project training meetings were held with the participation of principal investigators (PIs) from every project country. A standardised manual with detailed information in terms of operating procedures was designed and it covered every aspect of the training and field procedures.

All assessments were translated into the relevant local languages (Spanish, Tamil and Mandarin) from English. Experienced bilingual panels reviewed the translations and made appropriated modifications.

A project coordinator from each country was nominated to supervise the survey. Each centre had four to ten interviewers. These were generally lay graduates, except in Cuba and China where medical doctors were used. All interviewers were carefully trained by the project coordinator in the study protocol and procedures, standard structured interviewing techniques, the administration and rating of the Geriatric Mental State (Copeland et al., 1986; Copeland et al., 2002), a structured clinical mental status assessment, and the neurological/physical examination.

Interviews were usually implemented in participants' own houses. Informed consent from the participants or relatives of participants who lack capacity for consent were obtained prior to the interviews and examinations. Illiterate persons were read the information sheet and consent form, and invited to express their consent verbally, which was witnessed. All participants received the full assessments in one stage, lasting approximately two to three hours. For each participant, an informant was identified to provide more information. The informant was a person who either knew the participant best or had spent the longest period of time with participant. In most families, informants were co-resident family members. But in some cases, a co-resident non-family member, or a non-co-resident family member, or a friend or neighbour was selected.

A set of EpiData (version 2.0) database files were designed by the London team. Paper and pencil versions of questionnaires were used in most countries except Cuba, where computer assisted personal interviews were carried out by using these EpiData database files. Information was checked by project coordinators before it was entered into computers. Each country had a specific data entry clerk and 100% double entry was requested. Data were extracted into SPSS (version 15.0), and cleaning, processing of derived variables, and diagnostic algorithms were run with SPSS syntax files. Data were checked in London after the first 100 interviews had been completed and on three to four occasions subsequently. In this thesis, 10/66 database version 3.0 was used for the whole analysis.

2.5. Measurements

The 10/66 DRG survey comprises questionnaires on participants' socio-demographic

characteristics, health status, risk factor exposures and health service use. A physical examination was carried out and an informant interview administered for information on care arrangements, and caregiver practical, psychological and economic strain. In more detail, measurements were carried out from three aspects: a household assessment, a participant interview and physical examination, and an informant interview.

The objectives of household assessment are to determine the age of the participant, record the household assets and household composition. Information collected through the participant interview and physical examination included:

- (1) Socio-demographic characteristics: gender, age, education, marital status, household living circumstances, sources of income (pension and family support)
- (2) Health service utilisation: by using the Client Service Receipt Inventory (CSRI) (Chisholm et al., 2000a), which had been adapted for use in LAMICs (Chisholm et al., 2000b). Information included any use of community services (primary care, hospital outpatient, private doctor, and dentistry) and hospital admission during the three months preceding the interview. More detailed information about health service utilisation is provided in Section 3.
- (3) Health status: including self reported global health; self-reported diagnoses (stroke, diabetes, hypertension, heart disease, chronic obstructive pulmonary disease); treatments for diabetes and hypertension; a self-reported list of 12 commonly occurring physical impairments (arthritis or rheumatism, eyesight problems, hearing difficulties or deafness, persistent cough, breathlessness/difficulty breathing/asthma, heart trouble or angina; stomach or intestine problems, faints or blackouts, paralysis/weakness/loss of one leg or arm, skin disorders) (Duke University Centre for the Study of Aging and Human Development, 1978); disability (measuring activity limitation and participation restriction applying the World Health Organisation Disability Assessment Schedule -WHODAS II, which was developed by WHO for cross-cultural research(Ustun TB et al., 2010)).
- (4) Cognitive test: including the Community Screening Instrument for Dementia (CSID') (Hall KS et al., 1993) and 10-word list learning task with delayed recall, modified from the Consortium to Establish a Registry for Alzheimer's Disease (CERAD) (Ganguli et al., 1996)

- (5) Psychiatric examination: using a structured clinical mental state interview, the Geriatric Mental State (GMS) (Copeland et al., 1986; Copeland et al., 2002) to identify organicity (probable dementia), depression, anxiety and psychosis.
- (6) Neurological assessment: using the Neurological Exam (NEUROEX) (Broe GA et al., 1976; Broe et al., 1998), a brief fully structured neurological assessment with objectified quantifiable measures of lateralising signs, parkinsonism, ataxia, apraxia and primitive 'release' reflexes.
- (7) Direct physical assessments: pulse rate, systolic and diastolic resting blood pressure (average of two, sitting and standing), waist circumference, waist/hip ratio, walking test (5 metres walk, turn and return – timed and paces counted).
- (8) Risk factors: including smoking, alcohol consumption, physical activity, and obesity (by measuring the waist circumference).

Informant interviews included:

- (1) Socio-demographic characteristics of informant: including gender, age, education, marital status, and income
- (2) The informant's mental health status: assessed by the Self-Reporting Questionnaire 20 (SRQ-20) (Mari and Williams, 1985)
- (3) Cognitive status of participants: the informant section questions of the CSI'D were asked of informants to understand the recent cognitive and functional decline of the participants.
- (4) Dependence of the participants (needs for care): A series of open-ended questions (Sousa et al., 2010b) addressed to a key informant, to define the family network, to establish if the older person needed and received care from family members or others and to identify who was responsible for organising and providing 'hands on' care. On the basis of these questions, the interviewer coded whether the older person required no care, care for some of the time or care for much of the time.
- (5) Care arrangements: including information on informal care arrangements (time spent with the participant, and time spent assisting with communication, to use transport, to dress, to eat, and for personal hygiene and supervision), paid day and night care, and information on stopping or cutting back on work in order to provide care (Chisholm et al., 2000a; Chisholm et al., 2000b; Davis et al., 1997). More detailed information about care arrangements is provided in Section 3.

- (6) Impact of providing care: caregiver strain was measured with the Zarit Burden Interview (ZBI) (Whitlatch et al., 1991; Zarit et al., 1980; Zarit et al., 1986) which has been validated and widely used in developed and developing countries. This information was only asked of the informants when participants needed care.
- (7) Dementia diagnosis and subtype: measured by the History and Aetiology Schedule – Dementia Diagnosis and Subtype (HAS-DDS) (Dewey and Copeland, 2001), providing more detailed information on onset and course of dementia syndrome. This information was only asked of the informants when there was evidence from the informant section of CSI'D to suggest at least some possible cognitive and/or functional decline (a score of two or more).
- (8) Behavioural and psychological symptoms of dementia: assessed by the Neuropsychiatric Inventory (NPI-Q) (Kaufer et al., 1998; Kaufer et al., 2000) for all informants.

2.6. Diagnosis of psychiatric and physical diseases

The diagnosis of dementia was fully described in a published paper (Prince et al., 2008b), with evidence supporting their criterion validity (Prince et al., 2003) and predictive validity (Jotheeswaran et al., 2010). In this thesis, dementia was diagnosed according to the 10/66 dementia criteria. In brief, a 10/66 dementia diagnosis was allocated to those scoring above a cut-off point of predicted probability for dementia. The cut-off point was calculated using coefficients derived from a logistic regression equation in a 10/66 pilot study. The independent variables in the equation included information from GMS, cognitive score from CSI-D for participants (COGSCORE), results of 10-word list learning task with delayed recall, and the cognitive score from the informant section of CSI-D (RELSCORE). Subtype of dementia was determined according to HAS-DDS. The severity of dementia was determined according to a computerised operationalisation of the Clinical Dementia Rating (CDR).

A diagnosis of depression was according to the criteria and definition of ICD-10 depressive episode (World Health Organization, 1992), based on the results from the GMS clinical interview. Hypertension was diagnosed according to self-reported hypertension and/or a blood pressure measurement meeting the World Health

Organisation/International Society of Hypertension (WHO-ISH) criteria (SBP $\geq$ 140 mm Hg and/or diastolic blood pressure (DBP) $\geq$ 90mm Hg). Other physical diseases, including diabetes, ischemic heart disease, stroke, chronic obstructive pulmonary disease (COPD) were diagnosed according to self-report of clinician diagnoses (diabetes, myocardial infarction and stroke) or characteristic symptoms (angina and COPD).

The informant's mental health status was evaluated according to the score of SRQ-20. Those with eight points or over were classified as 'SRQ case', indicating the existence of a probable mental disorder (Mari and Williams, 1985).

2.7. General information of the sample in the study

Socio-demographic information, care arrangements, dependency, mental and physical status of participants, and socio-demographic information and health status of carers are reported for the whole sample (Tables 2.8 to 2.11) and for participants with dementia separately (Tables 2.12 to 2.15).

It is shown in Table 2.8 that more participants are female in the sample as a whole, ranging from 53% in rural Peru to 66% in the Dominican Republic. The proportion of participants aged 75 years and over is higher than those aged 74 and less, but participants are younger in rural China and India. The distribution of educational levels is similar across the sample as a whole, but participants in rural China and India have lower educational levels than those in other sites. About half of the participants across the whole sample are currently married, with the Dominican Republic having the lowest rate and urban China the highest. Very few participants are in full- or part-time work, but the percentages of having jobs are highest in rural Mexico and rural China. Most participants have some type of income, but variation can be found across sites. Only about half of the participants received income in rural China and urban India, while more than 90% of participants received income in urban China and rural India. Pension coverage shows substantial variation across sites. Urban China and Cuba have the highest coverage of pensions, while coverage is relatively low in the Dominican Republic, urban Mexico, India and rural China. There is a

noticeable rural/urban difference in China. The proportion of participants having private insurance also varies across the sites. No one has private insurance in rural India, and very few participants have it in Cuba and urban China. Rural and urban differences can be found in some countries, but in different directions. In Peru and Mexico, urban areas have a higher private insurance rate, while in China, the rural area has a higher rate. Compared with other sites, rural India has the lowest number of assets in the family.

Table 2.9 describes the care arrangements and dependency of participants in the 10/66 study. Very few participants live alone. Most participants live with children in Latin American sites, rural China and India. Only in urban China do most of the participants live with their spouses, and here there is the lowest rate of living with children under 16 years old. Disability, measured with the WHO-DAS, is highest in rural India. About 10% of participants need care in the sample as a whole. Differences in dependency can be found in rural and urban areas. Usually, participants from urban areas have higher dependency levels than those from rural area, except in India. Dependency is highly related to help with ADL and IADL, and supervision received. However, paid home care seems to be only related to economic status, as more participants receive paid home care in more developed urban areas.

Table 2.10 summarises the physical and mental status of participants. The prevalence of dementia is 9.2% in the sample as a whole. Variation can be found across sites, with the highest prevalence in the Dominican Republic (12%), and the lowest in rural China (5.6%). The prevalence of depression is 6.0% in the sample as a whole, being lower than the prevalence of dementia. However, the variation is larger across the sites than that for dementia, with the highest prevalence in the Dominican Republic (13.8%), and the lowest in urban China (0.3%). Both of the two sites in China have very low rates of depression prevalence compared with other sites. The prevalence of hypertension is the highest among physical diseases in all sites. Rural and urban differences can be found for all physical diseases in most of the sites, with participants in urban areas usually having higher prevalence rates of chronic physical disease. Participants in rural China and urban India have the lowest rates of physical impairment.

Table 2.8. Socio-demographic characteristics of participants in the 10/66 study, by site

Variables	Cuba (N=2944)	Dominican Republic (N=2011)	Peru (urban) (N=1381)	Peru (rural) (N=552)	Venezuela (N=1965)	Mexico (urban) (N=1003)	Mexico (rural) (N=1000)	China (urban) (N=1160)	China (rural) (N=1002)	India (urban) (N=1005)	India (rural) (N=999)	Total (N=15,022)
Gender												
Male	1031 (35.0%)	684 (34.0%)	493 (35.7%)	257 (46.6%)	706 (36.5%)	337 (33.6%)	398 (39.8%)	499 (43.0%)	446 (44.5%)	419 (42.3%)	454 (45.4%)	5724 (38.2%)
Female	1913 (65.0%)	1325 (66.0%)	888 (64.3%)	295 (53.4%)	1226 (63.5%)	666 (66.4%)	602 (60.2%)	661 (57.0%)	556 (55.5%)	571 (57.7%)	545 (54.6%)	9248 (61.8%)
Age group												
65-69	760 (25.9%)	533 (26.5%)	375 (27.2%)	179 (32.4%)	839 (42.8%)	245 (24.5%)	299 (29.9%)	316 (27.2%)	383 (38.2%)	415 (41.5%)	331 (33.1%)	4675 (31.2%)
70-74	789 (26.9%)	520 (25.9%)	352 (25.5%)	141 (25.5%)	469 (23.9%)	329 (32.8%)	252 (25.2%)	362 (31.2%)	296 (29.5%)	318 (31.8%)	350 (35.0%)	4178 (27.8%)
75-79	639 (21.8%)	397 (19.7%)	298 (21.6%)	101 (18.3%)	345 (17.6%)	205 (20.5%)	221 (22.1%)	254 (21.9%)	202 (20.2%)	144 (14.4%)	177 (17.7%)	2983 (19.9%)
80+	749 (25.5%)	561 (27.9%)	355 (25.7%)	131 (23.7%)	308 (15.7%)	223 (22.3%)	228 (22.8%)	228 (19.7%)	121 (12.1%)	124 (12.4%)	141 (14.1%)	3169 (21.1%)
Education level of participants												
No education	75 (2.6%)	392 (19.7%)	37 (2.7%)	84 (15.4%)	156 (8.1%)	227 (22.6%)	327 (32.7%)	232 (20.0%)	579 (57.8%)	428 (42.7%)	660 (66.1%)	3197 (21.4%)
Less than primary	655 (22.3%)	1022 (51.3%)	90 (6.6%)	141 (25.9%)	445 (23.1%)	354 (35.3%)	510 (51.0%)	153 (13.2%)	114 (11.4%)	234 (23.3%)	195 (19.5%)	3913 (26.2%)
Completed primary	979 (33.3%)	370 (18.6%)	460 (33.5%)	267 (49.1%)	965 (50.1%)	229 (22.8%)	122 (12.2%)	303 (26.1%)	259 (25.8%)	212 (21.1%)	116 (11.6%)	4282 (28.7%)
Completed secondary or higher	1227 (41.8%)	208 (10.4%)	786 (57.2%)	52 (9.6%)	359 (18.6%)	193 (19.2%)	41 (4.1%)	472 (40.7%)	50 (5.0%)	129 (12.9%)	28 (2.8%)	3545 (23.7%)

Marital status of participants												
Single	275 (9.4%)	139 (7.0%)	145 (10.6%)	68 (12.3%)	189 (9.8%)	63 (6.3%)	42 (4.2%)	3 (0.3%)	22 (2.2%)	21 (2.1%)	5 (0.5%)	972 (6.5%)
Married	1271 (43.3%)	586 (29.4%)	784 (57.2%)	308 (55.9%)	921 (48.0%)	470 (46.9%)	538 (53.9%)	829 (71.5%)	585 (58.4%)	523 (52.2%)	481 (48.1%)	7296 (48.8%)
Divorced/ widowed	1390 (47.3%)	1271 (63.7%)	442 (32.2%)	175 (31.8%)	810 (42.2%)	470 (46.9%)	419 (41.9%)	328 (28.3%)	395 (39.4%)	458 (45.7%)	513 (51.4%)	6671 (44.7%)
Job of Participants												
Full time job	136 (4.6%)	99 (4.9%)	6 (0.5%)	13 (2.5%)	91 (4.9%)	54 (5.4%)	108 (11.0%)	2 (0.2%)	389 (38.9%)	82 (8.2%)	50 (5.0%)	1030 (7.0%)
Part time job	29 (1.0%)	79 (3.9%)	19 (1.4%)	21 (4.1%)	58 (3.1%)	69 (7.0%)	224 (22.9%)	2 (0.2%)	5 (0.5%)	71 (7.1%)	139 (13.9%)	716 (4.8%)
No job	2763 (94.4%)	1830 (91.1%)	1308 (98.1%)	478 (93.4%)	1722 (92.0%)	868 (87.6%)	648 (66.1%)	1155 (99.7%)	607 (60.6%)	850 (84.7%)	810 (81.1%)	13039 (88.2%)
Participants with any income	2584 (87.8%)	1281 (63.7%)	983 (71.2%)	382 (69.2%)	1316 (67.0%)	841 (83.8%)	644 (64.4%)	1096 (94.5%)	524 (52.3%)	510 (50.7%)	904 (90.5%)	11065 (73.7%)
Participants with any governmental or occupational pension	2417 (82.1%)	611 (30.4%)	908 (65.7%)	357 (64.7%)	1147 (58.4%)	729 (72.7%)	254 (25.4%)	1050 (90.5%)	38 (3.8%)	117 (11.6%)	346 (34.6%)	7974 (53.1%)
Participant has private insurance	4 (0.1%)	430 (21.4%)	1111 (80.9%)	399 (72.4%)	862 (45.3%)	546 (54.4%)	280 (28.0%)	14 (1.2%)	769 (76.7%)	13 (1.3%)	0	4428 (29.7%)
Number of assets in the family	5.7±1.0	5.0±1.4	6.1±0.6	4.7±1.3	6.2±1.0	6.1±1.0	4.0±1.8	5.5±0.7	5.6±1.4	4.1±1.5	2.8±1.5	5.3±1.5

Figures are numbers (percentages) except for number of assets in the family where the data are means (standard deviations)

Table 2.9. Care arrangements and dependency of participants in the 10/66 study, by site

Variables	Cuba (N=2944)	Dominican Republic (N=2011)	Peru (urban) (N=1381)	Peru (rural) (N=552)	Venezuela (N=1965)	Mexico (urban) (N=1003)	Mexico (rural) (N=1000)	China (urban) (N=1160)	China (rural) (N=1002)	India (urban) (N=1005)	India (rural) (N=999)	Total (N=15,022)
Living arrangement of participants												
Living alone	261 (8.9%)	254 (12.6%)	45 (3.3%)	44 (8.0%)	61 (3.1%)	106 (10.6%)	112 (11.2%)	54 (4.7%)	49 (4.9%)	44 (4.4%)	120 (12.0%)	1150 (7.7%)
Living with spouse	804 (27.3%)	439 (21.8%)	232 (16.8%)	119 (21.6%)	326 (16.6%)	264 (26.3%)	269 (26.9%)	571 (49.2%)	219 (21.9%)	160 (15.9%)	187 (18.7%)	3590 (23.9%)
Living with children	1384 (47.0%)	1033 (51.4%)	830 (60.1%)	315 (57.1%)	1459 (74.2%)	515 (51.3%)	476 (47.6%)	361 (31.1%)	404 (40.3%)	614 (61.1%)	430 (43.0%)	7821 (52.1%)
Living with other relatives	495 (16.8%)	285 (14.2%)	274 (19.8%)	74 (13.4%)	119 (6.1%)	118 (11.8%)	143 (14.3%)	174 (15.0%)	330 (32.9%)	187 (18.6%)	262 (26.2%)	2461 (16.4%)
Living with children under 16	938 (32.1%)	803 (40.0%)	453 (32.9%)	220 (39.9%)	817 (53.2%)	304 (30.3%)	356 (35.6%)	211 (18.3%)	458 (45.9%)	471 (52.2%)	476 (47.6%)	5507 (38.1%)
WHO-DAS score	13.4±20.0	16.5±20.3	13.1±20.6	10.4±14.6	10.7±16.3	10.0±17.3	11.1±19.1	8.1±20.1	8.0±14.6	10.5±15.4	28.3±18.3	13.0±19.1
Dependency												
Need care much of the time	169 (6.5%)	143 (7.1%)	75 (5.4%)	10 (1.8%)	98 (5.0%)	56 (5.6%)	30 (3.0%)	119 (10.3%)	30 (3.0%)	14 (1.4%)	25 (2.5%)	769 (5.2%)
Need care some of the time	92 (3.5%)	94 (4.7%)	60 (4.3%)	16 (2.9%)	111 (5.7%)	58 (5.8%)	52 (5.2%)	64 (5.5%)	24 (2.4%)	15 (1.5%)	60 (6.0%)	646 (4.4%)
No dependency	2335 (89.9%)	1770 (88.2%)	1246 (90.2%)	524 (95.3%)	1754 (89.4%)	889 (88.6%)	918 (91.8%)	977 (84.2%)	948 (94.6%)	958 (97.1%)	914 (91.5%)	13233 (90.3%)
Received care												
Any ADL help	205 (7.0%)	183 (9.1%)	118 (8.5%)	22 (4.0%)	74 (3.8%)	69 (6.9%)	52 (5.2%)	152 (13.1%)	46 (4.6%)	21 (2.1%)	84 (8.4%)	1026 (6.8%)
Any IADL help	165 (5.6%)	93 (4.6%)	102 (7.4%)	18 (3.3%)	96 (4.9%)	83 (8.3%)	36 (3.6%)	75 (6.5%)	23 (2.3%)	22 (2.2%)	79 (7.9%)	792 (5.3%)
Supervision	84 (2.9%)	39 (1.9%)	91 (6.6%)	14 (2.5%)	88 (4.5%)	48 (4.8%)	24 (2.4%)	16 (1.4%)	8 (0.8%)	17 (1.7%)	17 (1.7%)	446 (3.0%)
Day paid care	34 (1.2%)	41 (2.0%)	45 (3.3%)	2 (0.4%)	28 (1.4%)	4 (0.4%)	1 (0.1%)	83 (7.2%)	1 (0.1%)	0	0	239 (1.6%)
Night paid care	10 (0.3%)	28 (1.4%)	27 (2.0%)	2 (0.4%)	10 (0.5%)	2 (0.2%)	0	81 (7.0%)	0	0	0	160 (1.1%)

Figures are numbers (percentages) except for WHO-DAS score where the data are means (standard deviations)

Table 2.10. Health status of participants in the 10/66 study, by site

Variables	Cuba (N=2944)	Dominican Republic (N=2011)	Peru (urban) (N=1381)	Peru (rural) (N=552)	Venezuela (N=1965)	Mexico (urban) (N=1003)	Mexico (rural) (N=1000)	China (urban) (N=1160)	China (rural) (N=1002)	India (urban) (N=1005)	India (rural) (N=999)	Total (N=15,022)
Dementia	323 (11.0%)	242 (12.0%)	130 (9.4%)	36 (6.5%)	145 (7.4%)	93 (9.3%)	87 (8.7%)	84 (7.2%)	56 (5.6%)	75 (7.5%)	108 (10.8%)	1379 (9.2%)
Depression	144 (4.9%)	278 (13.8%)	87 (6.3%)	16 (2.9%)	107 (5.4%)	47 (4.7%)	45 (4.5%)	3 (0.3%)	7 (0.7%)	39 (3.9%)	126 (12.6%)	899 (6.0%)
Hypertension	2173 (73.8%)	1537 (76.4%)	725 (52.5%)	235 (42.6%)	1423 (72.4%)	694 (69.2%)	565 (56.5%)	734 (63.3%)	570 (56.9%)	687 (68.4%)	445 (44.5%)	9788 (65.2%)
Diabetes	543 (18.4%)	281 (14.0%)	119 (8.6%)	54 (9.8%)	309 (15.7%)	246 (24.5%)	189 (18.9%)	195 (16.8%)	9 (0.9%)	121 (12.0%)	66 (6.6%)	2132 (14.2%)
Ischemic heart disease	415 (14.1%)	60 (3.0%)	91 (6.6%)	24 (4.3%)	120 (6.1%)	39 (3.9%)	15 (1.5%)	115 (9.9%)	12 (1.2%)	49 (4.9%)	28 (2.8%)	968 (6.4%)
Stroke	230 (7.8%)	175 (8.7%)	112 (8.1%)	20 (3.6%)	135 (6.9%)	67 (6.7%)	74 (7.4%)	109 (9.4%)	18 (1.8%)	20 (2.0%)	11 (1.1%)	971 (6.5%)
COPD	115 (3.9%)	137 (6.8%)	81 (5.9%)	11 (2.0%)	129 (6.6%)	59 (5.9%)	80 (8.0%)	36 (3.1%)	16 (1.6%)	18 (1.8%)	76 (7.6%)	758 (5.0%)
Number of physical impairments												
0	1295 (44.0%)	601 (29.9%)	608 (44.0%)	281 (50.9%)	781 (39.7%)	453 (45.2%)	382 (38.2%)	349 (30.1%)	695 (69.4%)	648 (64.5%)	326 (32.6%)	6419 (42.7%)
1-2	1357 (46.1%)	945 (47.0%)	549 (39.8%)	231 (41.8%)	695 (35.4%)	392 (39.1%)	433 (43.3%)	603 (52.0%)	268 (26.7%)	316 (31.4%)	505 (50.6%)	6294 (41.9%)
3+	292 (9.9%)	465 (23.1%)	224 (16.2%)	40 (7.2%)	489 (24.9%)	158 (15.8%)	185 (18.5%)	208 (17.9%)	39 (3.9%)	41 (4.1%)	168 (16.8%)	2309 (15.4%)

Figures are numbers (percentages)

Detailed information on the characteristics of carers is summarised in Table 2.11. About 70% of carers are female in the sample as a whole. However, in rural China, about 66% of carers are male, and in urban areas fewer female carers can be found compared with Latin American sites and India. About 70% of carers are of working age (18-64) in the sample as a whole. Variation can be detected across sites, ranging from 40% in urban China to 90% in rural Mexico. The educational level of carers is relatively higher than that of participants in all sites (compared with figures in Table 2.8). Carers from India have the lowest educational level among all the countries, and carers from urban Peru have the highest educational level. More single carers can be found in Peru, Venezuela and Mexico, while more divorced/widowed carers are in the Dominican Republic. There are about 25% of carers with full-time jobs in the sample as a whole and 10% of them have part-time jobs. However, relatively more carers with full-time jobs are in rural China. In the whole sample, about 40% of carers are children of the participants, and about 30% of carers are spouses. Variation can be seen across sites. About 50% of carers are children of the participants in rural Peru, Venezuela, Mexico and rural China, while the percentage is only 20% in rural India. About 60% of carers are spouses in urban China, while the percentage is only about 10% in rural Mexico. About 10% of carers have mental health problems in the sample as a whole, ranging from 0.3% in rural China to about 18% in the Dominican Republic and urban Peru.

This thesis focuses on the costs of care for participants with dementia and so it is helpful to describe the above information for this population separately. From Table 2.12, it is shown that more participants with dementia patients are female, older, with a lower educational level, and divorced/widowed. Although there are some variations across sites, the general tendencies are same in all sites. Fewer people have a job among dementia patients than among the general population. Similar distributions can be found for income, pensions, private insurance and number of assets among participants with patients compared with the general population.

Table 2.13 reports on the care arrangements and dependency levels of participants with dementia. Similar situations can be found for living arrangement among those with dementia patients as compared with the general population. However, the disability levels measured by WHO-DAS are substantially higher among participants with dementia. They are more dependent and receive more ADL and IADL help,

Table 2.11. Socio-demographic characteristics and health status of carers in the 10/66 study, by site

Variables	Cuba (N=2944)	Dominican Republic (N=2011)	Peru (urban) (N=1381)	Peru (rural) (N=552)	Venezuela (N=1965)	Mexico (urban) (N=1003)	Mexico (rural) (N=1000)	China (urban) (N=1160)	China (rural) (N=1002)	India (urban) (N=1005)	India (rural) (N=999)	Total (N=15,022)
Gender												
Male	885 (30.3%)	554 (27.6%)	385 (27.9%)	151 (27.5%)	577 (29.7%)	262 (26.1%)	201 (20.1%)	494 (42.6%)	661 (66.0%)	242 (24.2%)	173 (17.3%)	4585 (30.6%)
Female	2033 (69.7%)	1454 (72.4%)	996 (72.1%)	398 (72.5%)	1366 (70.3%)	740 (73.9%)	799 (79.9%)	666 (57.4%)	341 (34.0%)	758 (75.8%)	826 (82.7%)	10377 (69.4%)
Age group												
< 18	28 (1.0%)	42 (2.1%)	11 (0.8%)	8 (1.5%)	13 (0.7%)	10 (1.0%)	22 (2.2%)	5 (0.4%)	0	10 (1.0%)	5 (0.5%)	154 (1.0%)
18-64	1893 (64.8%)	1470 (73.3%)	775 (56.2%)	382 (70.0%)	1508 (77.2%)	736 (73.5%)	894 (89.6%)	455 (39.2%)	677 (67.6%)	844 (84.3%)	874 (87.5%)	10508 (70.2%)
65+	1002 (34.3%)	494 (24.6%)	594 (43.0%)	156 (28.6%)	433 (22.2%)	255 (25.5%)	82 (8.2%)	700 (60.3%)	325 (32.4%)	147 (14.7%)	120 (12.0%)	4308 (28.8%)
Education level of participants												
Less than primary	193 (6.6%)	597 (29.8%)	30 (2.2%)	72 (13.1%)	106 (5.4%)	167 (16.8%)	213 (21.4%)	220 (19.0%)	246 (24.6%)	459 (45.9%)	564 (56.5%)	2867 (19.2%)
Completed primary	445 (15.2%)	512 (25.5%)	241 (17.5%)	189 (34.4%)	621 (31.9%)	189 (19.0%)	235 (23.6%)	202 (17.4%)	229 (22.9%)	303 (30.3%)	217 (21.7%)	3383 (22.6%)
Completed secondary	1325 (45.4%)	584 (29.1%)	482 (35.0%)	180 (32.8%)	693 (35.6%)	306 (30.7%)	386 (38.8%)	546 (47.1%)	509 (50.8%)	162 (16.2%)	198 (19.8%)	5371 (35.9%)
Completed tertiary	958 (32.8%)	312 (15.6%)	626 (45.4%)	108 (19.7%)	528 (27.1%)	335 (33.6%)	160 (16.1%)	192 (16.6%)	18 (1.8%)	77 (7.7%)	20 (2.0%)	3334 (22.3%)
Marital status of participants												
Single	105 (3.8%)	1 (0.1%)	358 (26.0%)	141 (25.7%)	560 (28.7%)	264 (26.4%)	211 (21.1%)	45 (3.9%)	22 (2.2%)	129 (12.9%)	67 (6.7%)	1903 (13.1%)
Married	1913 (68.4%)	1012 (60.9%)	858 (62.4%)	355 (64.7%)	1023 (52.5%)	605 (60.5%)	703 (70.3%)	1084 (93.4%)	964 (96.2%)	813 (81.3%)	865 (86.6%)	10195 (70.3%)
Divorced/widowed	777 (27.8%)	650 (39.1%)	160 (11.6%)	53 (9.7%)	365 (18.7%)	131 (13.1%)	86 (8.6%)	31 (2.7%)	16 (1.6%)	58 (5.8%)	67 (6.7%)	2394 (16.5%)
Job of carers												

Full time job	1059 (36.0%)	349 (17.4%)	199 (14.4%)	48 (8.7%)	508 (25.9%)	199 (19.8%)	198 (19.8%)	223 (19.2%)	645 (64.4%)	138 (13.7%)	103 (10.3%)	3669 (24.4%)
Part time job	109 (3.7%)	267 (13.3%)	123 (8.9%) (15.9%)	88 (15.9%)	201 (10.2%)	174 (17.3%)	221 (22.1%)	4 (0.3%)	16 (1.6%)	84 (8.4%)	246 (24.6%)	1533 (10.2%)
No job	1776 (60.3%)	1395 (69.4%)	1059 (76.7%)	416 (75.4%)	1256 (63.9%)	630 (62.8%)	581 (58.1%)	933 (80.4%)	341 (34.0%)	783 (77.9%)	650 (65.1%)	9820 (65.4%)
Carers' relationship to participants												
Spouse	926 (31.7%)	403 (20.1%)	463 (33.6%)	162 (29.5%)	530 (27.3%)	224 (22.4%)	104 (10.4%)	691 (59.6%)	345 (34.4%)	264 (26.4%)	328 (32.8%)	4440 (29.7%)
Children	1057 (36.2%)	738 (36.8%)	505 (36.6%)	257 (46.8%)	928 (47.8%)	497 (49.6%)	480 (48.0%)	317 (27.4%)	521 (52.0%)	297 (29.7%)	200 (20.0%)	5797 (38.7%)
Children in law or other relatives	617 (21.1%)	510 (25.4%)	227 (16.4%)	95 (17.3%)	329 (16.9%)	220 (22.0%)	381 (38.1%)	56 (4.8%) (11.7%)	117 (11.7%)	381 (38.1%)	426 (42.6%)	3359 (22.4%)
Non-relative	323 (11.1%)	355 (17.7%)	185 (13.4%)	35 (6.4%)	156 (8.0%)	61 (6.1%)	35 (3.5%)	95 (8.2%)	19 (1.9%)	58 (5.8%)	45 (4.5%)	1367 (9.1%)
SRQ case	295 (10.1%)	369 (18.3%)	255 (18.5%)	77 (13.9%)	152 (7.8%)	124 (12.4%)	97 (9.7%)	16 (1.4%)	3 (0.3%)	26 (2.6%)	92 (9.2%)	1506 (10.0%)

Figures are numbers (percentages)

Table 2.12. Socio-demographic characteristics of participants with dementia in the 10/66 study, by site

Variables	Cuba (N=323)	Dominican Republic (N=242)	Peru (urban) (N=130)	Peru (rural) (N=36)	Venezuela (N=145)	Mexico (urban) (N=93)	Mexico (rural) (N=87)	China (urban) (N=84)	China (rural) (N=56)	India (urban) (N=75)	India (rural) (N=108)	Total (N=1379)
Gender												
Male	97 (30.0%)	73 (30.2%)	44 (33.8%)	12 (33.3%)	37 (31.6%)	24 (25.8%)	32 (36.8%)	32 (38.1%)	23 (41.1%)	28 (37.3%)	29 (26.9%)	431 (31.9%)
Female	226 (70.0%)	169 (69.8%)	86 (66.2%)	24 (66.7%)	80 (68.4%)	69 (74.2%)	55 (63.2%)	52 (61.9%)	33 (58.9%)	47 (62.7%)	79 (73.1%)	920 (68.1%)
Age group												
65-69	22 (6.8%)	21 (8.7%)	10 (7.8%)	6 (16.7%)	26 (18.3%)	2 (2.2%)	5 (5.7%)	7 (8.3%)	6 (10.7%)	18 (24.0%)	21 (19.4%)	144 (10.5%)
70-74	50 (15.5%)	37 (15.3%)	10 (7.8%)	8 (22.2%)	19 (13.4%)	16 (17.4%)	13 (14.9%)	12 (14.3%)	11 (19.6%)	21 (28.0%)	39 (36.1%)	236 (17.2%)
75-79	57 (17.7%)	52 (21.5%)	24 (18.6%)	7 (19.4%)	25 (17.6%)	21 (22.8%)	19 (21.8%)	18 (21.4%)	19 (33.9%)	9 (12.0%)	19 (17.6%)	270 (19.7%)
80+	193 (59.9%)	132 (54.5%)	85 (65.9%)	15 (41.7%)	72 (50.7%)	53 (57.6%)	50 (57.5%)	47 (56.0%)	20 (35.7%)	27 (36.0%)	29 (26.9%)	723 (52.7%)
Education level of participants												
No education	20 (6.2%)	77 (33.5%)	6 (4.7%)	12 (35.3%)	23 (19.7%)	49 (52.7%)	44 (50.6%)	25 (29.8%)	38 (67.9%)	44 (58.7%)	93 (86.1%)	431 (32.4%)
Less than primary	107 (33.4%)	105 (45.7%)	10 (7.9%)	9 (26.5%)	37 (31.6%)	29 (31.2%)	33 (37.9%)	15 (17.9%)	5 (8.9%)	9 (12.0%)	8 (7.4%)	367 (27.6%)
Completed primary	115 (35.9%)	32 (13.9%)	62 (48.8%)	11 (32.4%)	52 (44.4%)	9 (9.7%)	5 (5.7%)	18 (21.4%)	10 (17.9%)	19 (25.3%)	6 (5.6%)	339 (25.5%)
Completed secondary or higher	78 (24.4%)	16 (7.0%)	49 (38.6%)	2 (5.9%)	5 (4.3%)	6 (6.5%)	5 (5.7%)	26 (31.0%)	3 (5.4%)	3 (4.0%)	1 (0.9%)	194 (14.6%)
Marital status of participants												
Single	40 (12.5%)	19 (7.9%)	16 (12.7%)	8 (22.2%)	15 (12.8%)	7 (7.5%)	3 (3.4%)	0	0	0	0	108 (8.0%)

Married	96 (29.9%)	52 (21.7%)	48 (38.1%)	16 (44.4%)	37 (31.6%)	29 (31.2%)	31 (35.6%)	49 (58.3%)	23 (41.1%)	33 (44.0%)	35 (32.4%)	449 (33.4%)
Divorced/widowed	185 (57.6%)	169 (70.4%)	62 (49.2%)	12 (33.3%)	65 (55.6%)	57 (61.3%)	53 (60.9%)	35 (41.7%)	33 (58.9%)	42 (56.0%)	73 (67.6%)	786 (58.5%)
Job of Participants												
Full time job	2 (0.6%)	2 (0.8%)	0	0	0	0	2 (2.5%)	1 (1.2%)	8 (14.3%)	3 (4.0%)	4 (3.7%)	22 (1.7%)
Part time job	3 (0.9%)	4 (1.7%)	0	2 (5.9%)	0	0	7 (8.8%)	0	0	2 (2.7%)	8 (7.4%)	26 (2.0%)
No job	316 (98.4%)	236 (97.5%)	121 (100.0%)	32 (94.1%)	111 (100.0%)	87 (100.0%)	71 (88.8%)	83 (98.8%)	48 (85.7%)	70 (93.3%)	96 (88.9%)	1271 (96.4%)
Participants with any income	273 (84.5%)	126 (52.1%)	83 (63.8%)	25 (69.4%)	67 (46.2%)	78 (83.9%)	51 (58.6%)	79 (94.0%)	24 (42.9%)	32 (42.7%)	80 (74.1%)	918 (66.6%)
Participants with any governmental or occupational pension	263 (81.4%)	66 (27.3%)	76 (58.5%)	24 (66.7%)	59 (40.7%)	73 (78.5%)	30 (34.5%)	71 (84.5%)	6 (10.7%)	10 (13.3%)	29 (26.9%)	707 (51.3%)
Participant has private insurance	0	32 (13.2%)	91 (72.2%)	25 (69.4%)	56 (48.7%)	43 (46.2%)	17 (19.5%)	5 (6.0%)	35 (62.5%)	1 (1.3%)	0	305 (22.7%)
Number of assets in the family	5.6±1.0	4.8±1.5	6.2±0.5	4.1±1.8	6.0±1.3	5.9±1.1	3.3±1.8	5.5±0.7	5.5±1.4	3.7±1.6	2.5±1.5	5.0±1.7

Figures are numbers (percentages) except for number of assets in the family where the data are means (standard deviations)

Table 2.13. Care arrangements and dependency levels of participants with dementia in the 10/66 study, by site

Variables	Cuba (N=323)	Dominican Republic (N=242)	Peru (urban) (N=130)	Peru (rural) (N=36)	Venezuela (N=145)	Mexico (urban) (N=93)	Mexico (rural) (N=87)	China (urban) (N=84)	China (rural) (N=56)	India (urban) (N=75)	India (rural) (N=108)	Total (N=1379)
Living arrangement of participants												
Living alone	20 (6.2%)	21 (8.7%)	2 (1.5%)	5 (13.9%)	8 (5.5%)	13 (14.0%)	14 (16.1%)	2 (2.4%)	2 (3.6%)	3 (4.0%)	16 (14.8%)	106 (7.7%)
Living with spouse	68 (21.1%)	53 (21.9%)	24 (18.5%)	5 (13.9%)	21 (14.5%)	24 (25.8%)	20 (23.0%)	44 (52.4%)	8 (14.3%)	11 (14.7%)	11 (10.2%)	289 (21.0%)
Living with children	166 (51.4%)	130 (53.7%)	69 (53.1%)	20 (55.6%)	107 (73.8%)	44 (47.3%)	45 (51.7%)	26 (31.0%)	30 (53.6%)	47 (62.7%)	59 (54.6%)	743 (53.9%)
Living with other relatives	69 (21.4%)	38 (15.7%)	35 (26.9%)	6 (16.7%)	9 (6.2%)	12 (12.9%)	8 (9.2%)	12 (14.3%)	16 (28.6%)	14 (18.7%)	22 (20.4%)	241 (17.5%)
Living with children under 16	108 (33.5%)	94 (39.0%)	35 (26.9%)	14 (38.9%)	61 (55.0%)	36 (38.7%)	27 (31.0%)	7 (8.3%)	34 (60.7%)	32 (49.2%)	58 (53.7%)	506 (38.0%)
WHO DAS score	43.4±31.9	35.4±29.0	47.8±31.6	30.9±27.1	34.5±29.7	28.6±29.1	31.6±31.7	54.9±33.5	42.0±30.0	23.4±22.7	44.1±23.0	39.0±30.6
Dependency												
Need care much of the time	135 (45.0%)	82 (33.9%)	49 (37.7%)	6 (16.7%)	53 (36.6%)	32 (34.4%)	14 (16.1%)	57 (67.9%)	18 (32.1%)	11 (14.9%)	12 (11.1%)	469 (34.6%)
Need care some of the time	43 (14.3%)	23 (9.5%)	28 (21.5%)	6 (16.7%)	41 (28.3%)	19 (20.4%)	13 (14.9%)	17 (20.2%)	10 (17.9%)	4 (5.4%)	20 (18.5%)	224 (16.5%)
No dependency	122 (40.7%)	137 (56.6%)	53 (40.8%)	24 (66.7%)	51 (35.2%)	42 (45.2%)	60 (69.0%)	10 (11.9%)	28 (50.0%)	59 (79.7%)	76 (70.4%)	662 (48.9%)
Received care												
Any ADL help	151 (46.7%)	94 (38.8%)	71 (54.6%)	11 (30.6%)	41 (28.3%)	33 (35.5%)	24 (27.6%)	64 (76.2%)	27 (48.2%)	12 (16.0%)	32 (29.6%)	560 (40.6%)
Any IADL help	137 (42.4%)	64 (26.4%)	60 (46.2%)	8 (22.2%)	45 (31.0%)	39 (41.9%)	14 (16.1%)	41 (48.8%)	15 (26.8%)	14 (18.7%)	30 (27.8%)	467 (33.9%)
Supervision	75 (23.2%)	30 (12.4%)	61 (46.9%)	7 (19.4%)	51 (35.2%)	28 (30.1%)	12 (13.8%)	12 (14.3%)	6 (10.7%)	11 (14.7%)	8 (7.4%)	301 (21.8%)
Day paid care	26 (8.0%)	24 (9.9%)	29 (22.3%)	1 (2.8%)	14 (9.7%)	2 (2.2%)	1 (1.1%)	38 (45.2%)	0	0	0	135 (9.8%)
Night paid care	6 (1.9%)	18 (7.4%)	20 (15.4%)	1 (2.8%)	3 (2.1%)	1 (1.1%)	0	37 (44.0%)	0	0	0	86 (6.2%)

Figures are numbers (percentages) except for WHO-DAS score where the data are means (standard deviations)

supervision and paid home care.

Table 2.14 summarises the severity of dementia according to CDR and it is clear more participants with dementia are in mild levels in all sites. Among subtypes of dementia, AD is the most prevalent, followed by VD. Prevalence of other subtypes of dementia is relatively low. It is clear that dementia patients are likely to have co-morbid depression, chronic physical diseases and some degree of physical impairments.

Socio-demographic characteristics of carers of participants with dementia and their health status are described in Table 2.15. Most carers are female in all sites except for rural China. About 23% of carers are not of working age, ranging from 3.7% in rural India to 45.2% in urban China. Carers from India have the lowest educational levels and carers from urban Peru have the highest. Most of the carers are currently married and most of them do not have jobs. In contrast to the general population, it is clear that most of the carers are children in all sites except for rural India where the children-in-law or other relatives are the likely carers. Participants with dementia are less likely to have carers who are spouses compared with the general population.

Summary of section

The general methodology and study design of the 10/66 survey have been introduced in this section. The study was a population based survey among people living in the community aged 65 years and over in seven developing countries. Trained interviewers collected information on socio-demographic factors, cognitive function, health status, health service utilisation, BPSD, dependency and care arrangements of the participants, and the impact on caregivers. Psychiatric and neurological examinations for participants were also conducted by interviewers. Detection of dementia was according to 10/66 dementia diagnoses. Depression was diagnosed according to ICD-10. Hypertension was diagnosed according to self-report and blood pressure measurement and self-report information was used in the diagnosis of other physical conditions.

Socio-demographic characteristics, care arrangements, dependency, mental and physical status of participants, and socio-demographic characteristics and health status

of carers were reported among the whole sample and for participants with dementia separately. Most participants (in the general population and with dementia) were female, in the older age category, and had lower education levels. Very few participants still had a job, and this was even less among those with dementia. The receipt of income, pensions and having private insurance varied across sites. Very few participants lived alone. Most of the participants lived with children or children in law or other relatives, rather than lived with spouses. Dementia is clearly an important reason for dependency, which leads to more informal care and receipt of paid home care. Most of the carers were female in all sites except rural China. Most of the carers were still of working age, and this was even more so for carers of participants with dementia. However, many carers of working age did not have a job, and this may be related to their caring activities. Most of the carers were children, children in law or other relatives. Fewer spouses were the carers for participants with dementia compared to carers of those in the sample as a whole.

Table 2.14. Severity and subtype of dementia and other health status of participants with dementia in the 10/66 study, by site

Variables	Cuba (N=323)	Dominican Republic (N=242)	Peru (urban) (N=130)	Peru (rural) (N=36)	Venezuela (N=145)	Mexico (urban) (N=93)	Mexico (rural) (N=87)	China (urban) (N=84)	China (rural) (N=56)	India (urban) (N=75)	India (rural) (N=108)	Total (N=1379)
CDR severity												
Questionable and mild	198 (61.3%)	178 (73.6%)	85 (65.4%)	31 (86.1%)	104 (71.7%)	79 (84.9%)	79 (90.8%)	54 (64.3%)	42 (75.0%)	70 (93.3%)	101 (93.5%)	1021 (74.0%)
Moderate	71 (22.0%)	42 (17.4%)	34 (26.2%)	3 (8.3%)	37 (25.5%)	13 (14.0%)	7 (8.0%)	28 (33.3%)	13 (23.2%)	4 (5.3%)	5 (4.6%)	257 (18.6%)
Severe	54 (16.7%)	22 (9.1%)	11 (8.5%)	2 (5.6%)	4 (2.8%)	1 (1.1%)	1 (1.1%)	2 (2.4%)	1 (1.8%)	1 (1.3%)	2 (1.9%)	101 (7.3%)
Subtype												
Not allocated	88 (27.2%)	66 (27.3%)	34 (26.2%)	18 (50.0%)	46 (31.7%)	35 (37.6%)	54 (62.1%)	25 (29.8%)	26 (46.4%)	57 (76.0%)	90 (83.3%)	539 (39.1%)
Pure AD	156 (48.3%)	56 (23.1%)	50 (38.5%)	10 (27.8%)	50 (34.5%)	27 (29.0%)	15 (17.2%)	25 (29.8%)	19 (33.9%)	10 (13.3%)	6 (5.6%)	424 (30.7%)
Pure VD	35 (10.8%)	54 (22.3%)	19 (14.6%)	4 (11.1%)	25 (17.2%)	14 (15.1%)	6 (6.9%) (15.1%)	31 (36.9%)	8 (14.3%)	2 (2.7%) (2.7%)	3 (2.8%)	201 (14.6%)
Mixed AD/VAD	14 (4.3%)	15 (6.2%)	3 (2.3%)	1 (2.8%)	2 (1.4%)	2 (2.2%)	2 (2.3%)	0	2 (3.6%)	2 (2.7%)	1 (0.9%)	44 (3.2%)
Pure DLB	9 (2.8%)	17 (7.0%)	5 (3.8%)	3 (8.3%)	6 (4.1%)	1 (1.1%)	2 (2.3%)	0	0	2 (2.7%)	3 (2.8%)	48 (3.5%)
Mixed AD/DLB	12 (3.7%)	23 (9.5%)	7 (5.4%)	0	7 (4.8%)	5 (5.4%)	6 (6.9%)	1 (1.2%)	0	1 (1.3%)	2 (1.9%)	64 (4.6%)
FTD	9 (2.8%)	11 (4.5%)	12 (9.2%)	0	9 (6.2%)	9 (9.7%)	2 (2.3%)	2 (2.4%)	1 (1.8%)	1 (1.3%)	3 (2.8%)	59 (4.3%)
Depression	26 (8.0%)	57 (23.6%)	11 (8.5%)	6 (16.7%)	23 (15.9%)	10 (10.8%)	9 (10.3%)	1 (1.2%)	6 (10.7%)	9 (12.0%)	17 (15.7%)	175 (12.7%)
Hypertension	220 (68.1%)	176 (72.7%)	77 (59.2%)	12 (33.3%)	98 (67.6%)	59 (63.4%)	47 (54.0%)	54 (64.3%)	38 (67.9%)	51 (68.0%)	52 (48.1%)	884 (64.1%)
Diabetes	60 (18.6%)	28 (11.6%)	13 (10.0%)	2 (5.6%)	26 (17.9%)	22 (23.7%)	15 (17.2%)	12 (14.3%)	1 (1.8%)	8 (10.7%)	8 (7.4%)	195 (14.1%)
Ischemic heart disease	43 (13.3%)	5 (2.1%)	8 (6.2%)	1 (2.8%)	15 (10.3%)	3 (3.2%)	2 (2.3%)	17 (20.2%)	1 (1.8%)	3 (4.0%)	2 (1.9%)	100 (7.3%)

Stroke	61 (18.9%)	57 (23.6%)	24 (18.5%)	2 (5.6%)	24 (16.6%)	12 (12.9%)	9 (10.3%)	34 (40.5%)	8 (14.3%)	4 (5.3%)	3 (2.8%)	238 (17.3%)
COPD	14 (4.3%)	24 (9.9%)	8 (6.2%)	2 (5.6%)	17 (11.7%)	8 (8.6%)	9 (10.3%)	10 (11.9%)	4 (7.1%)	1 (1.3%)	5 (4.6%)	102 (7.4%)
Number of physical impairments												
0	118 (36.5%)	62 (25.6%)	52 (40.0%)	10 (27.8%)	57 (39.3%)	28 (30.1%)	18 (20.7%)	15 (17.9%)	15 (26.8%)	49 (65.3%)	16 (14.8%)	440 (31.9%)
1-2	164 (50.8%)	103 (42.6%)	47 (36.2%)	20 (55.6%)	45 (31.0%)	42 (45.2%)	43 (49.4%)	43 (51.2%)	36 (64.3%)	24 (32.0%)	55 (50.9%)	622 (45.1%)
3+	41 (12.7%)	77 (31.8%)	31 (23.8%)	6 (16.7%)	43 (29.7%)	23 (24.7%)	26 (29.9%)	26 (31.0%)	5 (8.9%)	2 (2.7%)	37 (34.3%)	317 (23.0%)

Table 2.15. Socio-demographic characteristics and health status of carers of participants with dementia in the 10/66 study, by site

Variables	Cuba (N=323)	Dominican Republic (N=242)	Peru (urban) (N=130)	Peru (rural) (N=36)	Venezuela (N=145)	Mexico (urban) (N=93)	Mexico (rural) (N=87)	China (urban) (N=84)	China (rural) (N=56)	India (urban) (N=75)	India (rural) (N=108)	Total (N=1379)
Gender												
Male	64 (19.9%)	44 (18.2%)	22 (16.9%)	5 (13.9%)	28 (19.4%)	16 (17.2%)	22 (25.3%)	28 (33.3%)	36 (64.3%)	23 (30.7%)	21 (19.4%)	309 (22.4%)
Female	258 (80.1%)	198 (81.8%)	108 (83.1%)	31 (86.1%)	116 (80.6%)	77 (82.8%)	65 (74.7%)	56 (66.7%)	20 (35.7%)	52 (69.3%)	87 (80.6%)	1068 (77.6%)
Age group												
< 18	2 (0.6%)	3 (1.2%)	0	1 (2.8%)	0	3 (3.2%)	0	0	0	0	0	9 (0.7%)
18-64	220 (68.1%)	187 (77.3%)	95 (73.1%)	28 (77.8%)	127 (87.6%)	80 (86.0%)	74 (85.1%)	46 (54.8%)	42 (75.0%)	64 (85.3%)	104 (96.3%)	1067 (77.4%)
65+	101 (31.3%)	52 (21.5%)	35 (26.9%)	7 (19.4%)	18 (12.4%)	10 (10.8%)	13 (14.9%)	38 (45.2%)	14 (25.0%)	11 (14.7%)	4 (3.7%)	303 (22.0%)
Education level of participants												
Less than primary	18 (5.6%)	74 (30.7%)	2 (1.5%)	2 (5.6%)	7 (4.8%)	23 (24.7%)	25 (29.1%)	17 (20.2%)	12 (21.4%)	34 (45.3%)	57 (52.8%)	271 (19.7%)
Completed primary	47 (14.6%)	65 (27.0%)	19 (14.6%)	15 (41.7%)	44 (30.3%)	16 (17.2%)	19 (22.1%)	7 (8.3%)	22 (39.3%)	22 (29.3%)	30 (27.8%)	306 (22.2%)
Completed secondary	160 (49.5%)	62 (25.7%)	42 (32.3%)	15 (41.7%)	57 (39.3%)	26 (28.0%)	27 (31.4%)	42 (50.0%)	21 (37.5%)	18 (24.0%)	19 (17.6%)	489 (35.5%)
Completed tertiary	98 (30.3%)	40 (16.6%)	67 (51.5%)	4 (11.1%)	37 (25.5%)	28 (30.1%)	15 (17.4%)	18 (21.4%)	1 (1.8%)	1 (1.3%)	2 (1.9%)	311 (22.6%)
Marital status of participants												
Single	8 (2.7%)	0	53 (40.8%)	11 (31.4%)	34 (23.6%)	26 (28.0%)	17 (19.5%)	4 (4.8%)	4 (7.1%)	7 (9.5%)	8 (7.4%)	172 (13.0%)
Married	191 (63.7%)	119 (56.9%)	57 (43.8%)	18 (51.4%)	78 (54.2%)	55 (59.1%)	60 (69.0%)	76 (90.5%)	51 (91.1%)	62 (83.8%)	90 (83.3%)	857 (64.9%)
Divorced/widowed	101 (33.7%)	90 (43.1%)	20 (15.4%)	6 (17.1%)	32 (22.2%)	12 (12.9%)	10 (11.5%)	4 (4.8%)	1 (1.8%)	5 (6.8%)	10 (9.3%)	291 (22.0%)
Job of carers												

Full time job	99 (30.7%)	36 (14.9%)	30 (23.1%)	6 (16.7%)	27 (18.6%)	14 (15.1%)	18 (20.7%)	18 (21.4%)	23 (41.1%)	15 (20.0%)	14 (13.0%)	300 (21.8%)
Part time job	19 (5.9%)	36 (14.9%)	11 (8.5%)	6 (16.7%)	22 (15.2%)	19 (20.4%)	23 (26.4%)	1 (1.2%)	1 (1.8%)	7 (9.3%)	29 (26.9%)	174 (12.6%)
No job	205 (63.5%)	170 (70.2%)	89 (68.5%)	24 (66.7%)	96 (66.2%)	60 (64.5%)	46 (52.9%)	65 (77.4%)	32 (57.1%)	53 (70.7%)	65 (60.2%)	905 (65.6%)
Carers' relationship to participants												
Spouse	62 (19.2%)	36 (14.9%)	17 (13.1%)	6 (16.7%)	18 (12.6%)	5 (5.4%)	11 (12.6%)	32 (38.1%)	15 (26.8%)	15 (20.0%)	15 (13.9%)	232 (16.8%)
Children	155 (48.0%)	119 (49.2%)	63 (48.5%)	20 (55.6%)	93 (65.0%)	61 (65.6%)	45 (51.7%)	34 (40.5%)	29 (51.8%)	32 (42.7%)	26 (24.1%)	677 (49.2%)
Children in law or other relatives	82 (25.4%)	56 (23.1%)	21 (16.2%)	9 (25.0%)	28 (19.6%)	24 (25.8%)	29 (33.3%)	7 (8.3%)	9 (16.1%)	26 (34.7%)	63 (58.3%)	354 (25.7%)
Non-relative	24 (7.4%)	31 (12.8%)	29 (22.3%)	1 (2.8%)	4 (2.8%)	3 (3.2%)	2 (2.3%)	11 (13.1%)	3 (5.4%)	2 (2.7%)	4 (3.7%)	114 (8.3%)
SRQ case	72 (22.3%)	74 (30.6%)	61 (46.9%)	21 (58.3%)	27 (18.6%)	22 (23.7%)	14 (16.1%)	2 (2.4%)	1 (1.8%)	6 (8.0%)	10 (9.3%)	310 (22.5%)

Section 3. Methodology for estimating the costs of medical care and social care

The costs reported in this thesis are divided into the cost of medical care and the cost of social care. Medical care represents care provided by healthcare professionals. Social care refers to care provided by unpaid family members (informal care) or paid home carers (non-professional help, such as cleaning the house, helping with cooking or other activities of daily life). In this section, methodological issues in terms of the identification, measurement and valuing the costs of dementia will be discussed.

3.1. Medical care costs

Cost identification

Medical attention for people with dementia is indicated for diagnosis, psycho-education and support for patients and carers, and attention to behavioural and psychological symptoms (Prince et al., 2011b; Prince et al., 2009). There is also considerable comorbidity with chronic physical health conditions, and a relatively high prevalence of physical impairments and depression (Prince et al., 2011a). Medical services include contact with primary care health professionals, public hospital doctors, other publically provided professionals (such as physiotherapists and nurses), and private health care services (including private doctors, dentists, and traditional healers). It also includes hospital inpatient care and medication prescribed and/or purchased. In receiving medical care use of other resources is required including transportation costs and time spent travelling and receiving services. Costs for medical care can be further divided into direct cost for receiving medical care (diagnostic assessments, examination and treatment), personal direct costs (especially transport and time costs) and indirect costs (loss of economic productivity).

Service measurement

For each service, participants were asked if they had made use of it in the last three

months, how often they had used it, what the duration of contacts were, and how much money was spent on using the service. They were also asked if a friend or family member accompanied them and how much money was spent on travelling. For inpatient services, if the participant had been admitted in the past three months, they were asked to state the number of nights in hospital and the total price of the admission (if they paid themselves). Total costs of medication paid by the families in the last three months were also recorded.

Calculation of service costs

When calculating service costs it is very important to establish the perspective that is being taken. In this study, costs are calculated at both the private (personal) level and the public level.

Private perspective

From an individual perspective, the cost of health care use is the out-of-pocket expense and the time spent using services and travelling to use them. These have been collected in the study. Specifically:

- The 3-month total direct medical costs for participants were recorded and this amount was multiplied by four to estimate the annual private direct medical cost.
- Payment for transportation was also recorded and also multiplied by four to generate annual direct non-medical costs.
- Time spent receiving care by the participants and time spent by family members as part of the care process in the past three months was also recorded. The methodology used for valuing this time is the same as used in valuing social care and described in section 3.2. In brief, time spent by family members is valued as if it were working time, and so values representing lost work are used here. Time given up by the participants in using services is not included in the cost calculations. This is because most of the participants were retired at the time of the interview, and their lost productivity can be considered to be negligible (Wimo et al., 2011).

Public perspective

To value health and other care services we can make reference to an available data

resource or generate unit costs that are specific to the study. None of the countries in the 10/66 project have published any robust unit cost estimates for the services we measured. Moreover, it was not feasible to collect the information required to calculate unit costs for all countries. Therefore, an alternative approach, i.e. extrapolation through application of UK unit costs was employed and these focussed on using available data either collected in the study or from secondary sources.

Application of UK unit costs

This method assumes that the relationships between the unit costs of health and social care services among all the project countries are fixed. Therefore, if unit costs of all health and social care services from one country are known, and the ratios between costs in this country and other project countries for certain services are also known, then the unit costs for all services in all countries can be calculated. Specifically, the steps involved in these calculations are as follows:

- (1) Determine the reference unit costs for each service from one country,
- (2) convert the costs in this country to international dollars according to purchasing power parity to enable comparison,
- (3) generate ratios for health and social care costs between the reference country and each project country, and
- (4) apply those ratios to each service in the reference country to generate country specific unit costs.

Reference unit costs

In the UK, the Department of Health has been funding a publication entitled ‘Unit Cost of Health and Social Care’ since 1992 (Curtis, 2010) and it is updated every year. The aim of developing this publication has been to provide transparent and comparable information about the costs of health and social care for use in health economic studies. Data from this publication are used in numerous economic evaluations and cost of illness studies in the UK.

In this publication the authors bring together data from a variety of sources to estimate up to date nationally appropriate unit costs for key health and social care services in the UK. The figures were identified as closely as possible with long run marginal opportunity cost. The unit costs are calculated from the public perspective

rather than a private/individual perspective. The latter would mainly include out-of-pocket expenses, but given the system in the UK this would be inappropriate.

Information from this publication was seen as being suitable for the current analyses. Costs were identified for the following service types investigated in the 10/66 survey: government primary care worker, government hospital doctor, other government health worker and hospital inpatient services. For services for which unit costs were not included in the publication (such as private doctor, dentist, traditional healer and medication), out of pocket payments were used to directly calculate costs. The reason for this method is because these services are more open to market forces.

Details of estimating the unit costs, using UK data, of specific services measured in the 10/66 survey are as follows:

(1) Governmental primary care service

The governmental primary care service is assumed to be similar to general practitioner (GP) care in the UK. Patients go to the surgery or clinic to consult community health doctors and receive prescriptions. The unit cost for a visit to a GP consists of two components. The first is the salary of the GP. In the unit costs publication the cost excluding direct care staff elements but with qualification costs is used. Qualification costs refer to initial training costs to enable the GP to work. The second component is the cost for prescriptions. Prescription costs per consultation provided by the publication were used in the calculation.

(2) Contact with government funded hospital doctor

Hospital-based outpatient procedures in the unit cost publication are the most similar service to government hospital doctors in the survey, and the average cost of this was therefore used. In the unit cost publications these costs were presented differently for different years. In 2002, costs were presented for a wide range of specialities, including geriatric care. From 2003 to 2007, the costs were presented for a limited range of specialities, but still including geriatric care. In the first three years (2003-2005), the costs were for the first attendance, while in the last two years (2006-2007), the costs were based on three-year average estimates for follow-up attendances. In 2008, the contacts were defined as face to face attendances

(non-consultant led). Costs were presented for the first attendances and all follow up attendances, but without speciality differentiation. In 2009 and 2010, the cost was a weighted average taking into account all outpatient procedures, again with no speciality differentiation.

(3) Other government health worker

It was assumed that patients would not receive prescriptions when seeing government funded health workers other than doctors. Therefore, the cost is based on staff salaries, qualifications and overheads. In this study the unit cost for a community nurse (including district nursing sister, district nurse) was assumed to be representative of all government health workers.

(4) Hospital services

It was assumed that most of the inpatient care received by the participants was not based on advance plans; that is they were assumed to only be admitted when needing treatment. Therefore, the national average cost for non-elective inpatient stays was used for the unit cost of hospital services. However, as with the costs for outpatient services, the costs for inpatient care were not consistently presented across the years for which the unit cost publications were available. From 2002 to 2007, inpatient costs were presented as the cost per bed day for different categories of patients, including those receiving geriatric care. Weighted average costs for all inpatient services were listed for non elective and elective admissions and costs were shown for each episode, rather than per bed day in 2008. Information is also provided for 2007. In 2009 and 2010, non-elective inpatient costs were also divided into long stays and short stays.

Details of the unit costs available for the four types of services are shown in Table 3.1.

Table 3.1. UK unit costs for health and social care services (2002-2010)

Service type		2002	2003	2004	2005	2006	2007	2008	2009	2010
Government Primary care	Salary costs, £ per minute	1.9	1.9	2	2.1	2.2	2.6	2.7	2.7	2.8
	Prescription costs, £ per prescription	18	31	31	32	35	44	41	40	39
Government hospital doctor, £ per visit		118 ¹	188 ²	223 ²	237 ²	106 ³	154 ³	71 ⁴	185 ⁵	152 ⁵
Other government health worker, £ per hour in clinic		41	40	41	46	46	48	52	54	56
Hospital services, £ per bed day		145 ¹	147 ⁶	166 ⁶	159 ⁶	217 ⁶	205 ⁶	-	-	-
Hospital services, £ per episode							1502 ⁷	1409 ⁷	2141 ⁸	2197 ⁸

1 Geriatric service

2 Geriatric service, cost per first attendance

3 Geriatric service, cost per follow-up attendance, based on three-year average

4 Weighted average of all follow-up attendances (adult)

5 Weighted average of all outpatient procedures

6 Geriatric patients

7 Weighted average of all inpatient non-elective episodes

8 Non-elective inpatient episodes (long stays)

From Table 3.1, we can see that the estimations for the cost of government primary care doctors and other government health workers are consistent across the different years, while the estimations for the costs of government hospital doctors and other hospital services differ across the years, especially after 2008. NHS Reference Costs (UK Department of Health, 2010) are published regularly by the UK Department of Health and provide detailed cost information on an extended range of surgical procedures and medical treatments. The annual report is based on unadjusted costs and activity in each financial year, ending on 31 March. The first report was published for 1998-99, and the latest one available for this project was for 2009-10. The NHS reference costs for different hospital services are shown in Table 3.2. There are three databases in the table, including the NHS Trust database, the Primary Care Trust database, and the NHS Trust and Primary Care Trust combined database. Data were extracted from the databases and calculations were carried out according to the purpose of this thesis. For outpatient services, the figures are generated by calculating the average cost across all kinds of activities. For inpatient services, the costs are derived as the unit cost per bed day, by calculating the total costs of all kinds of inpatient services, and dividing by the sum of bed days. As the figures for hospital costs (outpatient and inpatient services) were drawn from NHS Reference Costs for NHS trusts and primary care trusts combined, it is preferable to use the information from the NHS reference cost directly.

Table 3.2. NHS trust and Primary Care Trust reference cost in different years

Service types	Source	2007-08	2008-09	2009-10	2008 ¹	2009 ²
Out patient (£ per visit)	NHS trust	149	149	142	149	144
	Primary Care Trust (PCT)	215	219	232	218	229
	NHS trust and PCT combined	149	149	143	149	145
Non-elective inpatient (£ per bed day)	NHS trust	359	376	404	372	397
	Primary Care Trust (PCT)	251	310	307	295	308
	NHS trust and PCT combined	357	375	403	371	396
Elective inpatient (£ per bed day)	NHS trust	820	890	947	873	933
	Primary Care Trust (PCT)	258	432	312	389	342
	NHS trust and PCT combined	812	884	940	866	926

¹ 3 months from 2007-08 and 9 months from 2008-09

² 3 months from 2008-09 and 9 months from 2009-10

Source: Department of Health,

2007-08:http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_098945

2008-09:http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_111591

2009-10:http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_123459

Ratios for health costs between UK and project countries

WHO initiated the WHO-CHOICE (WHO, 2012b) (CHOosing Interventions that are Cost-Effective) project in 1998. The objective of the project was to provide policy makers with information when deciding on which interventions and programmes to provide using limited resources in order to maximise health. Country-level costs and effects of different health interventions are estimated and provided in the WHO-CHOICE report. The results have been summarised in regional databases, which are available on the internet.

In the WHO-CHOICE database, unit cost values for primary and secondary health care services are estimated and expressed both in international dollars and local currency units. The most recent figures were updated by the WHO to the years 2007 and 2008. In the database, both inpatient and outpatient unit costs are available. The inpatient unit cost presents the estimated cost per hospital bed-day, including non-direct medical cost (such as personnel, capital and food costs), but excluding

expenditures on drugs and diagnostic tests. The cost is categorised according to different levels and ownership of facilities. The levels include primary, secondary, and teaching hospitals. The ownership categories are public, private and non-governmental organisations (NGOs). The outpatient unit costs represent all cost components except for the costs of drugs and diagnostics. The costs are displayed for different levels of facility, area and ownership of the facility. The levels include health centre (with no beds), health centre (with beds), primary-level and secondary-level hospital. The area categories are urban and rural. Ownership is defined in the same way as for inpatient unit costs.

Inpatient unit costs contained in the WHO-CHOICE database

The unit costs for inpatient services among project countries in 2007 and 2008 are shown in Tables 3.3a and 3.3b.

Outpatient unit costs contained in the WHO-CHOICE database

The unit costs for outpatient services among project countries in 2007 and 2008 are shown in Table 3.4a and 3.4b.

Ratios applied in the analysis

Ratios applied in the analysis were determined considering different settings for each service. Government primary care could be treated as a kind of outpatient service in a health centre. An average ratio of cost per visit at a health centre (with no beds) and a health centre (with beds) owned by public organisations between the UK and each country could be used in the calculations. Government hospital doctor could be treated as an outpatient service in a public primary or secondary hospital. An average ratio of cost per visit at primary-level hospital and secondary-level hospital owned by public organisations between the UK and each country could again be used for calculation. It is not clear which level of the facility provides services by other government health workers. Therefore, an average ratio of all public facilities between the UK and each country was used.

Table 3.3a. Unit costs for inpatient services in the WHO-CHOICE database among project countries and UK in 2007

Ownership	Level of facility (Cost per bed day, International \$)	China	Cuba	Dominican Republic	India	Mexico	Peru	UK	Venezuela
Public	Primary-level hospital	48.65	31.63	72.16	21.35	148.97	72.29	452.22	123.29
	Secondary-level hospital	50.75	33.00	75.28	22.27	155.41	75.42	471.77	128.62
	Teaching hospital	65.63	42.67	97.34	28.80	200.96	97.52	610.02	166.31
Private	Primary-level hospital	62.72	40.78	93.03	27.52	192.05	93.20	582.99	158.94
	Secondary-level hospital	65.43	42.54	97.05	28.71	200.36	97.23	608.20	165.81
	Teaching hospital	84.60	55.01	125.49	37.13	259.07	125.72	768.43	214.40
NGO	Primary-level hospital	56.18	36.53	83.34	24.66	172.05	83.49	522.26	142.38
	Secondary-level hospital	58.61	38.11	86.94	25.72	179.49	87.10	544.84	148.54
	Teaching hospital	75.79	49.28	112.42	33.26	232.08	112.63	704.51	192.07

Source: WHO http://www.who.int/choice/country/country_specific/en/index.html

Table 3.3b. Unit costs for inpatient services in the WHO-CHOICE database among project countries and UK in 2008

Ownership	Level of facility (Cost per bed day, International \$)	China	Cuba	Dominican Republic	India	Mexico	Peru	UK	Venezuela
Public	Primary-level hospital	55.22	34.40	77.33	22.84	153.86	81.70	472.20	131.01
	Secondary-level hospital	57.61	35.89	80.67	23.83	160.52	85.23 110.2	492.61	136.67
	Teaching hospital	74.49	46.41	104.32	30.81	207.55	1 105.3	636.97	176.73
Private	Primary-level hospital	71.19	44.35	99.69	29.44	198.35	2 109.8	608.74	168.89
	Secondary-level hospital	74.27	46.27	104.00	30.72	206.93	8 142.0	635.06	172.20
	Teaching hospital	96.03	59.83	134.48	39.72	267.57	7	821.17	227.83
NGO	Primary-level hospital	63.78	39.73	89.31	26.38	177.69	94.35	545.33	151.30
	Secondary-level hospital	66.53	41.45	93.17	27.52	185.38	98.43 127.2	568.91	157.84
	Teaching hospital	86.03	53.60	120.47	35.58	239.70	8	735.63	204.10

Source: WHO http://www.who.int/choice/country/country_specific/en/index.html

Table 3.4a. Unit costs for outpatient services in the WHO-CHOICE database among project countries and UK in 2007

Area	Ownership	Level of facility(Cost per outpatient visit, International \$)	China	Cuba	Dominican Republic	India	Mexico	Peru	UK	Venezuela
Urban	Public	Health Centre (no beds)	8.33	6.09	11.08	4.58	18.76	11.10	41.98	16.35
		Health Centre (with beds)	10.28	7.52	13.69	5.66	23.16	13.70	51.84	20.19
		Primary-level hospital	11.72	8.57	15.6	6.44	26.39	15.62	59.07	23.00
		Secondary-level hospital	12.21	8.93	16.25	6.72	27.50	16.27	61.56	23.97
	Private	Health Centre (no beds)	11.73	8.59	15.62	6.46	26.43	15.64	59.17	23.04
		Health Centre (with beds)	14.49	10.6	19.29	7.97	32.64	19.31	73.06	28.45
		Primary-level hospital	16.51	12.08	21.98	9.08	37.20	22.01	83.26	32.42
		Secondary-level hospital	17.21	12.59	22.91	9.47	38.76	22.94	86.77	33.79
	NGO	Health Centre (no beds)	11.13	8.14	14.81	6.12	25.07	14.83	56.11	21.85
		Health Centre (with beds)	13.74	10.05	18.29	7.56	30.95	18.31	69.28	26.98
		Primary-level hospital	15.66	11.46	20.84	8.61	35.27	20.87	78.95	30.74
		Secondary-level hospital	16.32	11.94	21.72	8.98	36.75	21.75	82.27	32.04
Rural	Public	Health Centre (no beds)	5.86	4.28	7.79	3.22	13.19	7.81	29.53	11.50
		Health Centre (with beds)	7.23	5.29	9.62	3.98	16.29	9.64	36.46	14.20
		Primary-level hospital	8.24	6.03	10.97	4.53	18.56	10.98	41.55	16.18
		Secondary-level hospital	8.59	6.28	11.43	4.72	19.34	11.44	43.29	16.86
	Private	Health Centre (no beds)	8.25	6.04	10.99	4.54	18.59	11.00	41.62	16.21
		Health Centre (with beds)	10.19	7.46	13.57	5.61	22.95	13.58	51.38	20.01
		Primary-level hospital	11.61	8.50	15.46	6.39	26.16	15.48	58.56	22.80
		Secondary-level hospital	12.10	8.85	16.11	6.66	27.26	16.13	61.02	23.76
	NGO	Health Centre (no beds)	7.83	5.73	10.42	4.30	17.63	10.43	39.46	15.37
		Health Centre (with beds)	9.66	7.07	12.86	5.32	21.77	12.88	48.72	18.97
		Primary-level hospital	11.01	8.06	14.66	6.06	24.80	14.68	55.52	21.62
		Secondary-level hospital	11.47	8.40	15.27	6.31	25.85	15.30	57.86	22.53

Source: WHO http://www.who.int/choice/country/country_specific/en/index.html

Table 3.4b. Unit costs for outpatient services in the WHO-CHOICE database among project countries and UK in 2008

Area	Ownership	Level of facility(Cost per outpatient visit, International \$)	China	Cuba	Dominican Republic	India	Mexico	Peru	UK	Venezuela
Urban	Public	Health Centre (no beds)	9.13	6.47	11.65	4.81	19.20	12.13	43.32	17.09
		Health Centre (with beds)	11.27	7.99	14.39	5.94	23.71	14.98	53.49	21.10
		Primary-level hospital	12.84	9.11	16.4	6.77	27.02	17.07	60.96	24.04
		Secondary-level hospital	13.38	9.49	17.09	7.05	28.15	17.78	63.52	25.05
	Private	Health Centre (no beds)	12.87	9.13	16.43	6.78	27.06	17.09	61.06	24.08
		Health Centre (with beds)	15.89	11.27	20.28	8.37	33.41	21.11	75.39	29.73
		Primary-level hospital	18.10	12.84	23.11	9.54	38.08	24.05	85.39	33.88
		Secondary-level hospital	18.86	13.38	24.09	9.94	39.68	25.07	89.53	35.31
	NGO	Health Centre (no beds)	12.20	8.65	15.58	6.43	25.66	16.21	57.90	22.83
		Health Centre (with beds)	15.06	10.68	19.23	7.94	31.68	20.01	71.48	28.19
		Primary-level hospital	17.16	12.18	21.92	9.04	36.11	22.81	81.46	32.13
		Secondary-level hospital	17.89	12.69	22.84	9.42	37.62	23.77	84.89	33.48
Rural	Public	Health Centre (no beds)	6.42	4.55	8.20	3.38	13.50	8.53	30.47	12.02
		Health Centre (with beds)	7.93	5.62	10.12	4.18	16.67	10.53	37.62	14.84
		Primary-level hospital	9.03	6.41	11.53	4.76	19.00	12.00	42.87	16.91
		Secondary-level hospital	9.41	6.68	12.02	4.96	19.80	12.51	44.67	17.62
	Private	Health Centre (no beds)	9.05	6.42	11.55	4.77	19.03	12.02	42.94	16.94
		Health Centre (with beds)	11.17	7.92	14.26	5.89	23.50	14.84	53.02	20.91
		Primary-level hospital	12.73	9.03	16.26	6.71	26.78	16.92	60.42	23.83
		Secondary-level hospital	13.27	9.41	16.94	6.99	27.91	17.63	62.96	24.83
	NGO	Health Centre (no beds)	8.58	6.09	10.95	4.52	18.05	11.40	40.72	16.06
		Health Centre (with beds)	10.59	7.51	13.52	5.58	22.28	14.07	50.27	19.83
		Primary-level hospital	12.07	8.56	15.41	6.36	25.39	16.04	57.29	22.60
		Secondary-level hospital	12.58	8.92	16.06	6.63	26.46	16.71	59.70	23.55

Source: WHO http://www.who.int/choice/country/country_specific/en/index.html

Hospital service is an inpatient service in hospital. Patients stay in hospital for several days. However, it is not clear which level of the facility the service is provided in or which kind of ownership the facility is. Again therefore, an average ratio of all inpatient services between the UK and each country was used. In the WHO-CHOICE database, the estimates for average length of stay in hospital are different between levels of facilities, but the same across the countries. The average lengths of stay in a primary-level hospital, secondary-level hospital, and teaching hospital are 7.15, 9.75 and 9.75 days.

No ratio was applied for the unit cost of private doctor, dentistry, traditional healer and medication. The out-of-pocket expenditure collected in the questionnaire was used for these cost calculations.

Currency and time issue

In the 10/66 project, data were collected from a number of countries, each with their own currency, and at different time periods. To make reasonable comparisons it was necessary to apply appropriate conversion rates to the figures. The methods for doing this are described below.

Purchasing power parity (PPP)

Purchasing power parities (PPPs) are exchange rates which aim to make adjustments to equalise the purchasing power of different currencies and also to enable costs to be compared for different years. PPPs for most countries in the world are available on the website of the International Monetary Fund (International Monetary Fund, 2012). However, PPPs for Cuba were not available and other sources were required for this country. The PPPs for the six other project countries plus the UK from 2002 to 2010 are shown in Table 3.5a. The local currency of a country can be converted to comparable international dollars by dividing by the PPP of that country in a specific year.

PPPs are also available from the World Health Organisation's Global Health Expenditure Database (WHO, 2012a), and allows conversions between national currency units (NCUs) to US dollar (US\$). Information from this database on PPPs from 2002 to 2010 is shown in Table 3.5b.

Table 3.5a. PPPs in International Monetary Fund World Economic Outlook Database (2002-2010)

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	3.250	3.267	3.403	3.448	3.466	3.624	3.822	3.759	3.933
Dominican Republic	9.328	12.208	18.018	18.223	18.606	19.112	20.523	20.909	21.734
India	13.99	14.226	14.467	14.669	14.973	15.323	16.130	16.807	18.513
Mexico	6.207	6.651	6.959	7.127	7.365	7.561	7.868	8.095	8.352
Peru	1.429	1.438	1.480	1.485	1.542	1.527	1.505	1.521	1.572
United Kingdom	0.653	0.659	0.655	0.649	0.648	0.648	0.653	0.656	0.667
Venezuela	0.533	0.705	0.920	1.151	1.315	1.451	1.852	1.984	2.878

Source: International Monetary Fund, World Economic Outlook Database, September 2010

<http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx>

PPPs are also provided by WHO-CHOICE for the year of 2007 and 2008. Data from the WHO Global Health Expenditure Database are used to generate WHO-Choice data.

With regard to the PPP for Cuba, it has been estimated by the United States Department of Agriculture Foreign Agricultural Service

(<http://www.fas.usda.gov/info/factsheets/cuba/poultry.html>) that Cuba's per capita income is \$1500. After adjusting for PPP, it rises to \$3500, which implies that the PPP rate is 2.333. However, the above web site does not state the year for this estimation.

Consumer price index (CPI)

A consumer price index (CPI) measures changes in the prices of goods and services that households purchase across years. Such changes affect the real purchasing power of individual's incomes and consequently their welfare. Given that data in the 10/66 project were obtained for different years it was necessary to use such indexes. CPIs were available on the websites of the International Labour Organisation and International Monetary Fund. The figures from the Labour Statistics Database (LABORSTA) published by the International Labour Organisation are shown in Table 3.6a. For a specific country, the amount of money in a different year can be converted based on the amount of money in the original year by multiplying the ratio between the CPI of the two years (CPI of different year divided by the CPI of original year).

There are four categories in India relating to different employment levels. For this country an average index was calculated for use in the analyses.

Table 3.5b. PPPs in WHO Global Health Expenditure Database (2002-2010)

Index	Country	2002	2003	2004	2005	2006	2007	2008	2009	2010
WHO International \$ (PPPs)	China	3.282	3.297	3.428	3.448	3.465	3.622	3.822	3.764	3.946
	Cuba	1.135	1.183	1.198	1.230	1.295	1.361	1.357	1.408	1.408
	Dominican Republic	9.401	12.298	17.364	17.256	17.615	18.087	19.431	19.822	20.644
	India	13.578	13.764	14.550	14.669	15.118	15.531	16.217	17.280	18.763
	Mexico	6.550	6.810	7.215	7.130	7.223	7.327	7.470	7.690	7.951
	Peru	1.436	1.445	1.492	1.487	1.544	1.528	1.507	1.525	1.578
	United Kingdom	0.628	0.641	0.632	0.636	0.627	0.645	0.639	0.642	0.652
	Venezuela	0.534	0.706	0.919	1.153	1.316	1.460	1.873	2.011	2.909
Exchange Rate - (NCU per US\$)	China	8.277	8.277	8.277	8.194	7.973	7.608	6.949	6.831	6.770
	Cuba	1.000	1.000	1.000	1.000	1.000	0.926	1.000	1.000	1.000
	Dominican Republic	18.610	30.831	42.120	30.409	33.365	33.263	34.624	36.027	36.875
	India	48.610	46.583	45.316	44.100	45.307	41.349	43.505	48.405	45.726
	Mexico	9.660	10.790	11.290	10.900	10.900	10.930	11.130	13.510	12.636
	Peru	3.517	3.479	3.413	3.296	3.274	3.128	2.924	3.012	2.825
	United Kingdom	0.667	0.612	0.546	0.550	0.543	0.500	0.544	0.642	0.647
	Venezuela	1.161	1.607	1.891	2.090	2.147	2.147	2.147	2.147	2.582

Resource: WHO Global Health Expenditure Database

<http://apps.who.int/nha/database/DataExplorerRegime.aspx>

Table 3.6a. CPIs contained in the International Labour Organisation Labour Statistics Database (2002-2010)

Country	Employment level	2002	2003	2004	2005	2006	2007	2008	2009	2010
China		100.0	101.1	105.1	107.0	108.5	113.7	120.4	119.6	123.5
Cuba		106.1	108.2	105.9	108.9	114.5	122.5	124.5		
Dominican Republic		114.6	146.1	221.2	230.5	247.9	263.1	291.1	295.3	314.0
India	Agricultural workers	102.6	106.8	109.8	113.4	121.2	130.9	143.0	160.9	180.1
	Industrial workers	108.2	112.5	116.6	121.5	127.7	136.0	147.5	163.2	182.8
	Urban non-manual employees	109.8	113.7	118.0	123.2	130.6	139.1	149.7	167.1	187.7
	Delhi, Industrial workers	107.0	110.9	116.3	126.1	125.6	131.7	141.0	151.6	166.7
	Average*	106.9	111.0	115.2	121.0	126.3	134.5	145.3	160.7	179.3
Mexico		111.7	116.8	122.3	127.2	131.8	137.0	144.0	151.6	157.9
Peru	Lima	102.2	104.5	108.3	110.1	112.3	114.3	120.9	124.4	126.3
United Kingdom		103.5	106.5	109.6	112.7	116.3	121.3	126.1	125.5	131.3
Venezuela	Caracas	137.8	180.6	219.9	255.0	289.8	343.9	452.1	581.4	

* Not in the original database.

Source: International Labour Organization, LABORSTA, 2012 <http://laborsta.ilo.org/>

CPIs were also available in from the World Economic Outlook Database produced by the International Monetary Fund. Table 3.6b shows the indexes for 2002 to 2010. The estimations use 1984 as a base year and averages for the year and the end of the period are provided. In this table, the figures for Venezuela are very high. It is because the currency unit for Venezuela is an old unit, called the Venezuelan Bolivar. The latest currency unit in Venezuela is called Venezuelan Bolivar Fuerte, one Bolivar Fuerte being equal to 1000 Bolivars.

Process of calculating unit costs in study

Reference unit cost

When the cost for health services is to be estimated, a reference unit cost can be estimated from one of the project countries, where the government input for health services is the least. The assumption here is that the payment made by individuals then is similar to the actual cost. However, in reality the out-of-pocket-costs are very unlikely to represent 100% of the true cost, and medical costs generated using this method will be underestimated. The figures from the UK are comprehensively calculated and are unlikely to underestimate the health service cost. However, this method has disadvantages. The main disadvantage is that the UK is dissimilar to all project countries. Furthermore, matching of services in the UK to services measured in the 10/66 project may be inexact. As described earlier, assumptions were therefore made about which unit costs from the UK publication should be used.

An alternative approach is to use out-of-pocket expenses for each country and then to use these to impute the 'true' costs. The WHO Global Health Expenditure Database provides the percentage of out of pocket expenditure in total health expenditure at an individual country level. Using these percentages, the out-of-pocket expenses collected in the 10/66 survey can be converted to estimated total costs. This 'percentage method' is used in sensitivity analyses. More details and results of this are shown in at Section 7.

Ratios

An alternative approach to measuring costs is to apply a ratio generated according to the GDP per capita for every county. This method was used in recent studies to

Table 3.6b. CPI in World Economic Outlook Database (2002-2010)

Country	Subject Descriptor	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	Inflation, average consumer prices	200.4	202.7	210.6	214.5	217.6	228.0	241.4	239.8	247.8
	Inflation, end of period consumer prices	105.5	108.4	111.9	113.4	115.7	123.4	126.5	127.4	133.4
Dominican Republic	Inflation, average consumer prices	125.0	159.4	241.4	251.5	270.5	287.1	317.7	322.3	342.7
	Inflation, end of period consumer prices	132.9	189.6	244.0	262.2	275.3	299.7	313.3	331.3	352.0
India	Inflation, average consumer prices	103.3	107.1	111.3	115.7	122.9	130.8	141.7	157.1	175.9
	Inflation, end of period consumer prices	105.0	108.0	113.0	119.0	127.0	134.0	147.0	169.0	185.0
Mexico	Inflation, average consumer prices	69.1	72.3	75.6	78.7	81.5	84.8	89.1	93.8	97.7
	Inflation, end of period consumer prices	71.0	73.8	77.6	80.2	83.5	86.6	92.2	95.5	99.7
Peru	Inflation, average consumer prices	100.5	102.8	106.6	108.3	110.5	112.4	118.9	122.4	124.3
	Inflation, end of period consumer prices	101.3	103.9	107.5	109.1	110.3	114.6	122.3	122.6	125.1
United Kingdom	Inflation, average consumer prices	95.4	96.7	98.0	100.0	102.3	104.7	108.5	110.8	114.5
	Inflation, end of period consumer prices	96.0	97.3	98.7	100.8	103.6	105.7	109.8	112.1	115.9
Venezuela	Inflation, average consumer prices	26991.7	35383.6	43078.4	49951.4	56771.9	67389.7	87856.1	111648.4	143119.2
	Inflation, end of period consumer prices	30225.9	38412.3	45781.7	52355.2	61237.9	74990.1	98162.0	122758.7	156129.3

Source: International Monetary Fund, World Economic Outlook Database, September 2010

<http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx>

estimate the worldwide cost of dementia (Wimo et al., 2006; Wimo and Prince, 2010; Wimo et al., 2007). The authors of these studies assumed there was a relationship between direct costs of medical care and GDP per person. These ratios were calculated for countries which had available data and were then used to estimate costs in other countries where dementia costs had not been calculated. In this thesis, this method is labelled the ‘GDP ratio method’ and it has the advantage of allowing direct comparisons with these previous studies. It was however deemed appropriate to focus on ratios based on comparative costs of health services, with the GDP ratio used in sensitivity analyses. More details and results are also described Section 7.

PPPs

PPPs are contained in the World Economic Outlook Database from the International Monetary Fund, WHO Global Health Expenditure Database, WHO-CHOICE database and in other resources. The first three provide similar results for those countries with available data. Information on PPPs from the CIA and the Foreign Agricultural Service of the United States differ markedly with these official figures, and are not appropriate for use in these analyses. As the International Monetary Fund database does not include information for Cuba and figures for only two years are contained in the WHO-CHOICE database, the PPPs in the WHO Global Health Expenditure Database were most useful for the analyses.

Time issue

The survey was conducted in seven countries at different times from the earliest interviews in Cuba in 2002 to the latest interviews in Mexico in 2007. The distribution of interview dates is shown in Table 3.7.

Table 3.7. Interviewed date in the project countries

Countries	N	Earliest date of interview	Latest date of interview	Median of date of interview	Mode of interview year
China	2162	28.8.2003	19.10.2005	19.8.2004	2004
Cuba	2944	26.5.2002	06.12.2006	28.9.2004	2004
DR	2009	22.12.2002	06.2.2006	12.3.2005	2005
India	2002	12.10.2003	15.7.2006	03.2.2005	2004
Mexico	2003	09.12.2005	01.12.2007	18.9.2006	2006
Peru	1932	19.8.2002	29.8.2007	18.10.2005	2005
Venezuela	1965	20.12.2003	17.11.2006	28.11.2005	2005
Total	15016	26.5.2002	01.12.2007	15.4.2005	2005

The WHO-CHOICE database only provided information for 2007 and 2008, and it was decided that all figures would therefore be converted to equivalent values for the year 2008. As data collection in all the countries extended beyond one year, the modal interview year in each country was assumed as the interview year for every participant in that country. Consequently, the costs directly collected in the survey were converted to the equivalent value for the year 2008 according to the CPI. This was not available from the World Economic Outlook Database for Cuba and so data from the International Labour Organisation Labour Statistics Database were used for that country.

Calculation of private medical care costs (2008 prices)

Private medical care costs are the out of pocket expenses paid by patients and families. As described earlier, this information was collected for the three-month period before the interviews. For calculating the annual cost of dementia, the use of health services in the previous three months was multiplied to four to estimate annual figures. This is based on an assumption that people tend to use health services at a stable rate. However, this may not always be the case. Some individuals may only have used health services once in a year, but it happened to be in the three months prior to the interview. There will also be some individuals who used health services in the past year, but not in the past three months. In this situation, a cost will not be measured for this person. From a population level, some costs are likely to be under-estimated, and some costs over-estimated. It is hoped that these discrepancies will balance out across the sample. Furthermore, current evidence (Albanese et al., 2011) shows recall is only reliable for relatively short periods, e.g. 3 months.

There are some outliers in the data relating to time spent receiving health services, travel time and number of visits. These data were truncated according to the 99% percentile for every service (see Tables 3.8a and 3.8b). The number of visits in the past three months was truncated according to the 99.5% percentile for each service, except for traditional healers where the truncation was at the 99.99% percentile (see Table 3.8c). That is because the distribution of the number of visits for traditional healers were extremely skewed and the 99.0% percentile was zero. Figures which are larger than these ranges are set to the maximum figures. This is a quite arbitrary

decision, the objective being to exclude extreme outliers that are more likely to reflect a component of measurement error biased towards and overestimation of true service use.

Table 3.8a. Distribution of time spent in contact with health professionals (in minutes)

Time spent for health services		Primary health centre	Hospital doctor	Other government health worker	Private doctor	Dentist	Traditional healer
Number	Valid	14975	14975	14976	14977	14978	14977
	Using the service	3035	3019	626	2114	701	138
	Missing	47	47	46	45	44	45
Mean		4.22	5.05	1.15	3.86	1.73	.28
Standard deviation		13.166	15.951	7.462	12.784	9.741	3.432
Maximum		700	360	180	300	240	120
75%		0	0	0	0	0	0
90%		15.00	20.00	.00	15.00	.00	.00
95%		20.00	30.00	.00	30.00	7.10	.00
99%		45.00	60.00	30.00	60.00	45.00	10.00

Table 3.8b. Distribution of travel time (in minutes)

Transportation time		Primary health centre	Hospital doctor	Other government health worker	Private doctor	Dentist	Traditional healer
Number	Valid	14975	14975	14976	14977	14978	14977
	Missing	47	47	46	45	44	45
Mean		3.79	6.18	1.05	5.55	1.26	.29
Standard deviation		60.6	17.3	7.6	22.1	8.4	4.1
Maximum		5305	300	190	1440	480	240
75%		0	0	0	0	0	0
90%		10.00	20.00	0	20.00	0	0
95%		16.80	30.00	0	30.00	5.00	.00
99%		45.00	90.00	30.00	90.00	30.00	10.00

Table 3.8c. Distribution of number of visits in last 3 months

Number of visits in last 3 months		Primary health centre	Hospital doctor	Other government health worker	Private doctor	Dentist	Traditional healer
Number	Valid	14969	14968	14976	14972	14973	14977
	Missing	53	54	46	50	49	45
Mean		0.56	0.55	0.22	0.30	0.11	0.02
Standard deviation		2.054	2.175	2.077	1.232	0.741	0.484
Maximum		90	96	90	48	24	42
75%		0	0	0	0	0	0
90%		2	2	0	1	0	0
95%		3	3	0	2	0	0
99%		7	8	5	4	3	0
99.5%		12	10	12	6	5	1
99.99%							9

As the costs were collected in different national currencies in different years, they need to be converted using the CPI to the year 2008, and to be transformed by PPPs to international dollars. The CPIs to convert data from the interview year to 2008 in each country, and the PPPs for each country for 2008 are shown in Table 3.9.

To facilitate calculation, the conversion coefficients were calculated for the seven countries, see Table 3.9.

When calculating the costs in international dollars the following formula was used:

$$\text{Cost in I\$} = \frac{\frac{\text{CPI in 2008}}{\text{CPI in interview year}} \times \text{cost in local currency}}{\text{PPP in 2008}}$$

The right hand side of the above can be rewritten as:

$$\text{Cost in I\$} = \text{Cost in local currency} \times \frac{\text{CPI in 2008}}{\text{CPI in interview year} \times \text{PPP in 2008}}$$

The very right part in the formula is the conversion coefficient.

Table 3.9. Conversion coefficient in 10/66 project countries and the UK

Conversion rate	China	Cuba	Dominican Republic	India	Mexico	Peru	UK	Venezuela
Interview year ¹	2004	2004	2005	2004	2006	2005	-	2005
CPI in interview year ²	105.1	105.9	230.5	115.2	131.8	110.1	-	255.0
CPI in 2008 ²	120.4	124.5	291.1	145.3	144	120.9	126.1	452.1
PPP in 2008 ³	3.822	1.357	19.431	16.217	7.47	1.507	0.639	1.873
Conversion rate	0.300	0.866	0.065	0.078	0.146	0.729	-	0.947

1 Based on mode for each country

2 From Table 3.6a, CPI in International Labour Organization Labour Statistics Database (2002-2010)

3 From Table 3.5b, PPPs in WHO Global Health Expenditure Database (2002-2010)

Reporting of cost

In this thesis, different types of direct medical cost are displayed separately, and all types of direct non-medical costs are summed. The value of time spent by carers to enable the participant to receive treatments is also combined with out-of-pocket cost. All the time spent used the medical service was added together. The indirect cost was not broken down and treated as a whole. The income of the carers collected in the survey was treated as the unit cost at the private level. More details of this are described in section 3.2. The process of calculating the cost of medical care is summarised in the following flow chart (Figure 1).

Calculation of public medical care costs (2008 prices)

Country specific unit costs were estimated according to the following steps:

Step 1: UK unit costs for different services in 2008 were obtained from the PSSRU annual publication and from the NHS Reference Costs for 2007-08, 2008-09. These costs were transformed into international dollars for the year 2008 using UK PPP rates (see Table 3.10).

Table 3.10. Unit cost of health services in UK

Service types	2008 (Pounds)	2008 (I\$) ³
Government Primary care, per minute (from GP services)	2.7 ¹	1.7
Prescriptions, per prescription (from GP services)	41 ¹	26.2
Government hospital doctor, per minute ⁴	7.45 ²	4.8
Other government health worker, per minute in clinic	0.87 ¹	0.6
Inpatient care, per bed day	371 ²	237.1

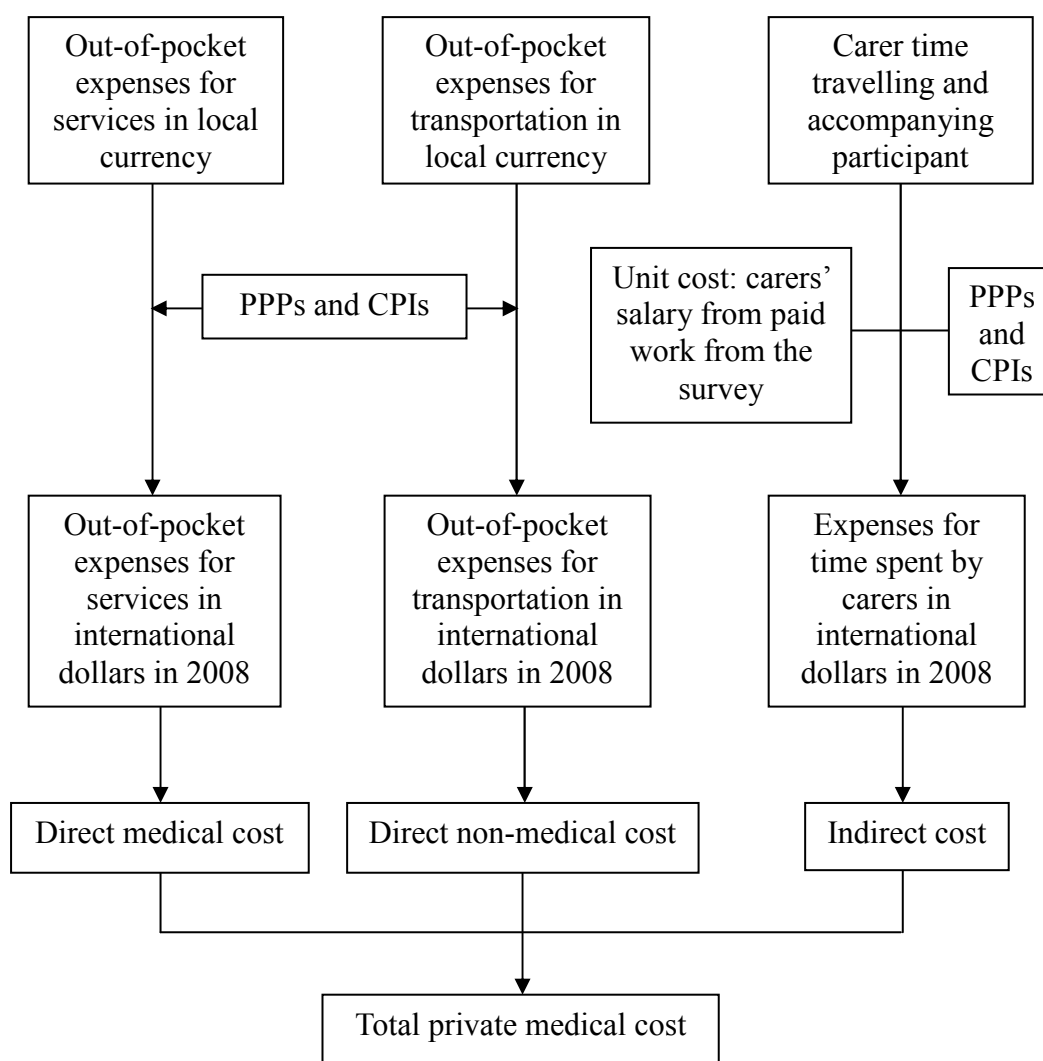
1 From UK Unit Cost of Health and Social Care 2008

2 From NHS trust and Primary Care Trust combined database, 2007-08, 2008-09

3 PPPs from WHO Global Health Expenditure Database for UK in 2008 is 0.639.

4 It is assumed that each outpatient contact in public sector hospitals lasted for 20 minutes.

Figure 1. Summary of private medical care cost calculation



Step 2: The ratio between health costs in the UK and each country was calculated using information in the WHO-Choice database for 2008 (Table 3.11a). The explanations for each ratio have been described in the above text. In brief, the ratio for government primary care was generated based on the average cost of public health centre (no beds) and public health centre (with beds) in the outpatient services database of the WHO-Choice project. Urban and rural ratios were separately calculated. The ratio for government hospital doctor care was generated based on the average cost of primary-level hospital and secondary-level hospital in the same database. Urban and rural ratios were also separately calculated. The average of the ratio from the two services mentioned before was used for other governmental health workers. An average ratio of hospital service for each country was calculated based on the average cost of public, private and NGO inpatient services. As there is no information about urban and rural differences, the ratios were the same for urban and rural areas in each country.

Table 3.11a. Ratios between the project countries and the UK, based on the WHO-Choice database

Country	Government primary care	Government hospital doctor	Other government health worker	Hospital services
China urban	0.211	0.211	0.211	0.117
China rural	0.211	0.211	0.211	0.117
Cuba urban	0.149	0.149	0.149	0.073
Dominican Republic urban	0.382	0.383	0.383	0.164
India urban	0.111	0.111	0.111	0.048
India rural	0.111	0.111	0.111	0.048
Mexico urban	0.443	0.443	0.443	0.326
Mexico rural	0.443	0.443	0.443	0.326
Peru urban	0.280	0.280	0.280	0.173
Peru rural	0.280	0.280	0.280	0.173
Venezuela urban	0.394	0.394	0.394	0.277

From the above table it can be seen that for outpatient services (including government primary care, government hospital doctor and other government health worker), all ratios for each country are same (with the exception of very small differences for the Dominican Republic). The WHO-CHOICE database also does not enable a difference between urban and rural areas to be calculated. Therefore, the ratios can be simplified as shown in Table 3.11b.

Table 3.11b. Simplified ratios between the project countries and the UK, based on the WHO-Choice database

Country	Outpatient service ¹	Inpatient service
China	0.211	0.117
Cuba	0.149	0.073
Dominican Republic	0.383	0.164
India	0.111	0.048
Mexico	0.443	0.326
Peru	0.280	0.173
Venezuela	0.394	0.277

¹ Includes government primary care, government hospital doctor and other government health worker

Step 3: These ratios are then applied to generate the unit costs for each country. These are shown in Table 3.12.

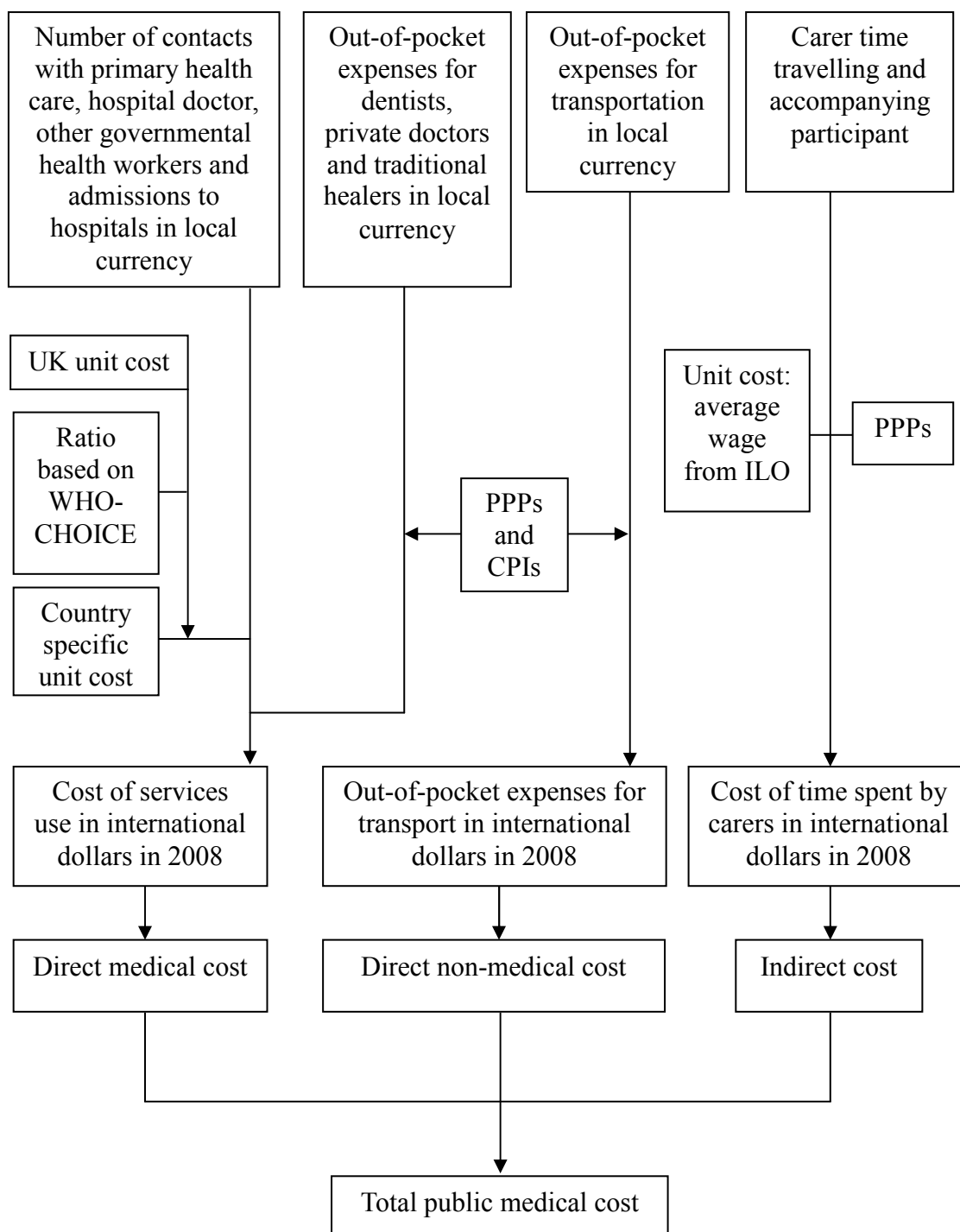
Table 3.12. Country specific unit costs (in I\$) in 2008 (based on WHO-CHOICE ratio)

Service	China	Cuba	Dominican Republic	India	Mexico	Peru	Venezuela
Government Primary care, per minute	0.36	0.25	0.65	0.19	0.75	0.48	0.67
Prescriptions, per prescription	5.53	3.90	10.03	2.91	11.61	7.34	10.32
Government hospital doctor, per minute	1.01	0.72	1.84	0.53	2.13	1.34	1.89
Other government health worker, per minute in clinic	0.13	0.09	0.23	0.07	0.27	0.17	0.24
Inpatient care, per bed day	27.74	17.31	38.88	11.38	77.29	41.02	65.68

The costs for primary health care, hospital doctor, other government health worker and admission to hospitals were calculated by using these unit costs, while the out-of-pocket expenditures for private doctors, dentists and traditional healers are assumed to represent the cost of these services. All the costs are subsequently summed to generate the total cost of health care.

The time spent by carers who accompanied the participant to hospitals or primary care centres was multiplied by the unit cost of their time to estimate the indirect cost of health care use. The unit cost of time spent by carers assumed to be equal to the average wage. This is described more fully in section 3.2. The process of calculating the cost of medical care is presented in the following flow chart (Figure 2).

Figure 2. Summary of public medical care cost calculation



Process of generating the cost variables

The cost of medical care was presented in four categories: direct medical cost, direct non-medical cost, indirect cost and total cost. The cost for direct medical care is the sum of the costs of each service. The direct non-medical cost is the total cost of transportation. The indirect cost is the loss of production by carers when helping the participant to use services. The total cost is the sum of direct medical cost, direct non-medical cost, and indirect cost. The direct medical costs were presented for each service. The direct non-medical costs and indirect costs were not broken down for each service.

All of the cost variables related to medical care were defined in the database (Table A2.1. and A2.2 in Appendix). For cost calculations, all the missing values (less than 0.4%) were changed to zero.

In summary, here is the process of generating the cost:

- Cost data including cost for services and cost for transportation were transferred to international dollars in the year of 2008 based on the conversion coefficients in Table 3.9, so as to generate the out of pocket expenses.
- Time spent for the services and transportation was presented in minutes. The amount of the time was multiplied by unit cost to generate the cost at public level.
- All the cost information was an average for each visit/use in 3 months. Therefore, cost or time spent was multiplied by the visit/use time for all types of cost for medical care, and also multiplied by the number of accompanied carers in indirect cost.
- For the information about hospital admissions and medicine, costs were converted to international dollars for the year 2008 based on the conversion coefficients in Table 3.9, so as to generate the costs in private level.
- In public level, the bed days in hospitals were multiplied with the unit cost to generate the cost for the three months period and then it was multiplied by four to generate annual costs.
- Cost for medicine was not included in public level calculation as it is assumed the prescription cost has been included in the unit cost of each service where

medicine could be prescribed.

3.2. Social care

As mentioned above, social care refers to care provided by unpaid family members (informal care) or paid home carers (non-professional home aids). This sub-section describes the identification, measurement and valuation of these costs.

Cost Identification

Informal care

Some participants with dementia need help with activities of daily living (ADLs), instrumental activities of daily living (IADLs) and supervision and these are mostly provided by family members. The ADLs in this survey refer to help with dressing, eating, grooming, toileting, and bathing. The IADLs include help with communication and transportation. In providing help, family carers may have to cut back or stop work, or reduce their own leisure time. Informal care refers to this care by unpaid family members, relatives or friends. It is assumed that the time spent providing care is firstly allocated from lost working days if the carer said they had cut back or gave up work. The remainder of the time is assumed to be allocated from leisure activities.

Paid home care

In some instances family members would also pay somebody else to provide help for the older person during the day or night. In this study 'paid home care' only refers to the care which the families paid for in order to obtain help with ADLs, IADLs or supervision. It does not include professional health workers' home visits, although these would be expected to be infrequent in the health systems studied.

Loss of work time for participants

The productivity losses of the older person because of retirement due to illness have not been identified in this study. Some participants may though have been able to work before they had dementia and stopped work because of dementia. Therefore the

total costs will be underestimated. However, studies show that very few people develop dementia before the age of 65 and after this age most people are retired. This study showed among participants with dementia, only 1.7% still had full-time paid jobs and 2.0% were in part-time work (Table 2.12). Therefore the productivity losses of the participants, while not zero, are considered to be very low.

Impact on the health status of carers because of providing cares for dementia patients

Evidence has shown that the prevalence of psychological morbidity among co-residents of people with dementia is higher than that for older people with other chronic conditions (Honyashiki et al., 2011). Therefore, the health impact on carers is an additional cost associated with dementia. However, it is not measured in this study. Estimating the cost of the emotional strain associated with caring is difficult (Meltzer, 2001) and it is hard to determine if poor health status of the carer is because of their relative's dementia or for other reasons. Again, therefore, this means that the total cost of dementia will be underestimated to some extent.

Measurement of cost

Informal care

Carers were asked to state the amount of hours spent helping with ADLs, IADLs and supervision in the preceding 24 hours. Results for ADLs and transportation were grouped into four categories, including no time, less than one hour, one to two hours, and more than two hours. The categorical variable was converted to a measure that could be used to generate costs (no time = 0, less than one hour = 1, one to two hours = 2, more than two hours = 3). Communication and supervision were assessed as number of hours per day with integer values between 0 and 24 accepted. .

In the study, carers were asked whether they had reduced or given up work. If this happened they were then asked for the hours per week they cut back on work or the time in months since they had stopped care. Information about carers' jobs and income was also collected. Apart from the main carer, time spent providing informal care by other relatives and their job types were also asked obtained from the survey.

Paid home carer

Two questions were asked to measure paid home care received during the day or night. For paid home care during the day, the respondents stated the frequency of care (none, occasional, regular, or constant). For paid home care during the night they stated the type of care (none, sleep-in paid help, or awaking paid help). There was no measurement of the actual hours spent by paid home carers and, therefore, some assumptions had to be made. For paid home care during the day time 'occasional' was assumed to be one day per week, 'regular' was assumed to be four days per week, and 'constant' was assumed to be seven days per week. A full day's work is assumed to be eight hours. The amount of paid home care during the night is assumed to be eight hours for both sleep-in paid and waking paid help. For night paid home care, it is assumed that the participants need the care every day, i.e., seven days per week.

Valuation of costs

The opportunity cost of time spent providing informal care is the value of lost working days or lost leisure time (McDaid, 2001). The value of supervision time may not be the same as the value of providing care. Therefore, there are four types of informal care cost to be valued: paid home care, working time, leisure time, and supervision time.

Paid home care

There were three options for determining the value of paid home care: collecting information from the survey, using a market price relating to each country, or using the minimum wage as an alternative price.

Collecting information from the survey

If the money paid for the paid home care had been collected in the survey, the value could be assumed to be equal to this amount. However, the 10/66 survey only collected the amount of the paid home care. No information on the expenditure for hiring a paid home carer was collected.

Market price in different countries

The value of paid home care can be determined as the market price of these services. However, no database was recognised as providing comparable information using the same methodology for all countries in the study. However, some indications of costs can be found from certain sources.

(1) International Labour Organisation (ILO)

The Department of Statistics of the ILO is responsible for labour statistics (LABORSTA), which play an important role for the development and evaluation of policies. The information in LABORSTA has been collected according to a high standard and can provide internationally comparable data on employment, unemployment, wages, hours of work, CPIs, occupational injuries, industrial disputes, household income and expenditure and international labour migration.

The wage database of LABORSTA provides annual wages in local currency by economic activity for most ILO member countries. However, the classifications for economic activities vary across the project countries, mainly using two categories developed by the United Nations in 1968 (UN 1968) and 1990 (UN 1990). Details are shown in Table 3.13.

As well as the standards varying across countries, the information provided in the database is not comprehensive for all countries. For example, data that can be used to value paid home carers are only provided for Cuba and Mexico in 1998 and for Venezuela in 1997 (see Table 3.14).

(2) Allo' Expat

Allo' Expat is a company offering information for people living in or moving to Malaysia, the Asia Pacific region, or beyond. Information provided by Allo' Expat includes data on international schools, 5 star hotels, hospitals, and restaurants. From their website the cost of hiring a maid are provided for most of the countries in the world. Table 3.15 summaries this information for seven countries in the 10/66 project. However, no information was available for Cuba and the Dominican Republic.

Table 3.13. The classifications for economic activities in the wage database of LABORSTA

Standard	Categories	Source	Equivalent classification for paid home carers
UN 1990 ¹	A: Agriculture, Hunting and Forestry B: Fishing C: Mining and Quarrying D: Manufacturing E: Electricity, Gas and Water Supply F: Construction G: Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods H: Hotels and Restaurants I: Transport, Storage and Communications J: Financial Intermediation K: Real Estate, Renting and Business Activities L: Public Administration and Defence; Compulsory Social Security M: Education N: Health and Social Work O: Other Community, Social and Personal Service Activities P: Private Households with Employed Persons Q: Extra-Territorial Organizations and Bodies X: Not classifiable by economic activity	United Nations: Statistical Papers, Series M, No. 4/ Rev. 3 (New York, 1990)	P: Private Households with Employed Persons
UN 1968 ²	1. Agriculture, Hunting, Forestry and Fishing 2. Mining and Quarrying 3. Manufacturing 4. Electricity, Gas and Water 5. Construction 6. Wholesale and Retail Trade and Restaurants and Hotels 7. Transport, Storage and Communication 8. Financing, Insurance, Real Estate and Business Services 9. Community, Social and Personal Services 0. Activities not Adequately Defined	United Nations: Statistical Papers, Series M, No. 4, rev. 2 (New York, 1968)	9. Community, Social and Personal Services

Source: Department of Statistics, International Labour Organization

1 <http://laborsta.ilo.org/applv8/data/isc3e.html>;

2 <http://laborsta.ilo.org/applv8/data/isc2e.html>

Table 3.14. Information provided in LABORSTA wage database for 7 countries

Countries	Wage classification standard	Wage categories provided in database	2008 monthly wage for paid home carers
China	UN 1990	A-N	No data
Cuba	UN 1968	All categories	385 Peso
Dominican Republic	UN 1990	C-L	No data
India	UN 1968	2 and 3	No data
Mexico	UN 1990	All categories	2401.1 Nuevo peso
Peru	UN 1990	A-O	No data
Venezuela	UN 1968	All categories, only in 1997	No data

Source: Department of Statistics, International Labour Organization, <http://laborsta.ilo.org>

Table 3.15. Cost of hiring a maid in seven 10/66 project countries

Countries	Salary	Notes
China	10-18 RMB per hour, 100-125 US \$ per month	Some expatriates paying double, plus a Chinese New Year bonus
Cuba	No data	Salary consists of two components: a monthly fee paid to Cubase and a dollar salary paid directly to the Cuban worker.
Dominican Republic	No data	The employer furnishes all meals, uniforms, linens and daily (public) transportation, if needed. Domestic workers who have been employed for a year expect a Christmas bonus of one month's salary.
India	600 - 800 Rupees (US\$ 15-20) per month	
Mexico	4000 Pesos per month	The figure is from a post in the forum.
Peru	150-200 US \$ per month	18% more for a full-time maid
Venezuela	Part time: 15,000 bolivares a day Living in: US\$ 250-300 per month	Bonuses are paid at Christmas and after a year of service.

Source: Allo' Expat <http://www.alloexpat.com>

Use of minimum wage to value paid care

As no database can provide comparable information using the same methodology for all project countries, the use of an alternative price to represent the value of paid home carers may be more practical. Although the price for a domestic service may vary according to the experience of the carer and the needs of families, it can be assumed that the price cannot be lower than the minimum wage of that country. Therefore, the minimum wage in each project country can be used for the unit cost of paid home carers. This information can be found in a database released by

International Labour Organization. This of course may be an underestimate of costs as carers may receive more than the minimum wage.

The Conditions of Work and Employment Branch (TRAVAIL) is a department of the ILO. TRAVAIL provides information on wages, working time, work organisation and maternity protection. One of TRAVAIL's products is a Global Wage Database which provides a comprehensive overview of wage trends in ILO member countries. The database includes information on average monthly wages, low pay rates and monthly minimum wages. The monthly minimum wages obtained from the TRAVAIL wage database for all project counties are shown in Table 3.16.

Table 3.16. Monthly minimum wages in local currencies, 2002-2009

Countries	Currency	2002	2003	2004	2005	2006	2007	2008	2009
China	Yuan	432	458	527	573	657	720	-	-
Cuba	Pesos	-	-	100	225	225	225	225	225
Dominican Republic	Dominican peso	2240	2720	3900	3900	3900	4485	4485	5158
India	Rupee	1300	1300	1716	1716	1716	1716	2080	-
Mexico	Pesos	1033	1080	1125	1176	1223	1271	1322	1383
Peru	Nuevo sol	410	460	460	460	500	530	550	550
Venezuela	Bolivar Fuerte	190	247	321	405	512	615	799	968

Source: Conditions of Work and Employment Branch (TRAVAIL), International Labour Organization, <http://www.ilo.org/travail/info/db/lang--en/index.htm>

Value of lost working time of carers

There were three methods investigated to determine the value of lost working time of carers: using information collected in the survey, applying the opportunity cost method (friction cost approach or human capital approach), and applying the replacement cost method.

Using information collected in the survey

This method involved valuing working time of carers according to their income. In the survey, the carers were first asked if they had full-time or part-time paid work, were unemployed, students, were a full-time housewife/husband or were retired. They were then asked (if applicable) which kind of jobs they had. Finally, information on the income of the carers from different sources was collected. These sources included government pensions, occupational pensions, disability pensions or benefits, money from families, income from rented land or property, income from paid work, and caregiver benefits.

Only if the carers had a full-time or part-time job would their income be affected by stopping or reducing work. Using individual income of the carers as the unit cost of working time reflects the impact at a personal level, but it may not reflect the economic burden at a societal level if the labour market does not function perfectly.

Opportunity cost method

The opportunity cost method focuses on what the individual foregoes if he/she cannot work. At a societal level, if the individual cannot work, then production will potentially be lost. There are two key ways to value lost production: the human capital approach and the friction cost approach.

Human capital approach

The human capital approach (HCA) assumes that lost production is equal to the lost income as a consequence of disease or, as in this case, caring responsibilities. It usually uses average wages to carry out this valuation. However, the HCA method may not reflect actual lost production because average wages are influenced by several factors, such as gender, profession, race and age. The same job may be done by different people but they may get paid different amounts. That will lead to different costs of lost production if the HCA is used (McCrone, 1998). Some economists have criticised the HCA method because it may over-estimate the impact of illness on production (Koopmanschap et al., 2008). The reason for this is that after a period of absenteeism, work may be taken over by others (colleagues, unemployed persons) or non-urgent work may be cancelled. Therefore, at a societal level, the real production losses for society may be smaller than the HCA assumes.

The ILO provides information on wages for its member countries and this can, therefore, be used for the HCA. Table 3.17 shows average monthly wages for the 10/66 countries between 2002 and 2009. However, information for Cuba was not available.

Average wages are also provided in the LABORSTA wage database. Information is displayed in Tables 3.18a to Table 3.18g for different occupations in seven of the project countries. However, the format of this information is not consistent across countries.

Table 3.17. Monthly average wages in local currencies, 2002-2009

Countries	Currency	2002	2003	2004	2005	2006	2007	2008	2009
China	Yuan	1031	1164	1327	1517	1738	2060	2436	2728
Cuba	Pesos	-	-	-	-	-	-	-	-
Dominican Republic	Dominican peso	5512	5825	7194	8144	8727	9644	10609	11000
India	Rupee	5536	5840	6230	6402	6823	7214	8466	-
Mexico	Pesos	4285	4560	4771	4920	5216	5549	5627	5745
Peru	Nuevo sol	1107	1120	1151	1034	1170	1170	1340	-
Venezuela	Bolivar	278817	308731	418603	560039	754641	952476	1265310	-

Source: Conditions of Work and Employment Branch (TRAVAIL), International Labour Organization, <http://www.ilo.org/travail/info/db/lang--en/index.htm>

Table 3.18a. Average wages in local currency in China for different occupations

Total men and women ¹	2002	2003	2004	2005	2006	2007	2008
Total	1035.17	1170	1335	1530.33	1750.08	2077.67	2435.75
A-B	533.17	580.8	634.3	692.4	785.8	923.8	1079.83
C Mining and Quarrying	918.08	1140.17	1406.17	1718.83	2027.92	2364.75	2867.08
D Manufacturing	916.75	1041.33	1169.42	1313.08	1497.17	1740.33	2016
E Electricity, Gas and Water Supply	1370	1562.67	1817.08	2089.42	2397.08	2817.42	3267
F Construction	856.58	956.5	1064.17	1194.83	1367.17	1565.42	1793.92
G-H	783.17	-	-	1270.08	1478	1740.67	2128.17
I Transport, Storage and Communications	1337	1331.08	1531.75	1779.33	2051.92	2369.5	2733
J Financial Intermediation	1594.58	1871.42	2248.5	2685.67	3273.33	4119.58	5153.42
K Real Estate, Renting and Business Activities	1291.75	1431.83	1559.33	1715.08	1881.5	2202.08	2527.25
L Public Administration and Defence; Compulsory Social Security	1164.58	1294.42	1467.42	1708.75	1906.92	2347.58	2746.25
M Education	1107.5	1199.92	1356.42	1539.17	1761.17	2180.17	2515.42
N Health and Social Work	1232.92	-	-	-	-	-	-

¹ Yuan per month

Source: Department of Statistics, International Labour Organization, <http://laborsta.ilo.org>

Table 3.18b. Average wages in local currency in Cuba for different occupations

Total men and women ¹	2002	2003	2004	2005	2006	2007	2008
Total	261	273	284	330	387	-	-
1 Agriculture, Hunting, Forestry and Fishing	254	276	297	332	387	420	444
2 Mining and Quarrying	308	315	353	407	540	544	562
3 Manufacturing	263	275	290	338	404	433	430
4 Electricity, Gas and Water	319	314	339	398	496	508	517
5 Construction	322	339	349	400	478	497	522
6 Wholesale and Retail Trade and Restaurants and Hotels	213	225	230	280	334	353	365
7 Transport, Storage and Communication	259	280	295	331	406	418	427
8 Financing, Insurance, Real Estate and Business Services	296	317	332	402	477	493	445
9 Community, Social and Personal Services	267	276	285	331	378	398	385

1 Peso per month

Source: Department of Statistics, International Labour Organization, <http://laborsta.ilo.org>

Table 3.18c. Average wages in local currency in Dominican Republic for different occupations

Total men and women ¹	2002	2003	2004	2005	2006	2007	2008
Total	31.3	37.7	41.7	-	-	-	-
C Mining and Quarrying	48	41.5	26.1	32.9	34.7	35.1	38.5
D Manufacturing	29.4	32.7	50.8	81.1	85.4	85.4	86.1
E Electricity, Gas and Water Supply	34.9	51.4	39.4	44.8	47.4	53.9	54.7
F Construction	38.6	46.2	73.4	53.9	84.4	81.6	75.6
G Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods	34	36.7	51.6	60.9	64.3	69.8	73.9
H Hotels and Restaurants	29.9	34.5	41.5	50.3	54	55.5	61.2
I Transport, Storage and Communications	32.6	37	35	42.6	46.4	51	56.5
J Financial Intermediation	48.3	69	48.2	62	62.3	64.9	74.5
K Real Estate, Renting and Business Activities	35.8	44.4	69.1	81.8	98.5	88.6	101.3
L Public Administration and Defence; Compulsory Social Security	36.8	44.6	45.5	59.1	62	62.8	71.1

1 Peso per hour

Source: Department of Statistics, International Labour Organization, <http://laborsta.ilo.org>

Table 3.18d. Wages in local currency in India

Total men and women ¹	2002	2003	2004	2005	2006	2007	2008
3 Manufacturing	1158.6	1078.9	1731.8	1234.4	3525.9	-	-

¹ Rupee per month

Source: Department of Statistics, International Labour Organization, <http://laborsta.ilo.org>

Table 3.18e. Average wages in local currency in Mexico for different occupations

Total men and women ¹	2002	2003	2004	2005	2006	2007	2008
Total	3553.5	3796.7	3969.7	4173.8	4425.9	4716.3	4800.9
A-B	1798.1	1990	2086.4	2271	2379.9	2522.9	2690.9
C-Q	3736.3	3972	4147.7	4346.2	4617.6	4898.3	4979.5
A Agriculture, Hunting and Forestry	1778.2	1953.5	2066.8	2229.9	2342.8	2494.1	2661
B Fishing	2956.8	3575.5	2959.4	3899.7	4013.5	4157	4379.1
C Mining and Quarrying	7249.6	8453.3	6919.4	8287.8	9509.1	10010.3	10580.4
D Manufacturing	3551.5	3752.6	3887.4	4140.3	4422.6	4689.2	4679.3
E Electricity, Gas and Water Supply	5375.9	5498.5	6235.4	5951.4	6689	7391	7151.7
F Construction	3388.3	3499	3754.2	3972.2	4278.1	4476.8	4750.5
G Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods	3134.9	3363.9	3427.8	3726.7	3971.1	4154	4236.4
H Hotels and Restaurants	2830.4	2905.8	3071.2	3330.9	3519.4	3760.6	3893.2
I Transport, Storage and Communications	4146.8	4484.8	4678.5	4795.9	5151.9	5647.3	5854.9
J Financial Intermediation	7087.1	7099.4	7689.7	7773.7	8087.7	8876.9	8976.4
K Real Estate, Renting and Business Activities	4526.8	4721.3	5011	4658.1	5039.7	5155	5181.2
L Public Administration and Defence; Compulsory Social Security	4887.2	5246.7	5611.3	5812.4	6130.9	6498.4	6565.3
M Education	5016.3	5451	5620.5	5938.1	6267.7	6549.6	6640.9
N Health and Social Work	4961.9	5539.4	5578.7	5929.8	6315.7	6620.5	6741.2
O Other Community, social and Personal Service Activities	3313.9	3658.8	3899.1	4031.9	4150.6	4622.8	4556.4
P Households with Employed Persons	1649.7	1796	1847.8	1980.9	2167.7	2340.7	2401.1

¹ Nuevo peso per month

Source: Department of Statistics, International Labour Organization, <http://laborsta.ilo.org>

Table 3.18f. Average wages in local currency in Peru for different occupations (salaries employees in urban areas).

Total men and women ¹	2002	2003	2004	2005	2006	2007	2008
Total	6.5	6.9	6	6.1	6.4	6.6	7.2
A-B	7.1	5.2	5.8	4.2	5.3	5.8	6
C-Q	6.5	7	6	6.1	6.4	6.6	7.2
A Agriculture, Hunting and Forestry	4.2	5.3	4.6	4.2	4.1	4.9	6
B Fishing	12.1	-	-	-	-	-	-
C Mining and Quarrying	17.4	17.4	18.4	26.9	17.3	16.6	20.7
D Manufacturing	11.4	10.6	9.8	6.4	8	7.9	9.1
E Electricity, Gas and Water Supply	10.5	14.3	9.5	12.1	9.1	13	12.7
F Construction	18.8	22.7	13.3	7	20	8.7	12.8
G Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods	4.5	4.3	3.2	3.9	3.4	4.4	4
H Hotels and Restaurants	3.3	3.1	3.3	3.1	2.9	3	3.6
I Transport, Storage and Communications	8.2	7	5.1	5.4	6.1	5.6	5.9
J Financial Intermediation	15.7	15.8	8	9.8	12.8	10.6	11.7
K Real Estate, Renting and Business Activities	6.2	6.5	5.2	8.5	5.5	6.4	6.5
L Public Administration and Defence; Compulsory Social Security	5.8	6.6	6.8	6.4	7	7	8.2
M Education	5.9	6.9	6.6	6	7.5	7.6	7.9
N Health and Social Work	5.4	6.3	6.8	7.4	7	8.8	8.4
O Other Community, Social and Personal Service Activities	6.4	5.3	3.5	5.1	5	4.9	5.8

¹ Nuevo sol per hour

Source: Department of Statistics, International Labour Organization, <http://laborsta.ilo.org>

Table 3.18g. Average wages in local currency in Venezuela for different occupations

Total men and women ¹	1997
Total	174424
1 Agriculture, Hunting, Forestry and Fishing	100386
2 Mining and Quarrying	107019
3 Manufacturing	141122
4 Electricity, Gas and Water	141003
5 Construction	158942
6 Wholesale and Retail Trade and Restaurants and Hotels	263500
7 Transport, Storage and Communication	137729
8 Financing, Insurance, Real Estate and Business Services	156988
9 Community, Social and Personal Services	104504

¹ Bolívar per month

Source: Department of Statistics, International Labour Organization, <http://laborsta.ilo.org>

As the LABORSTA provided average wage rates for many occupations it is important to match these with the job information of carers recorded in the 10/66 study. However, the classifications used in the UN system differ from that used in the 10/66 study. As Table 3.19 shows, only agricultural workers in the 10/66 study can be matched directly with a UN category (i.e. the category of agriculture, hunting and forestry).

Table 3.19. List of job type in 10/66 study

10/66 job type	UN 1990 occupation category	UN1968 occupation category
Manager/administrator	Not matched	Not matched
Professional (eg health, teaching, legal, financial)	Not matched	Not matched
Associate professional (eg technical, nursing, artistic)	Not matched	Not matched
Clerical worker /secretary	Not matched	Not matched
Shop keeper	Not matched	Not matched
Skilled labourer (e.g building, electrical etc.)	Not matched	Not matched
Semi-skilled labourer (e.g helper of skilled labourer)	Not matched	Not matched
Unskilled labourer	Not matched	Not matched
Agricultural worker	A Agriculture, Hunting and Forestry	1 Agriculture, Hunting, Forestry and Fishing

Although the job information cannot be matched between the LABORSTA database and the 10/66 survey, the average income can be calculated for each occupation in every country and this information may be valuable for cost estimation.

Friction cost approach

The second way to estimate the loss of production is the friction cost approach. The idea of the friction cost approach is that when work is lost there might be another person to take over. In this method, the value of lost working days is confined to the period during which labour is replaced (Koopmanschap et al., 2008). However, this method is challenged by other researchers (Johannesson and Karlsson, 1997). They suggest that the assumptions used in the friction cost approach are not supported by neoclassical economic theory, because if no additional workers need to be hired by a company, but the company still can insure the same production, the original profits were not maximised. Another problem is that it is unlikely that the person replacing the lost worker was previously unemployed. If they are recruited from another job then there may be another friction cost (and there may be a large number of them).

Replacement cost method

The replacement cost approach values informal care based on what one would have to pay to replace the carers if they were not available. In this survey, it was assumed that if the carers went to work rather than providing care, then they would have to hire paid home carers to provide care. Therefore, the cost for a paid home carer can be used as a proxy value for the lost working time of the carers. The value of paid home carers has been discussed in the former section.

Leisure time of the carers

Two options for valuing leisure time in monetary terms were considered. The first was to assume that the value of leisure time corresponds to the wage rate according to neoclassical labour theory. This assumes that leisure time is of equal value to work time. This method has been criticised for implying that a person who earns more from employment has more valuable leisure time than a person who earns less (Sendi and Brouwer, 2004). Furthermore, the neoclassical theory suggests that if a person is unemployed this implies that they have made that decision because the value of their leisure time is higher than the wage rate they would gain from employment (Shaw, 1992). However, if we approach this issue from a societal level by using the average wage to represent the unit cost of leisure time then these weaknesses may be overcome to some extent.

An alternative is to use the replacement cost method where the price of a professional such as a home care worker is used as a proxy for informal care. Although in developing countries, it may not be possible to hire a home care worker, this may still reflect the value of the care provided.

Some economists also suggest that leisure time should be valued as part of an individual's Quality-adjusted life year (QALY) gain, rather than in a monetary format. However, this approach was not possible in this study as QALYs were not measured.

Supervision time

Supervision is an important aspect of informal care for people with dementia. As

mentioned before, the value of supervision time may not be equivalent to the value of actually providing care. During supervision a carer may still carry out other activities. For example, a carer can supervise a person with dementia in order to prevent them leaving the house while watching television or cooking food. In this respect the carer is performing multiple activities during the same time period. As a result of the above reasoning, time spent in supervision may be assumed to be equal to a percentage of the value for time spent for help for ADLs.

Calculation process in this thesis

Paid home care

No information was collected in the 10/66 study on paid home care and, therefore, assumptions have been made for these unit costs. Data available from the ILO on the average wage for different occupations is not comprehensive for all of the project countries. The information from Allo 'Expat is not an official figure and its appropriateness is unclear. As was stated above, it may be assumed that a paid home carer cannot be paid less than the minimum wage of a country. As such, the minimum wage can be used as the unit cost of a paid home care worker. The TRAVAIL database of the ILO provides this information. In order to calculate the cost for the year 2008, the minimum wage for 2008 for each project countries, except China, was used. For China, the figure for 2007 was inflated according to the CPI of 2007 and 2008. The minimum wage in China in 2007 was 720 Yuan. According to Table 3.6a, the CPI in 2007 and 2008 in China was 113.7 and 120.4 respectively. Therefore the estimated minimum wage in 2008 in China is 762 Yuan. All of the information provided in wage database is in local currencies and so these were converted to international dollars according to PPPs (shown in Table 3.9). Table 3.20 shows the minimum wages in different counties in 2008.

Table 3.20. Monthly minimum wages in project different counties in 2008

Countries	Local currency		PPPs in 2008	International Dollars in 2008
	Currency	amount		
China	Yuan	762	3.822	199
Cuba	Pesos	225	1.357	166
Dominican Republic	Dominican peso	4485	19.431	231
India	Rupee	2080	16.217	128
Mexico	Pesos	1322	7.470	177
Peru	Nuevo sol	550	1.507	365
Venezuela	Bolivar Fuerte	799	1.873	427

Time spent by the carers

For carers with full-time or part-time jobs, time spent providing care was first valued as lost working time. The remainder of the time was treated as leisure time. For those without paid work, all of the time was treated as leisure time.

As with the calculation of medical care costs, the unit cost for working time was defined according to different perspectives. At the private level the unit cost of time was based on data collected directly from carers based on their own wage. At the public or societal level, carer time was valued using average wage.

For the unit cost of working time, the HCA was applied. The reason for this is that the HCA is the most widely used method to estimate the value of lost work time and average wages are routinely available from international databases. The friction cost approach is difficult to use, partly because the period of friction is hard to determine and value. The replacement cost approach may not be suitable for developing countries as most of the care will only ever be provided by family members rather than paid home carers.

In terms of average wages, the TRAVAIL database provides comparable information for project countries except Cuba in local currencies, while the information provided by the LABORSTA database is not comprehensive. However, wage information is available for Cuba in the LABORSTA database. Therefore, in the calculations wage information is firstly based on the TRAVAIL database with the LABORSTA database used for Cuba. The figures in 2008 have been used in the analyses and figures converted to international dollars according to PPPs. Average income calculated from the survey was also used and two methods were compared. However, as the 10/66 study was a population-based community survey with a large sample size, the average wage from the survey can be used as the unit cost in HCA approach. Moreover, the average wage can also be calculated for different occupations, which may provide a more precise estimation of the wage for carers with different jobs. This method is called the '10/66 salary method' and will be addressed through sensitivity analyses in Section 7. The replacement cost method is similarly addressed using sensitivity analyses and these are reported in Section 7.

The opportunity cost method was used for valuing the loss of leisure time by carers rather than the replacement cost approach which (as stated above) may not be suitable for developing countries. In the base case calculations, the loss of leisure time was valued the same as for lost work time. However, the value of loss of leisure time may be lower or higher than the value of lost work time. An individual is assumed to always seek maximum benefit (or satisfaction) from the activity he or she is carrying out (Sendi and Brouwer, 2004). The selection is influenced by the person's budget. If the person requires a lower budget for general expenditure, he or she will choose to spend relatively more time on leisure activities rather than doing work. In this case, the value of leisure time can be considered higher than that of working time. In contrast, if the person does not have enough money, he or she will have to choose to work and in this scenario, the value of leisure time is lower than that of working time. Therefore, in sensitivity analyses, 50% and 150% of the value of working time was used. This method of applying different values to leisure time is termed the 'leisure time method' in this thesis and will be addressed in sensitivity analyses.

Supervision is clearly an important component of the care process for elderly people, especially for those with dementia. Although supervision can be carried out at the same time as other carer activities, the production and benefits of supervision can not be ignored. Therefore, in this thesis, it is assumed that the value of supervision time is the same as caring time.

The costs of time spent providing care and supervision by family members are added together to estimate total informal care costs. The value of carer time was calculated according to the employment status of the carers for private level costs, while the average wage was used as the unit cost in public level costs. In sensitivity analyses, the unit costs are determined differently according to the loss of work time and the loss of leisure time. Caring time was firstly allocated to loss of work time and valued by the unit cost mentioned above. The remainder of the time was determined as loss of leisure time and was valued by 50% and 150% of the value of working time which has been described before.

Table 3.21 shows the average wages in 2008 according to the TRAVAIL wage database and (for Cuba) the LABORSTA database. The figure for Cuba was only available in 2006, and so this was converted using the CPI to the year 2008. The

average monthly wage in 2006 for Cuba was 387 Peso. According to Table 3.6a, the CPI in 2006 and 2008 in Cuba was 114.5 and 124.5 respectively. Therefore, the estimated average monthly wage in 2008 in Cuba is estimated at 421 Peso. All of the information provided in wage database is presented in local currencies, and these were converted to international dollars according to PPPs (see Table 3.9).

Table 3.21. Monthly average wages in different counties in 2008

Countries	Local currency		PPPs in 2008	International Dollars in 2008
	Currency	amount		
China	Yuan	2436	3.822	637
Cuba	Pesos	421	1.357	310
Dominican Republic	Dominican peso	10609	19.431	546
India	Rupee	8466	16.217	522
Mexico	Pesos	5627	7.470	753
Peru	Nuevo sol	1340	1.507	889
Venezuela	Bolivar Fuerte*	1265	1.873	676

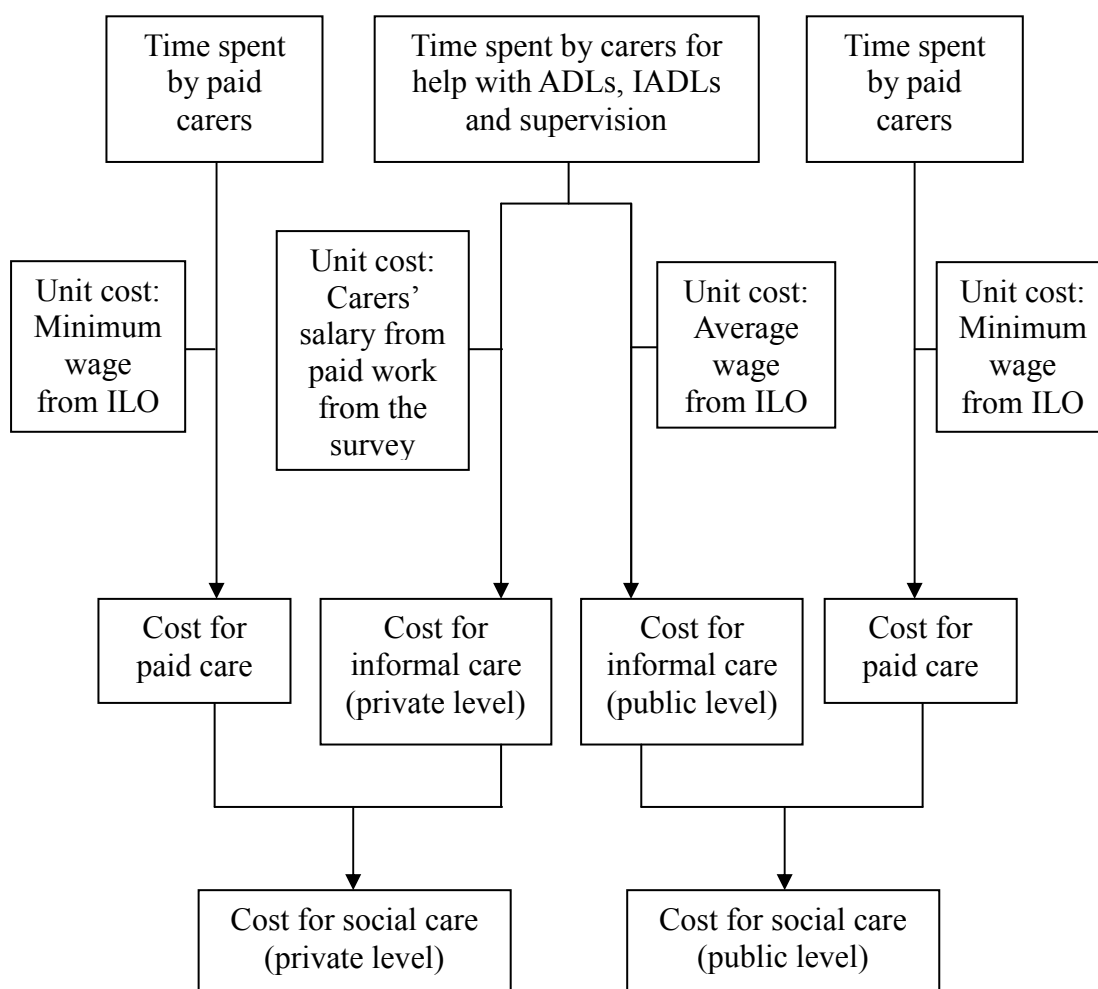
* Venezuelan Bolivar Fuerte = 1000Venezuelan Bolivar

However, Table 3.21 only shows the monthly average for a country as a whole. Evidence has shown that the average wage for women is lower than that for men (Wimo and Prince, 2010). Furthermore, as shown in Table 2.15, 77.4% of carers are of working age in the sample as a whole, ranging from 54.5% in urban China to 96.3% in rural India. People who are not in working age may not be economically active(Wimo and Prince, 2010), so they may have a low value of the productivity loss. As the 10/66 study can provide information on the proportion of female/male carers and the percentage of carers who are not of working age, two sensitivity analyses can be carried out according to these characteristics (gender and age) of the carers. This method is called ‘carers characteristics method’ and more details and results are described in Section 7.

Finally, consideration has been made for the provision of informal care from people other than the main caregiver. Main caregivers were asked if there were other persons in the family providing informal care and if so how many hours they provided per week. In addition, the number of weeks of lost work in the past three months of these other caregivers was also recorded. This method considering the cost of other informal care was termed the ‘all informal care method’ and is discussed in Section 7.

The process of calculating the cost of social care in the base case is presented in the following flow chart (Figure 3).

Figure 3. Summary of cost calculation for social care in private and public level



Process of generating the cost

The cost of social care was divided into two main categories: informal care and paid home care. The cost of informal care included cost of help for ADLs, IADLs, and supervision. Cost for ADLs was the total cost of five activities (dressing, eating, grooming, toileting, and bathing), and the cost for IADLs was the sum of the cost for transportation and communication.

All of the cost variables related to social care were defined in the database (see Table A2.3 in Appendix). For cost calculations, all the missing values were changed to zero. Sometimes the total hours per day were greater than 24 and these were therefore truncated at 24. As described earlier, time spent providing help for each ADL category and transportation could be no more than three hours. Therefore, the sum of all time spent in one day for the five ADLs and transportation could be no more than 18 hours. Allocating the remaining hours for communication and supervision was according to their distribution. Time spent in a day was multiplied by 365 to generate hours in a year.

The unit cost of time spent by carers was the monthly wage. Therefore, carer time needed to be converted to equivalent months. It was assumed that in a month there would be 160 hours of work. According to this assumption, hours spent in one year were changed to working months in a year, and were multiplied by the unit cost.

At the private level, the unit cost of carer time was the monthly wage of paid work of the carers. Information on monthly wages of the carers was collected in the survey and converted to international dollars based on the figures in Table 3.9. At the public or societal level, the unit cost of carer time was the average wage in each project country. For paid home care, the costs were the same for the private and public levels. The amount of paid home care was multiplied by the unit cost to estimate the total cost of paid home care.

3.3 Total cost

Total cost was the sum of the costs of medical care and social care. It was presented

both at private level and public level.

Summary of section

The identification, measurement and valuation of the costs of medical care and social care have been discussed in this section. Costs both at the private level and public level were estimated separately for a whole year. The amount was converted to international dollars for the year 2008 based on PPPs and CPIs.

The costs of medical care were divided into direct medical costs, direct non-medical costs and indirect costs. Information of health service utilisation in the past three months was collected. Costs of medical care at the private level were the out-of-pocket expenses for the services and real income lost by the caregivers when accompanying the participants when they used services. Costs of medical care at the public level for services publically provided was valued according to the UK unit cost method based on ratios generated from WHO-CHOICE database. The remaining services (private health care services) were valued in the same way as for the private level. The indirect costs of medical care at the public level were valued according to the average wage from the ILO.

Social care was divided into informal care and paid home care. Information on care provided for ADL, IADL, and supervision (informal care) during the past 24 hours, and paid home care in the past week was collected from the caregivers of the participants. The human capital approach was used to value the informal care based on the average wage from ILO. The minimum wage based on ILO estimations was used as the unit price of paid home care.

Some potential alternative methods have also been addressed. These form the basis of the subsequent sensitivity analyses.

Section 4. Findings from the analysis of medical care and social care costs

This section reports the findings of the analyses described in section 3. The total cost among all participants is reported first, followed by the costs of medical care and social care and their components. For each area of cost, the first step is to describe the number of participants incurring costs. The second step is to describe the total cost and its distribution in relation to different characteristics: gender, age group, dementia status and the number of physical diseases (including hypertension, diabetes, ischemic heart disease, stroke and chronic obstructive pulmonary disease (COPD)). This is repeated for the separate categories of medical care and social care. Each cost will be presented from a private level and public level perspective.

4.1. Total cost

Private level

Number of participants incurring costs across the sample

The numbers of people with costs from a private level perspective among all the participants are shown in Table 4.1. Participants are highly likely to have expenditures on medical care. Most participants have direct medical cost in Cuba, Dominican Republic, Venezuela, urban Mexico, and urban China. Just over half of the participants in urban Mexico incur direct non-medical costs, followed by rural India and urban Peru, while the percentage is less than 1% in rural China. Indirect costs for carers incurred as a result of the participant using medical care occur for no more than 15% of participants in any centre. Private level social care costs are not frequently incurred in any country. There were no major differences between ADL, IADL and supervision costs among centres. Paid care costs at the private level were seldom incurred. They were most common in urban China, but only occurred for 7.2% of participants.

Table 4.1. Number (%) of participants incurring costs at the private level, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Medical care</i>												
Direct medical cost	2177 (73.9%)	1402 (69.7%)	407 (29.5%)	98 (17.8%)	1468 (74.7%)	562 (56.0%)	483 (48.3%)	881 (75.9%)	356 (35.5%)	395 (39.3%)	462 (46.2%)	8691 (57.9%)
Direct non-medical cost	291 (9.9%)	536 (26.7%)	559 (40.5%)	118 (21.4%)	574 (29.2%)	524 (52.2%)	326 (32.6%)	161 (13.9%)	8 (0.8%)	189 (18.8%)	421 (42.1%)	3707 (24.7%)
Indirect for carers	246 (8.4%)	165 (8.2%)	33 (2.4%)	10 (1.8%)	201 (10.2%)	106 (10.6%)	66 (6.6%)	38 (3.3%)	17 (1.7%)	23 (2.3%)	141 (14.1%)	1046 (7.0%)
Any medical care cost	2245 (76.3%)	1466 (72.9%)	722 (52.3%)	166 (30.1%)	1540 (78.4%)	780 (77.8%)	563 (56.3%)	881 (75.9%)	356 (35.5%)	454 (45.2%)	539 (54.0%)	9712 (64.7%)
<i>Social care</i>												
<i>Informal care</i>												
ADL costs	57 (1.9%)	46 (2.3%)	16 (1.2%)	4 (0.7%)	22 (1.1%)	15 (1.5%)	4 (0.4%)	25 (2.2%)	17 (1.7%)	1 (0.1%)	42 (4.2%)	249 (1.7%)
IADL costs	52 (1.8%)	28 (1.4%)	15 (1.1%)	4 (0.7%)	30 (1.5%)	12 (1.2%)	2 (0.2%)	11 (0.9%)	11 (1.1%)	2 (0.2%)	40 (4.0%)	207 (1.4%)
Supervision costs	25 (0.8%)	11 (0.5%)	16 (1.2%)	4 (0.7%)	25 (1.3%)	8 (0.8%)	2 (0.2%)	1 (0.1%)	4 (0.4%)	2 (0.2%)	7 (0.7%)	105 (0.7%)
Informal care costs	65 (2.2%)	50 (2.5%)	19 (1.4%)	4 (0.7%)	40 (2.0%)	18 (1.8%)	4 (0.4%)	26 (2.2%)	19 (1.9%)	2 (0.2%)	43 (4.3%)	290 (1.9%)
Paid care	35 (1.2%)	41 (2.0%)	45 (3.3%)	2 (0.4%)	29 (1.5%)	4 (0.4%)	1 (0.1%)	83 (7.2%)	1 (0.1%)	0	0	241 (1.6%)
Any social care costs	85 (2.9%)	73 (3.6%)	52 (3.8%)	5 (0.9%)	57 (2.9%)	21 (2.1%)	5 (0.5%)	97 (8.4%)	20 (2.0%)	2 (0.2%)	43 (4.3%)	460 (3.1%)
<i>Total cost</i>												
	2259 (76.7%)	1477 (73.4%)	752 (54.5%)	167 (30.3%)	1552 (79.0%)	786 (78.4%)	564 (56.4%)	898 (77.4%)	362 (36.1%)	454 (45.2%)	552 (55.3%)	9823 (65.4%)

Average cost of care among participants at the private level

Average medical care, social care and total care costs among all participants at the private level are shown in Table 4.2. The Dominican Republic has the lowest cost for medical care and urban China the highest. Urban India has the lowest costs of informal care and social care. Cuba has the highest informal care costs and urban China has the highest social care costs. The latter is accounted for by the relatively high cost for paid care in that site. No paid care was found in urban or rural India in this study. More information about the distribution of service use, informal care, and paid home care by dementia status is shown in Appendix (Table A1.1 to A1.3).

In the sample as a whole, the cost for medical care was around two-thirds of the total cost. Urban China has the highest cost for medical care and this clearly influences the proportion of total cost accounted for by medical cost across the whole sample. If data from urban China are not included, the ratio of medical care cost to social care cost is changed from 2:1 to 1.5:1. Most of the cost associated with medical care is due to direct cost. In the sample as a whole, costs for informal care and paid care are about same and cost associated with ADL consists of half of the cost of informal care.

However, these tendencies differ by country. Cuba, the Dominican Republic, urban Peru and rural Peru have higher costs for medical care compared with the cost for social care. The proportion of paid care is highly variable. This is clearly driven by the availability of paid carers. These are largely absent in rural sites, and only relatively widespread in urban China and urban Peru. Paid care costs are much more variable between sites than informal care costs. Moreover, the cost associated with ADL is a major component of the cost of informal care in the Dominican Republic and urban China, while it plays a less important role in Venezuela.

Private level cost distribution by in participant characteristics

Cost distributions at the private level by participant characteristics are presented in Table 4.3. Gender differences were minor for the whole sample. However, in the Dominican Republic and rural Peru women had much higher total costs than men, while in Venezuela and rural India men had costs that were about one-third higher than for women.

Table 4.2. Annual mean and SD cost of care per capita at private level in 2008 international dollars, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Medical care</i>												
Direct medical cost	118±324	19±78	265±2137	34±379	744±4976	369±1603	348±3608	2870±8685	181±1613	75±537	60±1038	439±3369
Direct non-medical cost	34±928	1.5±15.5	28±164	12±46	21±232	18±48	26±85	6.5±26.6	0.3±3.3	5.9±29.2	5.5±21.1	17±424
Indirect cost for carers	1.6±9.3	1.1±11.3	0.8±7.4	0.3±2.9	2.7±15.1	4.3±23.1	2.0±14.2	0.8±5.3	0.1±1.2	0.3±2.7	0.5±2.2	1.4±11.1
Total cost of medical care	154±984	21±84	294±2145	47±386	768±4990	391±1610	376±3626	2877±8694	182±1613	81±547	66±1050	458±3400
<i>Social care</i>												
Informal care												
ADL costs	82±763	54±561	70±1282	22±302	31±406	60±610	9.6±197.5	114±1071	25±266	2.5±78.6	26±154	52±675
IADL costs	42±491	15±196	31±526	8.7±121.0	43±402	46±639	2.0±45.3	26±426	16±218	2.1±47.6	8.8±56.1	26±380
Supervision costs	38±943	8.1±141.0	31±526	16±220	55±590	26±388	5.6±153.9	8.3±281.3	2.1±40.2	0.6±14.0	2.7±49.2	22±518
Informal care costs	161±1692	77±720	131±2203	47±619	129±1132	132±1198	17±311	148±1498	43±431	5.2±130.4	38±226	100±1246
Paid care	35±356	119±913	301±1767	44±738	103±1009	15±282	3.0±94.0	463±1683	3.3±105.6	-	-	103±905
Total costs of social care	196±1821	196±1294	432±3081	91±1014	232±1685	147±1233	20±325	611±2443	46±443	5.2±130.4	38±226	202±1664
<i>Total cost</i>	350±2076	217±1302	726±3730	138±1092	999±5292	538±2017	396±3639	3488±9164	228±1678	86±562	104±1075	660±3837

Table 4.3. Annual mean and SD cost of care per capita at private level in 2008 international dollars for different participant characteristics, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Gender</i>												
Male	293±2001	123±844	677±4460	84±667	1159±7662	530±2381	352±1918	3582±10692	240±1750	71±447	130±1549	674±4654
Female	381±2116	267±1483	754±3257	185±1358	837±3136	542±1808	425±4425	3418±7824	218±1620	81±477	82±351	640±3213
<i>Dementia diagnosis</i>												
Dementia	1601±5069	1099±3012	3143±8621	931±3186	2920±10758	1209±2953	516±1755	8597±12783	768±1768	166±731	171±442	1887±6437
Questionable and mild	664±2001	509±1680	1702±3907	652±2399	2597±11818	1069±2902	504±1852	5475±7440	200±701	188±789	117±310	1107±4771
Moderate and severe	3096±7534	2770±4804	5866±13310	2922±6524	3741±7488	2071±3289	735±1190	14215±17768	2427±2782	62±140	1052±995	4188±9454
Non-dementia	196±1212	97±755	475±2650	83±735	846±4556	470±1885	384±3770	3089±8702	196±1668	80±546	95±1128	536±3443
<i>Age group</i>												
65-69	239±1940	38±347	704±3992	89±666	682±2447	393±1545	579±6216	2666±8710	306±2283	77±499	72±352	500±3398
70-74	299±1245	56±500	586±4649	78±516	1029±4072	518±1736	241±880	3354±8957	119±580	78±500	64±253	597±3476
75-79	282±1192	215±1148	480±2158	196±1396	1784±10714	484±1384	364±2217	2827±5053	268±1825	88±417	55±195	676±4221
80+	578±3198	539±2155	1097±3443	226±1627	947±2817	738±3020	358±1364	5578±12713	179±668	138±942	336±2771	963±4461
<i>Number of physical diseases</i>												
0	289±2409	75±770	591±3042	70±638	469±1783	421±2063	222±728	1672±6855	86±1010	53±376	53±246	332±2380
1-2	346±1438	205±1140	834±4507	154±1231	780±2814	603±1905	570±5429	3416±9204	425±2271	102±511	133±1487	708±3864
3+	650±2859	427±1965	833±3310	529±2196	1945±9596	714±2145	347±1212	6744±11342	1392±4159	485±1844	113±338	1395±6159

Dementia status was clearly related to total costs. In the sample as a whole, participants with dementia have costs that are 2.5 times higher than those without dementia. There was also a pronounced trend for increasing costs with greater dementia severity. The high variation indicates that the caring patterns are different across the sites. Further analyses were carried out to detect the main cause of the difference. The results showed that the variation across countries was mainly because of differences in the use of paid home care. Costs for informal care had similar distribution among dementia and non-dementia patients.

Total cost increases with age in most sites; exceptions being Venezuela, rural Mexico and rural China. Cost is also highly related to physical diseases. Participants with three or more physical diseases have higher average costs than those without any physical diseases. There was again a pronounced trend for costs to increase with the number of comorbid physical diseases. However, this tendency was not found in rural Mexico.

Public level

Number of participants incurring costs across sample

Table 4.4 shows the number and percentage of participants incurring costs from the public level perspective. Compared with the cost at the private level, fewer participants incurred public level medical care costs, mainly because medication is not included in the cost estimations at this level. Venezuela, Mexico, and rural India have relatively higher use of public level medical care. Public level medical care costs remain more likely to occur than social care costs in all countries. In all centres, participants have higher *direct* medical care costs than other components of medical care costs. Direct non-medical costs have the same distribution at the public level as at the private level. They are an important aspect of the total medical cost in urban Mexico, urban Peru and rural India, but not in rural China. The number of participants with indirect costs is higher at the public level than at the private level because of the different methods used to estimate the unit cost. Carers without paid work were assumed to not lose earnings in the private level estimations. However, carer time was costed at the public level regardless of whether the carer was losing work. This also affects the cost of social care. More participants have social care costs at the public level compared to the private level. Informal care costs occur more frequently in all centres at the public level than do paid care costs.

Table 4.4. Number (%) of participants incurring costs at the public level, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Medical care</i>												
Direct medical cost	1423 (48.3%)	888 (44.2%)	637 (46.1%)	145 (26.3%)	1048 (53.3%)	720 (71.8%)	620 (62.0%)	454 (39.1%)	63 (6.3%)	357 (35.5%)	527 (52.8%)	6882 (45.8%)
Direct non-medical cost	291 (9.9%)	536 (26.7%)	559 (40.5%)	118 (21.4%)	574 (29.2%)	524 (52.2%)	326 (32.6%)	161 (13.9%)	8 (0.8%)	189 (18.8%)	421 (42.1%)	3707 (24.7%)
Indirect cost for carers	738 (25.1%)	564 (28.0%)	353 (25.6%)	92 (16.7%)	726 (36.9%)	462 (46.1%)	367 (36.7%)	249 (21.5%)	41 (4.1%)	305 (30.3%)	393 (39.3%)	4290 (28.6%)
Total cost of medical care	1458 (49.5%)	962 (47.8%)	675 (48.9%)	147 (26.6%)	1178 (59.9%)	751 (74.9%)	651 (65.1%)	455 (39.2%)	64 (6.4%)	369 (36.7%)	546 (54.7%)	7256 (48.3%)
<i>Social care</i>												
Informal care												
ADL costs	205 (7.0%)	183 (9.1%)	118 (8.5%)	22 (4.0%)	74 (3.8%)	69 (6.9%)	52 (5.2%)	152 (13.1%)	46 (4.6%)	21 (2.1%)	84 (8.4%)	1026 (6.8%)
IADL costs	165 (5.6%)	93 (4.6%)	102 (7.4%)	18 (3.3%)	96 (4.9%)	83 (8.3%)	36 (3.6%)	75 (6.5%)	23 (2.3%)	22 (2.2%)	79 (7.9%)	792 (5.3%)
Supervision costs	84 (2.9%)	39 (1.9%)	91 (6.6%)	14 (2.5%)	88 (4.5%)	48 (4.8%)	24 (2.4%)	16 (1.4%)	8 (0.8%)	17 (1.7%)	17 (1.7%)	446 (3.0%)
Informal care costs	225 (7.6%)	192 (9.5%)	128 (9.3%)	23 (4.2%)	136 (6.9%)	100 (10.0%)	64 (6.4%)	165 (14.2%)	49 (4.9%)	27 (2.7%)	85 (8.5%)	1194 (7.9%)
Paid care	35 (1.2%)	41 (2.0%)	45 (3.3%)	2 (0.4%)	29 (1.5%)	4 (0.4%)	1 (0.1%)	83 (7.2%)	1 (0.1%)	0	0	241 (1.6%)
Total costs of social care	228 (7.7%)	200 (9.9%)	130 (9.4%)	23 (4.2%)	142 (7.2%)	102 (10.2%)	64 (6.4%)	172 (14.8%)	49 (4.9%)	27 (2.7%)	85 (8.5%)	1222 (8.1%)
<i>Total cost</i>												
	1583 (53.8%)	1062 (52.8%)	740 (53.6%)	160 (29.0%)	1245 (63.4%)	776 (77.4%)	670 (67.0%)	536 (46.2%)	97 (9.7%)	387 (38.5%)	572 (57.3%)	7828 (52.1%)

Average cost among all participants at the public level

Average medical care, social care and total costs among all participants at the public level are shown in Table 4.5. As with the private level, cost varies across centres, however the differences between countries are reduced. Rural China and India have the lowest costs for medical care and social care, while urban Peru, Venezuela, urban Mexico and urban China have relatively higher costs for both medical care and social care. In the sample as a whole, the cost for social care is about 3.5 times higher than the cost for medical care, which is quite different to the results at the private level where cost of medical care is higher. Most of the cost for medical care at the public level is due to direct medical costs. The costs for informal care are about eight times the cost of paid care. Again, this is very different compared with the results from the private level, where the two costs are similar.

All sites have higher costs for social care than for medical care, but variation is quite evident across the sites. Social care is much more important than medical care in urban China, urban India and rural China. Cost of social care is less different to the cost of medical care in Venezuela, and Mexico. The difference between the cost of paid home care and informal care is substantial in rural Mexico, rural China and urban Mexico, where the paid home care is seldom used. Paid care remains an important component (about 20%) of social care in urban Peru and urban China, and accounts for about 10% of the cost of social care in the Dominican Republic and Venezuela. No paid care was reported in India.

Cost distribution in public level

The distribution of costs by characteristics of the participants at the public level is shown in Table 4.6. The gender distribution of costs in the whole sample is similar to that found for the private level with very little difference between men and women. In rural Mexico and rural China women have lower total costs, while in other centres, men have higher total costs.

Dementia status is related to the total cost and greater severity of dementia is associated with higher costs. However, the ratio between dementia patients and non-dementia participants at public level is much higher than that at private level, with approximately a ten-fold difference in the sample as a whole. Variation also occurs among sites, ranging from a four- to six-fold difference in rural India and

Table 4.5. Annual mean and SD cost of care at public level in 2008 international dollars, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Medical care</i>												
Direct medical cost	96±212	159±488	312±1556	104±475	372±1376	441±1201	273±766	211±777	23±255	24±164	63±850	192±879
Direct non-medical cost	34±928	1.5±15.5	28±164	12±46	21±232	18±48	26±85	6.5±26.6	0.3±3.3	5.9±29.2	5.5±21.1	17±424
Indirect cost for carers	4.2±12.2	7.8±21.0	14±37	8.0±27.8	18±38	20±35	17±38	8.4±24.6	1.1±7.6	5.9±14.8	8.1±16.5	9.8±26.8
Total cost for medical care	134±960	169±502	354±1579	124±505	411±1415	478±1226	315±814	226±789	25±258	35±180	77±865	219±991
<i>Social care</i>												
Informal care												
ADL costs	293±124 5	517±1946	803±2897	408±2170	209±1396	432±1893	383±1893	1132±3468	308±1762	155±1230	393±1364	442±1978
IADL costs	158±940	178±1218	392±1924	219±1729	289±1564	444±2153	157±995	347±2020	133±1167	60±458	128±476	225±1401
Supervision costs	101±829	113±1033	388±2317	192±1918	422±2487	349±2404	266±2417	120±1286	19±229	108±1087	44±522	194±1654
Informal care costs	552±233 8	808±3320	1583±6010	819±4669	920±4243	1224±4797	806±4145	1600±5040	460±2714	324±2453	565±2006	861±3869
Paid care	35±356	119±913	301±1767	44±738	103±1009	15±282	3.0±94.0	463±1683	3.3±105.6	-	-	103±905
Total costs of social care	587±247 1	927±3663	1884±6955	864±4842	1022±4563	1240±4818	809±4156	2062±6168	463±2717	324±2453	565±2006	964±4251
<i>Total cost</i>	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408

Table 4.6. Annual mean and SD cost of care at public level in 2008 international dollars for different participant characteristics, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Gender</i>												
Male	620±2831	905±3447	2054±6781	959±4560	979±3585	1702±5264	1245±4985	1884±5442	589±3322	361±2339	538±2350	1027±4151
Female	775±2545	1196±3826	2340±7290	1013±5176	1328±4484	1726±4861	1043±3903	2594±6934	406±2154	365±2587	728±2240	1232±4424
<i>Dementia diagnosis</i>												
Dementia	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154
Questionable and mild	1981±3569	2652±5072	9667±13965	5339±10916	5096±9321	6745±9680	4025±8713	11740±9730	2727±6640	2129±5684	1686±3023	4249±8192
Moderate and severe	8558±5852	13125±10630	22260±15454	15951±12477	16850±13167	13785±14525	15659±12760	23371±11095	16076±7758	12180±12604	9961±3788	14126±11644
Non-dementia	253±1431	510±1792	1013±3825	602±3815	877±3156	1103±3432	761±3283	1226±4167	162±1168	153±1485	458±1995	620±2745
<i>Age group</i>												
65-69	328±2154	466±2532	966±4034	433±3078	746±3415	902±3096	812±4027	911±3601	233±2000	215±2151	422±1626	563±2939
70-74	429±1801	602±2323	1366±5277	710±3809	963±3440	1328±3621	827±3058	1421±5054	451±2584	461±2964	594±2104	798±3298
75-79	452±1849	918±3103	1872±6422	1708±6999	2009±5963	1197±3075	1131±4116	2059±5473	754±3672	350±2070	413±1490	1130±4237
80+	1645±3894	2278±5408	4668±10327	1490±5840	3368±7299	3569±8198	1853±5919	5831±9843	940±3192	600±2502	1565±4039	2637±6688
<i>Number of physical diseases</i>												
0	507±2449	509±2741	1628±6443	680±4241	682±2385	1191±4121	718±3063	1034±4558	106±1028	358±2468	302±1480	663±3352
1-2	752±2512	1029±3639	2215±6713	1172±5394	1168±4442	2118±5700	1020±4156	2042±5833	1099±4134	359±2539	664±2505	1198±4340
3+	1508±3744	1993±4633	3956±9242	2106±6002	2041±5591	2236±5298	2203±6474	5108±8974	3095±6754	382±1853	1234±2755	2383±6052

Mexico, to a 36-fold difference in rural China.

Similar to the findings found at the private level, older participants have higher total costs than younger ones except in rural Peru. Cost is again highly related to the number of physical diseases in all centres.

4.2. Medical care

The number and percentage of participants using specific health services in the different countries is described in Table 4.7. Participants received care mostly from primary health centres and hospitals in all centres except rural and urban India where private doctors were the most used service. Rural and urban Mexico and Cuba had the highest level of use of primary health centres, and rural China and urban India had the lowest use. For hospital doctors, use was quite similar across the centres, except rural Mexico, urban India and rural China, where hospital doctor services were used less frequently. Service use from other government health workers was generally lower than that from primary health centres and hospital doctors.

Contacts with private doctors were quite different across centres. Participants in Cuba, rural and urban China and rural Peru seldom saw private doctors, while in rural and urban India and Venezuela nearly one-third of participants and about one-fifth of those in Dominican Republic, rural and urban Mexico had visited private doctors in the last three months.

Participants in rural and urban China, and urban India occasionally visited dentists, while in urban Mexico, more than 10% of participants received dental services in the last three months. Rural and urban Mexico, rural Peru and rural India saw the greatest use of traditional healers, although even there the numbers were low.

The inpatient admission rate of participants was quite low compared to outpatient services, with the highest rate of 3.3% in Venezuela, and the lowest rates in rural Peru and rural China. The use of medication varied across centres. In general, except India, urban areas had higher use of medication.

Table 4.7. Number (%) of participants using health services in the last 3 months, by site

Services type	Cuba (N=2944)	Dominican Republic (N=2011)	Peru (urban) (N=1381)	Peru (rural) (N=552)	Venezuela (N=1965)	Mexico (urban) (N=1003)	Mexico (rural) (N=1000)	China (urban) (N=1160)	China (rural) (N=1002)	India (urban) (N=1005)	India (rural) (N=999)	Total (N=15022)
Primary health centre	1001 (34.1%)	216 (10.8%)	151 (10.9%)	63 (11.4%)	405 (21.0%)	360 (35.9%)	407 (40.7%)	239 (20.6%)	38 (3.8%)	32 (3.2%)	123 (12.3%)	3035 (20.3%)
Missing values	6	2	1	1	33	0	0	0	0	1	0	44
Hospital doctor	653 (22.2%)	444 (22.1%)	447 (32.4%)	89 (16.2%)	427 (22.1%)	257 (25.6%)	110 (11.0%)	266 (22.9%)	22 (2.2%)	94 (9.4%)	210 (21.0%)	3019 (20.2%)
Missing values	6	2	1	1	33	0	0	0	0	1	0	44
Other government health worker	185 (6.3%)	32 (1.6%)	38 (2.8%)	5 (0.9%)	129 (6.7%)	60 (6.0%)	44 (4.4%)	2 (0.2%)	1 (0.1%)	7 (0.7%)	123 (12.3%)	626 (4.2%)
Missing values	6	2	1	1	33	0	0	0	0	1	0	44
Private doctor	7 (0.2%)	399 (19.9%)	145 (10.5%)	12 (2.2%)	549 (28.4%)	197 (19.6%)	186 (18.6%)	1 (0.1%)	3 (0.3%)	251 (25.0%)	364 (36.4%)	2114 (14.1%)
Missing values	6	2	1	1	33	0	0	0	0	1	0	44
Dentist	173 (5.9%)	86 (4.3%)	87 (6.3%)	12 (2.2%)	148 (7.7%)	116 (11.6%)	35 (3.5%)	12 (1.0%)	0	2 (0.2%)	30 (3.0%)	701 (4.7%)
Missing values	6	2	1	1	33	0	0	0	0	1	0	44
Traditional healer	13 (0.4%)	5 (0.2%)	5 (0.4%)	5 (0.9%)	12 (0.6%)	17 (1.7%)	32 (3.2%)	3 (0.3%)	0	2 (0.2%)	44 (4.4%)	138 (0.9%)
Missing values	6	2	1	1	33	0	0	0	0	1	0	44
Hospital inpatient	61 (2.1%)	59 (2.9%)	31 (2.2%)	3 (0.5%)	64 (3.3%)	20 (2.0%)	14 (1.4%)	28 (2.4%)	4 (0.4%)	10 (1.0%)	17 (1.7%)	311 (2.1%)
Missing values	6	2	1	1	33	0	0	0	0	1	0	44
Has used medicines	2265 (77.1%)	1409 (70.1%)	897 (65.0%)	243 (44.1%)	1520 (78.7%)	791 (78.9%)	534 (53.5%)	878 (75.7%)	350 (34.9%)	275 (27.4%)	241 (24.1%)	9403 (62.8%)
Missing values	6	2	1	1	33	0	1	0	0	1	0	45

The average number of contacts with health services in the last 3 months among participants who used these services in each centre is shown in Table 4.8. Although the participants were relatively unlikely to use health services from other government health workers, the intensity of this service use was higher than for primary health centres and hospital doctors in Cuba, the Dominican Republic, urban Peru, and rural and urban Mexico. The data on this was not sufficient in rural Peru, rural and urban China, and urban India, as the numbers of people receiving help from other government health workers were too small.

The number of contacts with primary health centres was greatest in urban China followed by rural Peru. Participants in rural and urban India who used primary health centres did so at a lower frequency than in other countries. Participants in urban and rural Peru and urban China had the highest intensity of use of hospital doctors, while rural China and urban India had the lowest intensity. For services from private doctors, those in Cuba had most contacts. However, only 0.2% of participants used private doctors. Those in urban Peru used more dental services than those in other centres. While intensity of use of traditional healers was greatest in China, the numbers receiving this service were very small.

Average lengths of stay for those admitted to hospital were much longer in urban China than in other sites, with rural China ranked second. The participants in rural India had the shortest lengths of stay. This may be because the rules of the hospital were that, while treatment was free, a family member had to stay with the patient to provide food and personal care.

Private level costs of medical care

The direct medical costs, direct non-medical costs and indirect costs have been shown in Table 4.2. Details of the specific services that constitute direct medical care costs are shown in Table 4.9. In the sample as a whole, medication is the most important contributor to out-of-pocket costs. Visiting primary health centres and hospital doctors, and admissions to hospital also have high out-of-pocket direct medical care costs. However, there are country differences. Out-of-pocket expenses are very low in

Cuba and the Dominican Republic for every service. Urban China has the highest out-of-pocket cost for contacts with primary health centres, hospital doctors and admissions to hospital. Costs for dentists are very high in urban Peru and urban Mexico, while they are low in China and India. Costs for private doctor contacts are relatively high in Venezuela, urban Mexico and India, but lower in China. The costs for medication are the leading out-of-pocket costs in Cuba, Dominican Republic, urban Peru, Venezuela, Mexico and rural China.

The relationships between gender and direct medical costs, direct non-medical costs, indirect cost and total cost at the private level are shown in Table 4.10. Men have higher total costs for medical care at in the private level in the sample as a whole. Total costs do not differ much between the two groups in Cuba, the Dominican Republic, rural China and urban India. Men have higher total costs in rural Peru, Venezuela, urban Mexico, urban China and rural India; while women have higher costs in urban Peru and rural Mexico. The direct medical cost is higher among male participants in most of the counties except Cuba, the Dominican Republic and urban India. The gender difference is not clear for direct non-medical costs and indirect costs.

The age distribution of direct medical cost, direct non-medical cost, indirect cost and total cost at the private level is shown in Table 4.11. As with gender, there is not a large difference among the four age groups with regard to direct non-medical costs and indirect costs. For the whole sample, the direct medical costs and total medical costs initially increase with age and then decrease in later life. However, in urban Mexico, urban China and India, participants who are 80 and over have the highest direct medical cost and total cost. This trend is not observed in Peru and rural China, where the costs decrease with age. Cost does not seem to differ to any great extent among different age groups in the Dominican Republic.

The difference in cost between participants with and without dementia is described in Table 4.12. In the sample as a whole, participants with dementia have slightly higher direct medical and total costs than those without dementia. Those with moderate or severe dementia have higher costs than those in other categories. The differences between the two groups (dementia, non-dementia) and between different severities of dementia are small in Cuba, the Dominican Republic, rural Peru, rural Mexico, and

Table 4.8. Mean and SD number of contacts by those using health services in the last 3 months, by site

Services type	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Primary health centre	3.2±4.4	2.8±4.2	2.9±2.7	3.8±6.3	2.1±2.2	2.3±1.6	2.5±4.9	4.0±4.2	2.0±1.6	1.7±1.6	1.5±1.2	2.8±3.8
Missing values	0	0	2	5	0	0	0	0	0	0	0	7
Hospital doctor	2.6±3.4	2.8±3.8	3.4±4.3	3.4±3.7	2.4±2.4	2.7±4.9	2.3±3.2	3.4±8.3	1.6±1.0	1.7±2.2	1.9±1.8	2.7±4.2
Missing values	0	0	4	3	0	0	0	0	0	0	0	7
Other government health worker	9.4±11.0	5.5±5.9	4.2±5.9	6.0±10.1	2.3±3.0	3.7±5.5	8.1±16.0	20.5±27.6	1	1.9±0.7	2.0±3.8	5.2±8.8
Missing values	0	0	0	0	0	0	0	0	0	0	0	0
Private doctor	4.0±3.8	2.0±2.4	2.9±2.6	1.3±0.5	2.3±3.4	2.0±2.4	2.1±2.3	20	3.0±2.0	1.8±2.1	1.8±2.1	2.1±2.6
Missing values	0	0	1	2	0	0	0	0	0	1	0	4
Dentist	2.0±2.5	2.3±2.0	3.6±3.7	3.1±3.4	2.4±2.3	2.4±2.5	1.9±1.5	2.2±1.1	-	1±0	1.1±0.3	2.4±2.5
Missing values	0	0	5	0	0	0	0	0	-	0	0	5
Traditional healer	1.9±2.3	1±0	2.4±3.1	2.6±1.5	1.9±1.0	2.4±1.8	3.1±5.1	15.7±22.8	-	1±0	1.5±1.3	2.4±4.4
Missing values	0	0	0	0	0	0	0	0	-	0	0	0
Hospital inpatient ¹	9.1±8.1	6.1±8.8	7.6±8.5	12.7±9.1	6.0±7.1	6.3±8.9	4.6±4.4	30.9±28.0	14.0±1.4	9.8±7.8	2.3±2.5	9.1±13.1
Missing values	0	0	0	0	0	0	0	0	0	0	0	0

¹ Numbers of the days in hospital

Table 4.9. Direct medical costs at the private level in 2008 international dollars, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Primary health centre	0.04±1.2	0.1±1.8	5.4±79.5	4.5±35.0	3.2±79.4	8.2±88.6	5.3±30.6	568±3205	5.5±52.6	0.3±6.0	0.1±0.6	46±904
Hospital doctor	0.03±1.3	0.7±9.1	48±1421	2.7±21.8	0.7±12.1	7.6±81.8	2.4±23.0	1016±5691	11±135	0.6±10.6	0.6±3.8	85±1661
Other government health worker	0.2±5.0	0.8±21.8	2.0±26.1	0.1±1.9	30±629	20±283	17±206	13±423	0.1±3.8	0.1±2.4	0.1±1.9	7.8±271.8
Private doctor	0.1±4.3	1.4±18.3	22±132	1.2±11.8	87±981	32±127	65±508	0.2±7.4	7.2±227.5	13±149	15±200	23±393
Dentist	0.1±4.8	1.3±19.8	124±1493	17±372	59±730	126±1021	26±390	8.9±133.9	-	0.03±1.0	0.5±4.4	31±602
Traditional healer	0.2±8.2	0.01±0.3	0.5±8.9	0.4±4.6	1.2±38.8	5.6±91.0	4.9±42.1	1.6±43.3	-	0.1±1.6	24±638	2.6±167.6
Admitted to hospital	0.01±0.4	1.3±16.5	8.8±210.6	0	255±3996	39±1114	59±1057	329±3258	43±833	37±481	8.4±182.7	72±1773
Medication	118±324	13±62	54±295	8.5±58.3	306±1650	131±299	68±190	933±1657	115±1224	24±91	9.9±47.0	165±874
Direct medical cost	118±324	19±78	265±2137	34±379	744±4976	369±1603	348±3608	2870±8685	181±1613	75±537	60±1038	439±3369
Total cost of medical care	154±984	21±84	294±2145	47±386	768±4990	391±1610	376±3626	2877±8694	182±1613	81±547	66±1050	458±3400

Table 4.10. Costs for medical care at the private level in 2008 international dollars, by site and gender

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Direct medical cost</i>												
Male	97±198	16±51	236±1918	49±548	987±7520	433±2290	291±1835	3117±10338	195±1688	62±440	96±1524	508±4278
Female	130±374	20±88	281±2250	21±84	621±2658	337±1105	218±819	2683±7192	170±1551	67±431	28±184	386±2424
<i>Direct non-medical cost</i>												
Male	62±1556	1.1±5.7	24±85	12±45	18±105	20±60	25±85	5.7±22.7	0.1±1.7	5.4±21.3	5.3±16.3	20±663
Female	19±149	1.7±18.6	31±195	13±46	24±283	17±40	26±85	7.0±29.2	0.4±4.2	6.0±34.0	5.7±24.3	15±141
<i>Indirect cost of carers</i>												
Male	1.2±8.5	0.3±2.4	0.5±5.0	0.1±1.2	2.1±17.5	3.7±23.7	0.8±5.9	0.5±5.1	0.1±1.3	0.2±1.7	0.3±1.2	0.9±9.6
Female	1.8±9.7	1.5±13.9	0.9±8.5	0.4±3.8	3.0±13.8	4.5±22.8	2.7±17.6	1.0±5.5	0.1±1.1	0.3±3.2	0.6±2.8	1.7±11.9
<i>Total out of pocket cost for medical care</i>												
Male	160±1567	17±53	261±1921	61±555	1011±7537	456±2295	317±1864	3124±10345	195±1689	68±443	101±1538	530±4334
Female	151±410	24±97	313±2261	34±104	648±2678	358±1113	414±4422	2691±7203	171±1552	74±448	37±222	414±2672

Table 4.11. Costs for medical care at the private level in 2008 international dollars, by site and age group

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Direct medical cost</i>												
65-69	97±125	16±54	552±3863	71±657	561±2118	364±1528	197±778	2495±8568	280±2247	70±497	39±234	398±2815
70-74	153±545	14±38	198±1069	26±112	802±3528	377±1276	214±853	3095±8758	89±462	61±444	19±82	462±3015
75-79	113±187	23±130	169±665	6.6±27.3	1329±10479	277±753	335±2180	2312±4374	181±1693	77±361	22±52	456±3925
80+	109±226	22±74	110±638	13±40	493±1876	450±2468	265±1206	3654±11775	96±488	122±925	248±2732	424±3474
<i>Direct non-medical cost</i>												
65-69	83±1813	1.9±27.1	21±52	18±62	27±345	13±32	21±76	4.9±23.2	0.5±4.5	6.2±23.3	6.9±30.3	24±746
70-74	17±96	0.9±4.3	26±75	9.7±32.3	15±50	18±46	25±87	4.1±19.6	0.2±3.1	3.4±13.3	4.7±8.8	11±57
75-79	15±90	1.3±6.7	45±270	8.1±41.8	23±104	20±44	28±80	8.3±23.9	0	11±62	4.1±7.9	16±106
80+	20±191	1.8±10.5	24±188	11±30	15±56	21±65	29±98	10±40	0.1±1.1	4.8±14.9	6.0±26.9	14±119
<i>Indirect cost of carers</i>												
65-69	1.9±11.3	0.7±3.4	1.2±10.6	0.1±1.0	2.7±18.0	2.4±12.2	2.9±20.5	0.1±1.1	0.03±0.4	0.3±2.6	0.3±1.6	1.3±11.2
70-74	1.7±9.7	1.5±18.6	0.7±7.5	0	2.6±12.2	5.0±28.3	1.5±9.6	0.8±5.5	0.04±0.4	0.1±1.1	0.4±1.6	1.5±12.4
75-79	1.2±5.7	1.2±9.8	0.4±2.9	0.1±0.7	2.2±13.9	4.9±20.4	1.1±9.4	1.2±5.5	0.3±2.5	0.1±1.6	0.6±2.6	1.3±9.1
80+	1.5±9.1	1.1±8.0	0.6±5.9	1.0±5.7	3.1±11.8	4.7±26.1	2.1±12.0	1.2±7.8	0.1±0.5	0.7±5.4	0.7±3.9	1.6±10.7
<i>Total out of pocket cost for medical care</i>												
65-69	182±1816	19±77	574±3868	89±666	591±2148	380±1534	558±6212	2500±8574	280±2247	77±499	50±283	445±3303
70-74	172±560	17±44	225±1073	36±120	825±3543	399±1288	241±880	3100±8764	89±465	66±451	24±84	475±3020
75-79	130±214	26±131	214±718	15±56	1354±10498	302±760	364±2217	2321±4389	181±1693	88±417	26±57	473±3936
80+	130±304	25±77	135±667	25±57	511±1881	476±2472	296±1228	3666±11789	96±488	128±936	255±2758	440±3482

Table 4.12. Costs for medical care at private level in 2008 international dollars, by site and dementia status

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Direct medical cost</i>												
Dementia	121±241	19±47	94±380	17±47	1524±10083	246±438	336±1573	4584±11109	255±706	82±489	27±63	535±4421
Questionable and mild	114±206	15±31	69±326	21±52	1715±11444	242±448	337±1685	3062±6942	74±117	91±528	26±63	433±4131
Moderate and severe	134±290	28±69	142±465	0	1039±5332	277±402	348±570	7324±15907	765±1292	50±112	70±75	853±5273
Non-dementia	118±332	19±81	283±2241	35±392	682±4316	382±1677	349±3745	2736±8458	177±1651	74±540	64±1099	430±3244
<i>Direct non-medical cost</i>												
Dementia	18±102	2.1±13.5	14±36	16±31	27±125	13±25	27±88	15±51	1.1±5.7	14±76	6.4±11.7	14±73
Questionable and mild	14±87	2.3±15.4	13±37	20±34	32±143	13±24	29±93	13±45	0	15±82	5.6±9.3	14±72
Moderate and severe	24±122	1.6±6.3	14±33	3.5±5.2	14±57	12±29	15±32	18±61	4.3±11.1	12±28	23±27	15±78
Non-dementia	36±983	1.4±15.7	30±172	12±46	21±238	18±49	26±85	5.8±23.6	0.2±3.1	5.2±21.3	5.4±21.9	17±444
<i>Indirect cost of carers</i>												
Dementia	1.8±8.1	3.3±29.1	1.3±8.5	2.6±9.9	1.7±8.1	1.8±6.6	1.2±6.6	1.1±5.0	0.1±0.8	0.2±1.0	0.9±4.4	1.7±13.7
Questionable and mild	2.1±9.4	4.4±34.3	0.8±6.6	3.2±11.0	2.0±9.2	1.7±6.7	1.4±7.1	0.7±3.4	0	0.2±1.1	1.0±4.7	1.9±15.8
Moderate and severe	1.2±5.4	0.6±2.1	2.2±11.2	0	1.1±4.3	2.7±6.0	0	1.8±7.1	0	0	0.7±1.2	1.2±5.9
Non-dementia	1.6±9.4	0.8±5.5	0.7±7.3	0.1±1.3	2.7±15.6	4.5±24.2	2.0±14.7	0.7±5.4	0.1±1.2	0.3±2.8	0.4±1.8	1.4±10.8
<i>Total out of pocket cost for medical care</i>												
Dementia	141±264	25±62	109±393	36±74	1552±10108	260±443	364±1585	4600±11130	256±710	96±564	34±71	551±4432
Questionable and mild	130±228	22±57	83±340	44±80	1748±11470	256±452	367±1696	3076±6958	74±117	106±610	32±70	448±4142
Moderate and severe	159±312	30±70	159±479	3.5±5.2	1054±5359	292±418	364±598	7344±15936	770±1300	62±140	94±93	870±5285
Non-dementia	156±1039	21±87	313±2250	47±399	705±4330	405±1684	377±3763	2743±8466	177±1651	80±546	70±1111	448±3278

India. In urban Peru and urban Mexico, participants with dementia have less out of pocket expense than those without dementia with regard to direct medical costs and total costs, while in Venezuela and China those with dementia have higher costs.

There is a clear tendency for the direct medical costs and total cost at the private level to increase when a participant has more physical diseases. The main exception is rural Peru, where the costs are similar among different groups. The results are shown in Table 4.13.

Public level costs of medical care

The direct medical cost, direct non-medical cost and indirect cost have been described earlier in Table 4.5. Direct medical costs associated with specific services are shown in Table 4.14. Costs for private doctors, dentists and traditional healers are same as those at the private level as these are assumed to be equivalent to out-of-pocket expenses. Medication is not included separately in the cost of medical care at the public level. This is because prescription costs have already been accounted for in the unit costs of relevant services, including primary health centre and hospital doctor. Country differences are smaller at the public level than at the private level. Within countries, costs are generally higher in urban than that in rural sites. Hospital doctor costs are a key component of the total cost of direct medical care except for in India. Costs for other government health workers are relatively low in all centres. Costs for dentists are a large component of total medical costs in urban Peru and urban Mexico. Inpatient admissions only account for a large proportion of total medical cost in urban China. The costs for private doctors and dentists are low in Cuba, the Dominican Republic and urban China. Private doctor costs are the main cost component in rural China and India, and are an important contributor in Venezuela. Costs for traditional healers are the largest component of the total in rural India.

The gender distribution of direct medical costs, direct non-medical costs, indirect costs and total costs at the public level are shown in Table 4.15. Unlike the costs at the private level, gender differences are quite small among the whole sample. However, there are differences between the two groups among some centres. Women

have markedly lower costs in Cuba, the Dominican Republic, Peru, urban China and rural India; while men have lower costs in Venezuela.

Table 4.16 provides details of the age distribution of direct medical costs, direct non-medical costs, indirect costs and total costs. There are no major differences between the four age groups in the sample as a whole. However, younger participants have higher direct medical costs and total costs in Cuba, the Dominican Republic, urban Peru, rural Peru, rural China, while the situation is the opposite in urban China and rural India. The relationship between age and non-medical costs is limited in most of the centres except Cuba, where the youngest group has the highest direct non-medical costs. Indirect costs are similar across different age groups.

The differences in cost by dementia status are described in Table 4.17. As with the private level costs, in the whole sample participants with dementia have slightly higher costs than those with non-dementia participants and those with moderate or severe levels of dementia have higher costs than those with mild dementia. The differences between the two groups and between different severity levels of dementia are small in Cuba and the Dominican Republic. In urban Peru and urban Mexico, participants with dementia have lower direct medical and total cost for medical care than for those without dementia, while in Venezuela and China, those with dementia have higher costs.

With regard to physical diseases, the same tendency is found at the public level as with the private level. Participants with more physical diseases have higher costs for direct medical cost and total costs in all centres. The results are shown in Table 4.18.

Table 4.13. Costs for medical care at the private level in 2008 international dollars, by site and number of physical diseases

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Direct medical cost</i>												
0	98±397	8.6±37.1	261±2344	42±524	354±1378	348±1908	170±611	1432±6650	74±989	46±355	17±79	216±1924
1-2	129±258	22±102	232±1699	24±101	583±2291	376±1269	294±1766	2815±8776	355±2231	81±459	94±1455	457±3088
3+	158±219	26±51	357±2494	33±58	1612±9390	414±1384	297±1163	5444±10668	891±3838	472±1832	32±69	970±5686
<i>Direct non-medical cost</i>												
0	49±1391	0.4±2.3	17±55	6.3±25.0	8.5±60.8	14±45	26±104	1.6±9.1	0.02±0.5	4.9±31.6	3.6±5.9	16±627
1-2	25±181	2.1±22.2	31±164	16±53	34±378	19±44	23±68	6.8±26.4	0.8±6.1	7.1±25.0	5.7±28.2	17±162
3+	14±72	1.7±5.1	51±303	38±84	25±81	26±60	31±76	14±42	0.6±3.8	12±18	8.5±12.8	19±110
<i>Indirect cost of carers</i>												
0	1.1±6.7	0.5±3.4	0.5±7.1	0.03±0.4	1.2±6.9	3.3±19.8	1.6±11.1	0.1±1.2	0.03±0.4	0.1±1.4	0.4±1.6	0.8±7.5
1-2	1.9±11.0	1.1±13.9	0.9±8.1	0.4±3.1	3.9±22.4	5.2±28.5	2.3±17.9	0.8±4.8	0.2±2.2	0.5±4.2	0.3±1.4	1.7±13.9
3+	2.0±9.9	1.7±12.1	1.0±6.8	1.4±7.6	3.3±11.3	4.8±16.2	1.8±9.4	1.9±9.4	0.2±0.7	0.7±3.1	1.0±4.3	2.2±10.5
<i>Total out of pocket cost for medical care</i>												
0	148±1445	9.5±38.7	279±2349	48±530	364±1381	366±1913	198±646	1434±6652	74±989	51±373	21±81	233±2025
1-2	156±329	25±112	264±1710	40±120	625±2337	400±1280	552±5419	2822±8784	356±2233	90±463	103±1474	492±3375
3+	174±234	30±55	409±2509	73±119	1640±9406	444±1387	329±1189	5460±10684	892±3838	485±1844	42±76	992±5695

Table 4.14. Direct medical cost at the public level in 2008 international dollars, by site (based on UK unit cost method)

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Primary health centre	31±69	20±82	19±72	16±74	44±121	89±154	94±172	44±125	4.4±30.0	1.2±9.5	3.6±12.6	33±100
Hospital doctor	48±145	108±336	117±266	58±226	128±397	144±383	59±262	73±206	5.5±41.9	5.4±31.4	18±56	74±261
Other government health worker	3.7±26.2	0.2±6.4	1.3±21.3	0.1±2.3	3.1±47.6	4.9±47.6	4.1±59.7	0.7±22.8	0.2±1.3	0.1±1.4	0.6±3.3	2.0±30.2
Hospital inpatient	13±121	28±282	28±276	11±177	51±436	39±465	20±228	83±708	6.2±98.4	4.4±55.5	1.8±19.6	27±323
Private doctor ²	0.1±4.3	1.4±18.3	22±132	1.2±11.8	87±981	32±127	64±508	0.2±7.4	7.2±227.5	12±149	15±200	22±393
Dentist ²	0.1±4.8	1.3±19.8	124±1493	17±372	59±730	126±1021	26±390	8.9±133.9	-	0.03±1.0	0.5±4.4	31±602
Traditional healer ²	0.2±8.2	0.01±0.3	0.5±8.9	0.4±4.6	1.2±38.8	5.6±91.0	4.9±42.1	1.6±43.3	-	0.1±1.6	24±638	2.6±167.6
Direct medical cost	96±212	159±488	312±1556	104±475	372±1376	441±1201	273±766	211±777	23±255	24±164	63±850	192±879
Total cost for medical care	134±960	169±502	354±1579	124±505	411±1415	478±1226	315±814	226±789	25±258	35±180	77±865	219±991

1 Include prescription

2 Out-of-pocket expenditures

Table 4.15. Costs for medical care at the public level in 2008 international dollars, by site and gender (based on UK unit cost method)

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Direct medical cost</i>												
Male	92±204	178±617	338±1903	127±632	335±863	450±1240	267±930	246±936	28±350	23±88	95±1252	192±922
Female	98±216	150±406	298±1325	84±273	404±1613	436±1182	276±637	185±630	20±138	24±202	37±140	194±853
<i>Direct non-medical cost</i>												
Male	62±1556	1.1±5.7	24±85	12±45	18±105	20±60	25±85	5.7±22.7	0.1±1.7	5.4±21.3	5.3±16.3	20±663
Female	19±149	1.7±18.6	31±195	13±46	24±283	17±40	26±85	7.0±29.2	0.4±4.2	6.0±34.0	5.7±24.3	15±141
<i>Indirect cost of carers</i>												
Male	4.1±12.6	5.7±17.9	12±32	7.1±23.9	16±38	20±40	16±39	7.1±24.2	1.0±5.7	6.3±15.5	8.0±15.2	8.8±26.0
Female	4.2±12.0	8.9±22.3	15±40	8.7±30.9	19±38	20±32	17±36	9.4±24.8	1.2±8.7	5.6±14.2	8.3±17.5	10±27
<i>Total cost for medical care</i>												
Male	158±1569	185±628	373±1918	146±653	369±898	490±1266	308±966	259±945	29±352	34±102	108±1270	221±1148
Female	121±303	160±422	344±1357	105±325	447±1654	472±1206	319±695	201±647	21±143	35±219	51±168	219±884

Table 4.16. Costs for medical care at the public level in 2008 international dollars, by site and age group (based on UK unit cost method)

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Direct medical cost</i>												
65-69	92±178	179±684	477±2670	135±715	356±1402	448±1559	237±500	155±448	42±400	19±55	44±171	200±1093
70-74	99±214	153±362	330±1089	91±350	362±847	517±1379	288±739	231±742	12±61	30±266	37±85	194±684
75-79	103±236	158±431	269±807	69±272	451±2030	394±796	270±501	141±366	9.3±55.7	25±123	37±67	188±821
80+	92±219	148±398	157±352	102±257	347±1012	365±657	305±1186	335±1323	15±122	23±89	208±2244	186±805
<i>Direct non-medical cost</i>												
65-69	83±1813	1.9±27.1	21±52	18±62	27±345	13±32	21±76	4.9±23.2	0.5±4.5	6.2±23.3	6.9±30.3	24±746
70-74	17±96	0.9±4.3	26±75	9.7±32.3	15±50	18±46	25±87	4.1±19.6	0.2±3.1	3.4±13.3	4.7±8.8	11±57
75-79	15±90	1.3±6.7	45±270	8.1±41.8	23±104	20±44	28±80	8.3±23.9	0	11±62	4.1±7.9	16±106
80+	20±191	1.8±10.5	24±188	11±30	15±56	21±65	29±98	10±40	0.1±1.1	4.8±14.9	6.0±26.9	14±119
<i>Indirect cost of carers</i>												
65-69	4.3±13.5	7.1±20.9	13±42	8.0±29.0	14±32	13±25	15±36	5.1±15.9	0.7±5.2	6.1±16.4	7.6±14.3	8.6±25.2
70-74	4.4±12.6	6.5±19.2	16±43	5.8±23.6	20±41	20±40	16±37	9.1±29.4	1.8±11.4	4.8±12.2	8.1±16.6	9.9±28.3
75-79	3.7±10.5	8.0±20.1	15±35	3.5±12.5	20±40	23±36	17±38	8.4±17.2	1.1±6.0	8.1±16.9	8.7±17.4	10±26
80+	4.2±11.9	9.6±23.0	12±26	14±37	20±43	23±34	19±40	12±32	0.6±3.0	5.6±12.2	8.8±19.5	11±28
<i>Total cost for medical care</i>												
65-69	179±1824	188±697	511±2684	161±750	397±1452	474±1578	273±569	165±466	43±403	31±78	58±203	233±1333
70-74	120±258	160±373	372±1113	106±373	396±874	556±1408	330±788	245±756	14±74	38±281	50±103	215±707
75-79	122±268	167±446	329±882	81±283	495±2061	437±827	315±575	158±382	10±62	44±158	50±84	214±849
80+	115±341	159±415	193±426	127±307	381±1056	409±688	353±1214	357±1333	16±123	33±106	222±2276	211±837

Table 4.17. Costs for medical care at the public level in 2008 international dollars, by site and dementia status (based on UK unit cost method)

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Direct medical cost</i>												
Dementia	91±201	156±366	143±331	112±204	571±2963	278±452	459±1619	608±2052	24±75	35±166	47±109	216±1197
Questionable and mild	93±184	153±364	160±386	123±216	383±1074	253±403	493±1738	258±964	1.6±10.3	39±180	39±75	180±687
Moderate and severe	90±227	175±383	109±185	94±165	1046±5321	426±672	220±359	1236±3118	80±134	19±42	197±305	330±2048
Non-dementia	96±213	160±503	330±1630	103±489	356±1160	458±1252	255±627	180±558	23±261	23±164	65±900	190±840
<i>Direct non-medical cost</i>												
Dementia	18±102	2.1±13.5	14±36	16±31	27±125	13±25	27±88	15±51	1.1±5.7	14±76	6.4±11.7	14±73
Questionable and mild	14±87	2.3±15.4	13±37	20±34	32±143	13±24	29±93	13±45	0	15±82	5.6±9.3	14±72
Moderate and severe	24±122	1.6±6.3	14±33	3.5±5.2	14±57	12±29	15±32	18±61	4.3±11.1	12±28	23±27	15±78
Non-dementia	36±983	1.4±15.7	30±172	12±46	21±238	18±49	26±85	5.8±23.6	0.2±3.1	5.2±21.3	5.4±21.9	17±444
<i>Indirect cost of carers</i>												
Dementia	5.4±12.6	9.9±20.1	11±25	19±35	24±48	23±32	21±44	21±48	2.2±8.1	8.2±17.8	14±28	13±30
Questionable and mild	6.0±13.5	10±21	12±29	21±37	26±47	20±29	22±46	18±35	0.3±1.7	9.4±19.0	12±24	13±30
Moderate and severe	4.6±11.0	9.7±17.8	8.6±14.5	16±29	22±52	38±46	22±31	27±65	6.6±14.4	2.2±4.9	45±62	13±32
Non-dementia	4.0±12.2	7.5±21.1	14±38	7.2±27.1	17±36	19±35	16±37	7.4±21.6	1.0±7.5	5.7±14.5	7.5±14.3	9.5±26.4
<i>Total cost for medical care</i>												
Dementia	114±254	168±385	167±368	148±256	622±3008	313±488	508±1641	643±2061	27±88	57±208	67±142	243±1219
Questionable and mild	112±236	165±388	186±429	164±272	440±1182	287±431	544±1759	289±989	1.9±12.0	63±224	57±99	207±724
Moderate and severe	119±282	187±390	132±208	113±199	1083±5354	476±738	257±414	1281±3117	91±158	33±75	265±390	358±2064
Non-dementia	136±1014	169±516	374±1654	122±518	394±1200	495±1277	297±684	194±573	24±264	34±177	78±915	217±966

Table 4.18. Costs for medical care at the public level in 2008 international dollars, by site and number of physical diseases, by UK unit cost method

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Direct medical cost</i>												
0	70±176	83±314	237±971	83±580	232±940	323±905	264±683	73±298	16±279	21±196	22±43	123±581
1-2	113±229	152±409	325±1578	118±342	409±1663	513±1408	259±788	173±541	36±172	23±58	92±1194	202±943
3+	132±256	274±737	486±2499	172±293	559±1503	598±1356	321±875	554±1491	73±276	67±154	55±104	364±1274
<i>Direct non-medical cost</i>												
0	49±1391	0.4±2.3	17±55	6.3±25.0	8.5±60.8	14±45	26±104	1.6±9.1	0.02±0.5	4.9±31.6	3.6±5.9	16±627
1-2	25±181	2.1±22.2	31±164	16±53	34±378	19±44	23±68	6.8±26.4	0.8±6.1	7.1±25.0	5.7±28.2	17±162
3+	14±72	1.7±5.1	51±303	38±84	25±81	26±60	31±76	14±42	0.6±3.8	12±18	8.5±12.8	19±110
<i>Indirect cost of carers</i>												
0	3.0±9.7	3.3±11.0	8.9±31.4	4.2±23.7	11±31	16±27	15±33	3.3±16.3	0.4±2.8	4.2±13.3	6.6±10.8	6.3±20.9
1-2	5.1±14.1	7.4±19.2	15±36	11±32	18±38	21±39	16±39	8.7±25.3	2.8±13.4	8.6±16.9	6.7±14.4	10±27
3+	5.3±12.8	14±30	24±50	17±25	27±44	28±41	21±42	16±31	2.8±7.5	12±15	15±26	18±36
<i>Total cost for medical care</i>												
0	121±1402	86±320	263±992	93±608	252±954	353±924	306±743	78±308	16±280	30±212	32±55	146±864
1-2	143±342	161±422	371±1602	144±374	461±1718	553±1435	298±823	188±555	40±182	39±81	105±1214	229±975
3+	152±283	290±756	560±2528	227±340	612±1540	652±1385	374±925	584±1503	77±278	91±170	79±131	401±1300

4.3. Social care

The use of social care in different countries is described in Table 4.19. Fewer than 10% of participants received any kind of social care. In the sample as a whole, participants received more help for ADLs than for other kinds of informal care, and they received more informal care than paid home care.

More participants received care for ADLs than IADLs and supervision in Cuba, the Dominican Republic, China, and rural India. In Venezuela and urban Mexico participants received less care for ADLs than for IADLs and supervision. In Peru, rural Mexico and urban India, the percentages receiving ADLs, IADLs and supervision are quite similar. No participants received paid home care in India, and very few participants received paid home care in rural Mexico and rural China. Paid home care was most frequently used in the Dominican Republic, urban Peru and urban China.

Table 4.20a shows the amount of informal care received per day among participants who received any informal care. The amounts are generally similar for different types of ADL. Participants tend to receive more help for communication and supervision than for transportation. Carers of participants from Venezuela had the lowest amount of help with ADLs among all the sites. Participants from India received the highest amounts of informal care, and this was mainly due to large amounts of supervision.

Table 4.20b shows the hours of paid home care received per week among participants who received this service. Participants tended to use relatively high amounts of paid home care, if any were received. Paid home care received during the day was usually for longer than care received during the night.

Private social care costs

At the private level, the costs for ADL, IADL, supervision, and paid care were added together to estimate the total cost of social care (see Table 4.2).

Table 4.19. Number (%) of participants receiving social care, by site

Type of social care	Cuba (N=2944)	Dominican Republic (N=2011)	Peru (urban) (N=1381)	Peru (rural) (N=552)	Venezuela (N=1965)	Mexico (urban) (N=1003)	Mexico (rural) (N=1000)	China (urban) (N=1160)	China (rural) (N=1002)	India (urban) (N=1005)	India (rural) (N=999)	Total (N=15022)
<i>ADL</i>												
Dressing	168 (5.7%)	126 (6.3%)	91 (6.6%)	19 (3.4%)	29 (1.5%)	40 (4.0%)	39 (3.9%)	99 (8.5%)	28 (2.8%)	12 (1.2%)	65 (6.5%)	716 (4.8%)
Eating	142 (4.8%)	124 (6.2%)	84 (6.1%)	18 (3.3%)	34 (1.7%)	39 (3.9%)	33 (3.3%)	111 (9.6%)	29 (2.9%)	16 (1.6%)	79 (7.9%)	709 (4.7%)
Grooming	164 (5.6%)	114 (5.7%)	92 (6.7%)	18 (3.3%)	26 (1.3%)	35 (3.5%)	32 (3.2%)	112 (9.7%)	27 (2.7%)	13 (1.3%)	47 (4.7%)	680 (4.5%)
Toileting	141 (4.8%)	115 (5.7%)	100 (7.2%)	16 (2.9%)	38 (1.9%)	22 (2.2%)	28 (2.8%)	111 (9.6%)	25 (2.5%)	16 (1.6%)	56 (5.6%)	668 (4.4%)
Bathing	177 (6.0%)	141 (7.0%)	103 (7.5%)	20 (3.6%)	41 (2.1%)	47 (4.7%)	35 (3.5%)	97 (8.4%)	31 (3.1%)	17 (1.7%)	78 (7.8%)	787 (5.2%)
Total ADL	205 (7.0%)	183 (9.1%)	118 (8.5%)	22 (4.0%)	74 (3.8%)	69 (6.9%)	52 (5.2%)	152 (13.1%)	46 (4.6%)	21 (2.1%)	84 (8.4%)	1026 (6.8%)
<i>IADL</i>												
Using transport	35 (1.2%)	27 (1.3%)	90 (6.5%)	14 (2.5%)	68 (3.5%)	61 (6.1%)	25 (2.5%)	19 (1.6%)	4 (0.4%)	17 (1.7%)	9 (0.9%)	369 (2.5%)
Communication	156 (5.3%)	77 (3.8%)	81 (5.9%)	12 (2.2%)	72 (3.7%)	52 (5.2%)	21 (2.1%)	65 (5.6%)	22 (2.2%)	12 (1.2%)	78 (7.8%)	648 (4.3%)
Total IADL	165 (5.6%)	93 (4.6%)	102 (7.4%)	18 (3.3%)	96 (4.9%)	83 (8.3%)	36 (3.6%)	75 (6.5%)	23 (2.3%)	22 (2.2%)	79 (7.9%)	792 (5.3%)
<i>Supervision</i>	84 (2.9%)	39 (1.9%)	91 (6.6%)	14 (2.5%)	88 (4.5%)	48 (4.8%)	24 (2.4%)	16 (1.4%)	8 (0.8%)	17 (1.7%)	17 (1.7%)	446 (3.0%)
<i>Total informal care</i>	225 (7.6%)	192 (9.5%)	128 (9.3%)	23 (4.2%)	136 (6.9%)	100 (10.0%)	64 (6.4%)	165 (14.2%)	49 (4.9%)	27 (2.7%)	85 (8.5%)	1194 (7.9%)
<i>Paid home care</i>												
During the day	34 (1.2%)	41 (2.0%)	45 (3.3%)	2 (0.4%)	28 (1.4%)	4 (0.4%)	1 (0.1%)	83 (7.2%)	1 (0.1%)	0	0	239 (1.6%)
During the night	10 (0.3%)	28 (1.4%)	27 (2.0%)	2 (0.4%)	10 (0.5%)	2 (0.2%)	0	81 (7.0%)	0	0	0	160 (1.1%)
Total paid home care	35 (1.2%)	41 (2.0%)	45 (3.3%)	2 (0.4%)	29 (1.5%)	4 (0.4%)	1 (0.1%)	83 (7.2%)	1 (0.1%)	0	0	241 (1.6%)
<i>Total social care</i>	228 (7.7%)	200 (9.9%)	130 (9.4%)	23 (4.2%)	142 (7.2%)	102 (10.2%)	64 (6.4%)	172 (14.8%)	49 (4.9%)	27 (2.7%)	85 (8.5%)	1222 (8.1%)

Table 4.20a. Hours of informal care received per day among users, by site

Type of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL</i>												
Dressing	1.0±1.0	0.7±0.8	0.8±0.6	0.9±0.7	0.2±0.7	0.5±0.7	0.5±0.6	0.9±1.0	0.7±0.9	0.8±1.1	0.8±0.4	0.7±0.8
Eating	0.9±1.0	0.7±0.8	0.7±0.6	0.8±0.6	0.3±0.8	0.5±0.8	0.6±0.8	1.0±0.9	0.9±1.0	1.0±1.1	1.0±0.3	0.7±0.8
Grooming	0.9±0.9	0.7±0.8	0.8±0.7	0.9±0.8	0.2±0.6	0.4±0.7	0.5±0.7	1.0±1.0	0.7±0.9	0.8±1.0	0.6±0.5	0.7±0.8
Toileting	0.9±1.0	0.7±0.8	0.9±0.6	0.7±0.7	0.3±0.7	0.3±0.6	0.6±0.9	1.1±1.1	0.8±1.0	1.1±1.1	0.7±0.5	0.7±0.9
Bathing	1.0±0.9	0.8±0.8	0.9±0.6	1.0±0.8	0.3±0.6	0.6±0.8	0.6±0.8	0.9±1.0	0.8±0.8	0.9±0.8	0.9±0.3	0.8±0.8
Total ADL	4.7±3.9	3.5±3.1	4.1±2.5	4.3±2.7	1.3±2.5	2.2±2.5	2.7±2.8	4.9±4.0	3.9±3.6	4.5±4.2	3.9±1.3	3.6±3.4
<i>IADL</i>												
Using transport	0.2±0.6	0.2±0.6	0.8±0.6	0.5±0.5	0.6±1.0	1.0±1.1	0.6±1.0	0.2±0.5	0.1±0.4	1.0±0.9	0.1±0.3	0.4±0.8
Communication	2.3±3.8	1.0±2.6	1.2±2.2	1.8±3.3	1.1±2.3	1.3±2.7	0.5±1.3	1.4±3.2	1.6±3.0	0.7±1.0	1.2±0.6	1.4±2.8
Total IADL	2.5±3.8	1.2±2.6	2.0±2.4	2.3±3.3	1.8±2.6	2.3±3.1	1.1±1.7	1.5±3.2	1.7±3.1	1.8±1.5	1.3±0.7	1.8±2.9
<i>Supervision</i>	1.6±3.6	0.8±2.3	2.0±3.2	2.0±4.0	2.6±4.3	1.8±3.8	1.9±4.6	0.5±2.2	0.2±0.6	3.1±4.5	0.4±1.5	1.4±3.4
<i>Total informal care</i>	8.8±7.3	5.5±5.8	8.0±5.7	8.6±6.6	5.6±6.6	6.3±5.8	5.7±6.4	7.0±5.9	5.9±5.7	9.4±7.9	5.6±2.2	6.8±6.3

Table 4.20b. Hours of paid home care received per week among users, by site

Type of paid care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
During the day	43±15	46±18	51±11	56±0	35±19	44±24	56±0	54±8	56±0	-	-	48±15
During the night	16±26	38±26	34±28	56±0	19±27	28±32	-	55±9	-	-	-	37±26
Total paid home care	59±30	84±40	84±34	112±0	54±37	72±50	56±0	108±14	56±0	-	-	85±36

Informal care costs at the private level are shown in Table 4.21. Costs are quite similar for different ADL types. The cost of help for ADLs accounts for around half of the total cost for informal care in the whole sample, and the cost for IADLs and supervision are similar to each other. Costs vary across centres. China has the highest ADL costs, while urban India has the lowest. Venezuela has the highest cost for IADLs and supervision, while urban India has the lowest cost for supervision and rural Mexico has the lowest cost for IADLs. Cuba has the highest total informal care costs followed by urban China. Urban India has the lowest total cost.

Details of paid home care costs are shown in Table 4.22. Costs during the day are slightly higher than the costs during the night. Urban Peru and urban China have much higher costs of paid home care than the other centres. No paid care was found in India and there were very low costs for paid care in rural Mexico and rural China because very few participants used paid home care.

The gender distribution of cost for different types of social care is detailed in Table 4.23. Women have slightly higher costs for ADLs, IADLs, supervision and paid care, which lead to a larger total cost of social care in the whole sample. However, in some centres, including urban Peru and rural Mexico, men have higher costs of informal care. In rural Mexico, men have higher costs of total social care.

The age distribution of cost for different types of social care is presented in Table 4.24. The older the participant is, the higher the social care costs. This tendency can be found for each category and in most centres. Only in Peru and Venezuela for the cost of ADLs is this not the case.

The differences in cost between participants with dementia and those without are shown in Table 4.25. Dementia is a clear driver of costs of social care in every centre. Cost is also positively related to the severity of dementia. Participants with moderate/severe dementia have higher costs than those with questionable or mild dementia.

The relationship between social care costs and the number of physical diseases is reported in Table 4.26. The number of physical diseases is modestly related to the cost of social care. However, in urban China, because of the contribution made by the cost

Table 4.21. Cost of informal care at the private level in 2008 international dollars by site

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL</i>												
Dressing	17±181	11±134	14±259	4.5±75.2	5.2±87.6	9.8±149.5	1.2±36.9	25±262	4.9±61.2	0	4.4±28.9	10±153
Eating	16±167	13±148	12±254	3.6±45.8	9.3±125.8	12±147	1.2±36.9	23±226	5.8±73.3	1.1±33.7	7.3±46.7	11±150
Grooming	17±169	8.9±100.8	15±258	5.4±75.4	6.2±104.7	14±166	2.4±52.9	22±211	4.0±52.4	0.4±11.2	2.9±24.3	10±143
Toileting	12±132	9.5±111.5	14±257	2.7±40.6	4.7±78.6	10±138	2.5±47.6	23±230	5.0±59.6	0.7±22.5	5.2±35.4	9.0±133.9
Bathing	20±202	12±125	15±260	6.0±84.8	5.4±90.3	14±149	2.5±47.6	21±247	5.2±50.9	0.4±11.2	6.3±41.4	11±156
Total ADL	82±763	54±561	70±1282	22±302	31±406	60±610	9.6±197.5	114±1071	25±266	2.5±78.6	26±154	52±675
<i>IADL</i>												
Using transport	5.3±81.3	2.8±74.1	13±183	1.5±25.5	16±163	16±241	1.2±36.9	0.9±22.5	0	1.2±28.1	0.5±9.5	6.0±112.7
Communication	36±477	12±154	18±377	7.2±112.7	27±333	30±510	0.8±26.3	25±424	16±218	0.9±20.2	8.3±53.6	20±332
Total IADL	42±491	15±196	31±526	8.7±121.0	43±402	46±639	2.0±45.3	26±426	16±218	2.1±47.6	8.8±56.1	26±380
<i>Supervision</i>	38±943	8.1±141.0	31±526	16±220	55±590	26±388	5.6±153.9	8.3±281.3	2.1±40.2	0.6±14.0	2.7±49.2	22±518
<i>Total informal care</i>	161±1692	77±720	131±2203	47±619	129±1132	132±1198	17±311	148±1498	43±431	5.2±130.4	38±226	100±1246

Table 4.22. Cost of paid home care at the private level in 2008 international dollars, by site

Paid home care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
During the day	25±245	65±483	181±1010	22±369	66±617	9.3±163.0	3.0±94.0	229±836	3.3±105.6	-	-	58±504
During the night	9.5±162.3	54±455	120±849	22±369	36±511	5.9±132.7	-	233±852	-	-	-	44±447
Total paid home care	35±356	119±913	301±1767	44±738	103±1009	15±282	3.0±94.0	463±1683	3.3±105.6	-	-	103±905

Table 4.23. Cost of social care at the private level in 2008 international dollars, by site and gender

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL costs</i>												
Male	66±715	30±352	116±2039	14±218	16±177	41±434	20±302	111±1091	18±176	0	20±130	44±772
Female	90±788	66±643	44±498	30±360	20±291	70±681	2.8±67.9	115±1056	30±320	4.4±104.3	31±172	53±591
<i>IADL costs</i>												
Male	30±361	7.8±108.9	55±838	3.9±62.2	22±260	16±166	2.9±58.4	12±148	23±290	2.5±52.2	6.5±43.2	19±323
Female	48±548	18±229	18±201	13±155	40±389	61±775	1.4±33.9	37±549	10±134	1.9±44.7	11±65	28±401
<i>Supervision costs</i>												
Male	12±211	4.0±72.8	44±666	5.8±93.4	24±336	7.4±101.3	12±240	0	3.1±50.8	0.6±13.0	1.6±23.6	11±257
Female	52±1160	10±166	23±431	25±288	56±626	35±471	1.4±33.9	14±373	1.2±29.0	0.6±14.9	3.7±63.1	27±617
<i>Informal care costs</i>												
Male	107±1075	42±470	215±3484	23±374	62±670	65±655	35±463	123±1116	44±459	3.2±65.2	29±185	74±1229
Female	190±1945	95±819	85±902	68±772	116±1086	166±1394	5.5±135.7	167±1733	42±408	6.9±163.8	45±254	109±1227
<i>Paid home care costs</i>												
Male	26±301	64±678	201±1386	0	86±964	8.8±162.0	0	335±1460	0	0	0	70±740
Female	39±382	148±1013	356±1945	83±1008	73±803	18±326	4.9±121.2	559±1828	6.0±141.8	0	0	118±965
<i>Total costs of social care</i>												
Male	133±1221	106±838	416±4041	23±374	147±1405	74±674	35±463	458±2097	44±459	3.2±65.2	29±185	144±1571
Female	230±2074	243±1474	441±2390	151±1340	189±1433	184±1434	10±182	726±2670	48±431	6.9±163.8	45±254	226±1669

Table 4.24. Cost of social care at the private level in 2008 international dollars, by site and age group

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL costs</i>												
65-69	13±211	16±328	22±299	0	14±292	8.2±84.5	5.6±96.3	16±202	8.9±125.9	0	15±108	12±219
70-74	64±635	7.1±110.3	128±2393	25±294	41±520	34±470	0	70±1032	25±270	7.8±139.7	26±150	42±843
75-79	82±693	36±412	49±574	16±166	74±590	144±1055	0	106±856	40±412	0	22±140	59±593
80+	170±1182	146±941	80±591	55±521	14±122	58±463	35±398	326±1795	49±271	0	59±246	113±899
<i>IADL costs</i>												
65-69	18±315	2.8±48.3	21±251	0	6.4±134.4	4.9±54.1	2.8±48.2	1.1±19.1	15±280	0	6.0±44.7	8.2±177.7
70-74	29±331	1.9±38.0	52±957	7.1±84.0	33±304	46±512	0	0	4.9±64.2	3.4±59.9	8.4±54.9	19±361
75-79	40±325	4.8±48.6	18±224	6.6±66.2	88±488	4.1±58.2	0	2.3±36.5	25±203	0	6.7±40.0	24±244
80+	81±800	45±363	32±243	24±225	105±753	110±1161	5.1±77.2	129±953	30±256	8.6±95.9	19±90	62±635
<i>Supervision costs</i>												
65-69	15±277	0	4.6±63.1	0	21±352	0	2.8±48.2	0	1.8±35.0	0	1.4±25.4	7.0±188.0
70-74	15±238	0.8±18.7	39±718	11±126	53±650	38±515	0	0	0	1.1±20.0	5.0±77.4	16±352
75-79	14±244	0	11±124	36±364	80±683	4.1±58.2	0	0	5.1±72.2	0	0	15±272
80+	106±1818	28±265	66±741	28±292	124±845	55±533	21±318	42±634	3.1±28.6	2.2±24.0	3.8±27.9	60±992
<i>Informal care costs</i>												
65-69	46±554	19±337	48±545	0	42±597	13±138	11±193	17±215	26±403	0	22±166	27±415
70-74	107±992	9.9±124.6	220±4069	42±504	127±1257	118±1128	0	70±1032	30±317	12±220	39±240	77±1406
75-79	137±1057	41±427	78±920	59±596	243±1458	152±1110	0	109±866	70±589	0	28±177	99±885
80+	358±2986	220±1256	178±1212	107±1036	243±1546	222±1744	61±612	498±2952	83±446	11±120	81±335	234±1928
<i>Paid home care costs</i>												
65-69	12±218	0	82±835	0	50±705	0	9.9±172.0	148±986	0	0	0	28±471
70-74	20±245	30±481	142±1162	0	76±992	0	0	185±1097	0	0	0	44±609
75-79	16±254	148±1008	188±1402	121±1220	187±1257	31±416	0	397±1550	17±235	0	0	105±900
80+	90±572	294±1417	785±2851	94±1072	193±1366	40±444	0	1414±2710	0	0	0	289±1503
<i>Total costs for social care</i>												
65-69	58±680	19±337	129±1057	0	92±1054	13±138	21±258	165±1115	26±403	0	22±166	55±695
70-74	127±1112	40±496	362±4529	42±504	204±1866	118±1128	0	254±1782	30±317	12±220	39±240	122±1670
75-79	152±1145	189±1139	266±2059	181±1353	430±2163	183±1199	0	506±1865	87±632	0	28±177	203±1386
80+	448±3174	514±2145	962±3395	200±1625	436±2106	262±1795	61±612	1912±4198	83±446	11±120	81±335	523±2600

Table 4.25. Cost of social care at the private level in 2008 international dollars, by site and dementia status

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL costs</i>												
Dementia	627±2110	293±1390	504±4031	296±1130	278±1375	509±1832	44±239	713±2869	334±1010	33±288	85±256	385±1988
Questionable and mild	291±1337	137±703	11±101	321±1240	212±1216	479±1886	51±257	228±1011	101±543	39±311	61±208	180±1004
Moderate and severe	1164±2877	736±2401	1435±6802	266±595	445±1720	714±1620	0	1586±4524	1019±1656	0	496±528	984±3458
Non-dementia	14±256	21±293	25±340	3.2±73.2	11±151	14±217	6.4±192.9	67±755	6.5±97.3	0	19±136	18±300
<i>IADL costs</i>												
Dementia	314±1353	100±529	207±1621	116±453	217±881	264±1739	9.6±89.3	236±1448	159±756	28±173	28±86	179±1084
Questionable and mild	132±719	56±464	0	120±493	192±870	275±1880	11±96	32±233	26±162	33±187	21±73	89±716
Moderate and severe	604±1951	225±678	597±2732	133±298	279±917	216±672	0	604±2384	562±1451	0	142±175	444±1735
Non-dementia	8.3±188.5	3.2±66.6	13±175	1.3±29.3	29±332	24±373	1.3±38.6	9.8±172.1	7.5±125.1	0	6.5±51.0	10±195
<i>Supervision costs</i>												
Dementia	284±2761	63±399	134±1193	143±602	308±1346	108±527	65±521	114±1045	19±100	8.3±51.0	23±148	148±1502
Questionable and mild	32±263	26±218	0	166±668	238±1242	53±266	75±561	0	0	9.7±55.2	2.8±27.4	51±478
Moderate and severe	684±4408	167±681	386±2018	66±149	487±1582	424±1191	0	319±1749	76±194	0	320±517	426±2823
Non-dementia	7.5±231.3	0.7±20.6	20±397	7.1±161.1	35±477	17±371	0	0	1.1±33.4	0	0.2±6.1	9.5±255.9
<i>Informal care costs</i>												
Dementia	1225±4791	456±1834	844±6840	554±2176	803±2984	881±2937	118±737	1063±4674	512±1539	70±476	136±436	712±3686
Questionable and mild	455±1850	219±1045	11±101	608±2395	642±2898	807±2916	137±793	259±1031	127±704	82±514	85±296	320±1662
Moderate and severe	2452±7194	1128±3040	2418±11545	466±1041	1212±3194	1354±3220	0	2509±7564	1657±2578	0	958±1077	1854±6558
Non-dementia	30±490	25±328	57±688	12±264	75±800	55±804	7.7±231.5	77±815	15±212	0	26±181	38±544
<i>Paid home care costs</i>												
Dementia	236±871	618±2042	2190±4448	341±2044	565±2164	68±618	34±319	2934±3276	0	0	0	624±2177
Questionable and mild	79±454	268±1338	1608±3892	0	207±1072	5.4±48.1	0	2140±3092	0	0	0	338±1624
Moderate and severe	484±1243	1611±3109	3290±5216	2453±5485	1475±3565	425±1590	372±1051	4362±3157	0	0	0	1464±3160
Non-dementia	10±208	51±584	104±998	24±540	66±843	9.8±220.3	0	270±1308	3.5±108.7	0	0	50±627

<i>Total costs for social care</i>												
Dementia	1461±5032	1074±2997	3034±8636	895±3187	1368±3986	949±2996	152±798	3997±5848	512±1539	70±476	136±436	1336±4501
Questionable and mild	534±1990	487±1676	1619±3923	608±2395	849±3156	812±2933	137±793	2400±3425	127±704	82±514	85±296	658±2343
Moderate and severe	2937±7479	2740±4776	5708±13346	2918±6526	2687±5391	1778±3414	372±1051	6872±7947	1657±2578	0	958±1077	3318±7588
Non-dementia	40±627	76±747	162±1416	35±600	141±1302	65±833	7.7±231.5	346±1681	19±238	0	26±181	88±926

Table 4.26. Cost of social care at the private level in 2008 international dollars, by site and number of physical diseases

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL costs</i>												
0	55±605	16±220	36±450	5.9±99.4	14±149	10±166	3.1±61.3	18±266	6.0±95.7	0	20±134	21±330
1-2	84±791	46±390	115±1958	31±392	20±303	84±744	16±284	145±1321	29±254	7.9±140.1	22±133	62±849
3+	188±1157	119±993	52±438	87±552	23±307	143±948	9.0±122.4	184±1096	332±1067	0	52±231	96±780
<i>IADL costs</i>												
0	28±338	3.4±46.7	13±177	2.4±39.8	36±296	20±307	0	19±272	3.5±67.9	1.7±42.0	7.4±53.4	15±220
1-2	35±351	20±254	45±783	14±170	19±248	73±906	2.7±56.0	27±512	26±222	3.4±60.1	7.7±51.4	26±420
3+	132±1161	19±179	44±344	25±158	49±505	53±540	4.5±61.2	38±355	168±890	0	15±72	47±537
<i>Supervision costs</i>												
0	46±1353	0	7.2±95.3	13±219	11±151	24±430	13±245	0	2.5±46.8	0.4±10.5	5.2±80.2	15±627
1-2	29±407	15±200	64±826	16±220	40±538	16±225	0	0	1.4±19.3	1.1±20.0	0.4±8.2	20±372
3+	43±354	4.9±69.2	11±89	37±237	102±834	55±552	4.5±61.2	46±664	0	0	4.9±41.6	38±477
<i>Informal care costs</i>												
0	130±1914	20±259	56±721	21±358	61±470	55±792	16±307	36±526	12±205	2.1±52.5	32±227	52±950
1-2	149±1243	81±702	225±3374	60±780	79±1008	172±1342	18±339	171±1691	56±409	12±220	30±182	108±1394
3+	364±2346	143±1070	108±788	150±947	175±1348	251±1683	18±245	268±1938	500±1650	0	71±319	181±1408
<i>Paid home care costs</i>												
0	11±161	46±571	255±1629	0	44±621	0	7.8±152.1	202±1129	0	0	0	48±641
1-2	40±383	99±826	345±1908	53±807	77±887	31±425	0	422±1614	12±204	0	0	107±918
3+	112±687	254±1334	317±1777	307±1939	130±1117	19±237	0	1017±2389	0	0	0	222±1280
<i>Total costs for social care</i>												
0	141±1928	66±768	312±1974	21±358	105±976	55±792	24±342	239±1239	12±205	2.1±52.5	32±227	99±1202
1-2	189±1388	180±1134	569±4189	114±1226	155±1504	204±1412	18±339	594±2654	69±455	12±220	30±182	216±1815
3+	476±2834	397±1953	425±2226	456±2136	305±1820	270±1696	18±245	1285±3108	500±1650	0	71±319	403±2062

of paid home care, cost is related to the number of physical diseases. Participants have higher costs among those with three or more physical diseases in urban China.

Public social care costs

At the public level, the total cost of social care is also divided into costs for ADL, IADL, supervision and paid care. However, the cost for paid care is the same as at the private level. These results have been reported in Table 4.2. This is because the 10/66 survey did not collect information on the expenditure for paid home care by families. The unit cost of paid home care was defined and calculated in the same way as for the private and public level cost estimates.

Detailed costs of informal care at the public level are presented in Table 4.27. Costs for help with ADLs make up around one-half of the total cost for social care and IADLs and supervision each make up around one-quarter. Costs do vary across centres. China still has the highest cost for ADLs at the public level, while urban India has the lowest cost. Urban Mexico has the highest cost for IADL and Venezuela has the highest cost for supervision. Urban India has the lowest cost for IADLs and rural China has the lowest cost for supervision.

The gender distribution of cost for different types of social care at the public level is shown in Table 4.28. The gender difference at this level is similar to that at the private level. Women have higher costs for help with ADLs, IADLs, supervision and paid care. In urban Peru and rural Mexico men have higher costs for informal care than women and in rural Mexico and rural China men have higher total social care costs.

The age distribution of cost for different types of social care is reported in Table 4.29. It is clear that older participants have higher cost for every type of social care. This finding is consistent with the costs at the private level.

The difference in cost between participants with dementia and those without, and the distribution of cost among those with different numbers of physical diseases are described in Tables 4.30 and 4.31 respectively. Similar to the findings at the private level, dementia is a clear driver of the cost of social care, while the impact of physical diseases is much weaker. Costs for paid home care do though appear to be associated with the number of physical diseases.

Table 4.27. Cost of informal care at the public level in 2008 international dollars using the ILO average wage method, by site

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL</i>												
Dressing	63±286	104±453	154±615	84±489	38±354	91±486	72±370	210±751	58±374	27±267	78±294	87±440
Eating	54±265	103±446	140±579	74±417	48±402	96±517	82±491	223±745	68±428	34±292	99±346	89±451
Grooming	57±262	98±445	156±627	84±519	34±326	79±440	67±405	229±768	57±372	27±262	56±252	83±436
Toileting	57±282	98±441	169±635	66±418	47±378	53±392	79±515	259±862	62±424	37±310	67±274	88±465
Bathing	62±270	114±454	185±696	99±558	42±314	113±547	82±467	210±756	62±382	30±239	94±326	95±461
Total ADL	293±1245	517±1946	803±2897	408±2170	209±1396	432±1893	383±1893	1132±3468	308±1762	155±1230	393±1364	442±1978
<i>IADL</i>												
Using transport	12±123	29±278	150±594	51±319	103±589	197±833	82±559	36±309	8.7±145.0	36±279	11±113	61±424
Communication	146±916	149±1167	242±1563	168±1611	186±1277	247±1702	75±704	310±1956	125±1139	25±251	117±430	164±1228
Total IADL	158±940	178±1218	392±1924	219±1729	289±1564	444±2153	157±995	347±2020	133±1167	60±458	128±476	225±1401
<i>Supervision</i>	101±829	113±1033	388±2317	192±1918	422±2487	349±2404	266±2417	120±1286	19±229	108±1087	44±522	194±1654
<i>Total informal care</i>	552±2338	808±3320	1583±6010	819±4669	920±4243	1224±4797	806±4145	1600±5040	460±2714	324±2453	565±2006	861±3869

Table 4.28. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and gender

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL costs</i>												
Male	208±1069	370±1591	740±2758	426±2305	135±990	479±2027	345±1804	1031±3417	339±1866	151±1112	304±1224	385±1884
Female	339±1328	594±2103	838±2972	392±2049	146±1060	408±1822	408±1951	1209±3507	282±1675	163±1326	468±1467	464±1994
<i>IADL costs</i>												
Male	154±1055	196±1519	378±2066	316±2370	138±922	442±2247	187±1203	178±1311	202±1606	68±461	97±403	198±1409
Female	160±872	170±1030	400±1840	136±833	286±1590	445±2105	137±830	475±2414	78±618	56±462	153±528	230±1356
<i>Supervision costs</i>												
Male	74±767	90±885	362±2317	71±486	251±1813	282±2288	404±3174	82±894	20±238	108±1016	29±255	153±1501
Female	115±861	125±1102	402±2318	298±2581	377±2309	383±2462	174±1743	150±1517	18±222	110±1150	57±667	201±1639
<i>Informal care costs</i>												
Male	436±2218	656±3152	1481±5956	813±4506	524±3043	1203±5035	937±4779	1290±4214	560±3299	327±2326	430±1734	736±3661
Female	615±2398	888±3404	1640±6043	825±4815	809±3861	1236±4676	719±3668	1834±5575	379±2131	330±2574	677±2202	895±3857
<i>Paid home care costs</i>												
Male	26±301	64±678	201±1386	0	86±964	8.8±162.0	0	335±1460	0	0	0	70±740
Female	39±382	148±1013	356±1945	83±1008	73±803	18±326	4.9±121.2	559±1828	6.0±141.8	0	0	118±965
<i>Total costs of social care</i>												
Male	462±2362	720±3394	1682±6531	813±4506	610±3435	1212±5081	937±4779	1625±5115	560±3299	327±2326	430±1734	806±3932
Female	654±2526	1036±3794	1996±7181	908±5125	882±4061	1254±4684	724±3688	2393±6842	385±2138	330±2574	677±2202	1013±4295

Table 4.29. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and age

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL costs</i>												
65-69	59±486	131±1022	227±1595	113±1069	64±897	112±686	207±1495	474±2168	110±977	63±760	259±1117	143±1123
70-74	136±817	249±1174	438±2280	331±2094	112±976	318±1680	239±1423	731±3117	339±1924	232±1657	361±1328	292±1678
75-79	166±893	386±1659	640±2579	562±2297	277±1681	394±1841	451±2068	1024±3163	475±2284	108±689	269±1096	403±1898
80+	802±2024	1226±2940	1857±4075	774±3055	661±2304	932±2717	708±2506	2804±4960	576±2184	326±1645	946±2010	1106±2968
<i>IADL costs</i>												
65-69	50±598	105±1188	108±763	147±1824	86±1079	196±1511	80±592	83±937	72±1199	12±165	90±399	84±967
70-74	71±599	70±493	219±1620	115±718	162±1005	298±1533	164±931	221±1496	98±823	79±589	129±517	139±990
75-79	91±683	144±934	361±1896	336±2119	340±1416	184±944	143±794	395±2492	216±1426	91±528	88±360	207±1327
80+	415±1498	373±1757	868±2771	341±2015	980±2840	1118±3590	264±1520	860±2955	276±1290	144±618	262±622	558±2182
<i>Supervision costs</i>												
65-69	29±324	42±653	38±312	11±152	149±1669	119±1425	241±2363	41±659	7.6±148.5	109±1312	14±160	76±1107
70-74	81±791	93±1026	196±1487	158±1164	216±1660	157±1263	95±1307	40±629	0	112±915	54±568	108±1070
75-79	57±719	72±957	354±2115	608±4119	710±3326	151±802	222±1803	86±818	36±338	108±1099	6.7±89.5	202±1726
80+	221±1176	227±1334	966±3787	155±928	1153±3801	1070±4499	527±3639	396±2525	72±413	96±539	135±1027	473±2591
<i>Informal care costs</i>												
65-69	138±1058	278±2418	373±2591	272±2871	300±2806	428±2588	528±3770	598±2925	190±1952	184±2144	363±1562	302±2419
70-74	289±1672	412±2215	853±4651	604±3808	490±2858	773±3323	498±2810	992±4109	437±2569	423±2951	544±2064	538±2947
75-79	314±1694	602±2671	1354±5717	1506±6669	1328±5159	729±2795	816±3977	1505±4664	727±3651	306±2025	363±1468	812±3788
80+	1439±3694	1825±4789	3690±8694	1270±5502	2794±6796	3120±8114	1499±5675	4060±7657	925±3189	567±2506	1343±2971	2137±5882
<i>Paid home care costs</i>												
65-69	12±218	0	82±835	0	50±705	0	9.9±172.0	148±986	0	0	0	28±471
70-74	20±245	30±481	142±1162	0	76±992	0	0	185±1097	0	0	0	44±609
75-79	16±254	148±1008	188±1402	121±1220	187±1257	31±416	0	397±1550	17±235	0	0	105±900
80+	90±572	294±1417	785±2851	94±1072	193±1366	40±444	0	1414±2710	0	0	0	289±1503
<i>Total costs of social care</i>												
65-69	149±1143	278±2418	455±3013	272±2871	350±3079	428±2588	538±3809	746±3587	190±1952	184±2144	363±1562	330±2584
70-74	309±1763	442±2294	994±5110	604±3808	566±3269	773±3323	498±2810	1176±4840	437±2569	423±2951	544±2064	583±3168
75-79	330±1825	750±3073	1542±6367	1627±6970	1515±5583	760±2824	816±3977	1901±5455	743±3661	306±2025	363±1468	916±4122
80+	1529±3888	2120±5384	4475±10328	1363±5818	2987±7089	3160±8153	1499±5675	5474±9518	925±3189	567±2506	1343±2971	2426±6568

Table 4.30. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and dementia status

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL costs</i>												
Dementia	2203±2889	2574±3926	5616±5957	3718±6161	1723±3984	2457±4249	2508±4677	8062±6535	4048±5595	1413±3687	1455±2389	2945±4597
Questionable and mild	898±1743	1618±3378	3650±5083	3147±6146	1023±2831	2092±3842	1993±4102	6566±6354	1998±4132	930±2858	1191±2183	1897±3842
Moderate and severe	4283±3124	5333±4119	9329±5759	8518±5442	3498±5656	4662±5813	8589±6493	10753±6065	10380±4832	6430±6609	5784±1273	6025±5195
Non-dementia	58±458	236±1243	303±1716	177±1280	88±807	225±1288	181±1179	592±2372	86±766	54±644	265±1116	189±1216
<i>IADL costs</i>												
Dementia	1167±2150	1178±3187	2917±4968	1352±3692	1927±3789	2823±5392	600±1593	3160±5774	1713±4285	588±1417	430±754	1549±3568
Questionable and mild	608±1677	336±910	2028±4187	1329±3956	1281±2758	3026±5819	582±1658	2045±4669	690±2869	502±1372	376±722	1013±2925
Moderate and severe	2062±2503	3539±5373	4597±5871	2028±2868	3565±5316	1894±1856	1074±1278	5167±7008	4878±6207	1905±1993	1531±581	3145±4670
Non-dementia	34±532	42±383	130±898	140±1475	159±1129	201±1236	115±908	127±1075	40±466	18±206	91±416	91±824
<i>Supervision costs</i>												
Dementia	795±2166	840±2813	3136±6278	958±2588	3582±6860	2072±5810	1276±4686	1096±3389	208±646	857±2623	210±1040	1389±4147
Questionable and mild	283±1335	265±1518	2195±5512	699±1899	2145±5178	1335±4073	907±4208	700±2583	36±230	633±2419	63±402	794±3180
Moderate and severe	1610±2878	2455±4510	4912±7254	2839±5288	7230±9019	6326±10841	5368±7815	1808±4456	727±1104	3811±4326	2382±3297	3133±5834
Non-dementia	15±359	13±227	102±996	139±1854	170±1447	173±1618	169±2055	44±904	7.7±170.3	47±825	24±414	74±1057
<i>Informal care costs</i>												
Dementia	4164±5303	4591±7692	11669±13725	6028±10932	7232±10771	7351±10714	4383±9145	12317±10036	5968±8931	2858±6880	2095±3574	5883±9173
Questionable and mild	1790±3413	2219±4606	7874±12138	5175±10889	4448±8572	6453±9631	3481±8199	9311±7907	2725±6640	2065±5654	1630±2979	3704±7430
Moderate and severe	7954±5570	11327±10251	18838±13806	13385±11163	14293±12538	12883±14865	15031±12945	17728±11265	15985±7773	12146±12557	9697±3730	12304±10660

Non-dementia	107±936	291±1497	535±2960	456±3630	417±2612	598±3085	465±3098	763±3152	134±1120	119±1474	380±1630	354±2275
<i>Paid home care costs</i>												
Dementia	236±871	618±2042	2190±4448	341±2044	565±2164	68±618	34±319	2934±3276	0	0	0	624±2177
Questionable and mild	79±454	268±1338	1608±3892	0	207±1072	5.4±48.1	0	2140±3092	0	0	0	338±1624
Moderate and severe	484±1243	1611±3109	3290±5216	2453±5485	1475±3565	425±1590	372±1051	4362±3157	0	0	0	1464±3160
Non-dementia	10±208	51±584	104±998	24±540	66±843	9.8±220.3	0	270±1308	3.5±108.7	0	0	50±627
<i>Total costs of social care</i>												
Dementia	4400±5594	5210±8350	13859±15661	6368±11376	7797±11289	7420±10688	4418±9186	15251±11368	5968±8931	2858±6880	2095±3574	6507±10016
Questionable and mild	1869±3575	2487±5082	9481±14030	5175±10889	4655±8824	6458±9632	3481±8199	11451±9613	2725±6640	2065±5654	1630±2979	4043±8070
Moderate and severe	8439±5856	12938±10628	22128±15373	15838±12636	15768±12941	13308±14550	15402±12945	22091±11213	15985±7773	12146±12557	9697±3730	13768±11523
Non-dementia	117±1000	342±1702	639±3410	480±3745	483±2906	608±3118	465±3098	1033±4048	137±1129	119±1474	380±1630	404±2519

Table 4.31. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and number of physical diseases

Types of informal care	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>ADL costs</i>												
0	189±1010	196±1211	548±2427	239±1560	78±753	349±1709	216±1569	396±1957	46±479	156±1297	172±882	217±1376
1-2	302±1243	472±1864	802±2911	483±2422	129±982	473±2056	286±1441	1065±3364	716±2722	143±1047	384±1342	458±1997
3+	700±1907	1026±2653	1503±3800	1166±3700	259±1407	565±1972	956±3012	2564±5001	2161±4421	232±1488	851±1964	965±2865
<i>IADL costs</i>												
0	107±728	77±623	234±1501	128±1284	221±1145	225±1316	68±531	176±1494	27±393	64±494	62±324	125±947
1-2	162±959	163±1162	366±1735	334±2237	156±1204	655±2943	131±812	263±1784	304±1587	53±388	132±491	222±1430
3+	366±1494	340±1771	887±3010	203±895	356±1872	547±1660	403±1779	878±3078	857±3797	58±372	241±632	462±2037
<i>Supervision costs</i>												
0	79±794	104±1128	327±2371	219±2483	87±739	264±2428	121±1320	182±1736	17±233	107±947	36±535	127±1386
1-2	104±827	134±1122	332±1889	158±1075	345±2352	405±2318	306±2804	104±1066	27±234	124±1387	42±565	182±1556
3+	178±985	83±646	688±3013	203±1006	684±3037	453±2547	470±3092	65±940	0	0	64±326	334±2101
<i>Informal care costs</i>												
0	375±1962	376±2459	1109±5329	587±4163	386±1938	838±4052	405±2856	754±3798	90±984	328±2449	270±1467	470±2930
1-2	568±2342	768±3393	1500±5617	974±5168	630±3784	1534±5429	722±3904	1432±4570	1046±4110	320±2537	559±1999	862±3820
3+	1245±3446	1449±3985	3078±8121	1572±5041	1299±4923	1566±5042	1829±6262	3507±7232	3018±6778	290±1860	1155±2697	1760±5305
<i>Paid home care costs</i>												
0	11±161	46±571	255±1629	0	44±621	0	7.8±152.1	202±1129	0	0	0	48±641
1-2	40±383	99±826	345±1908	53±807	77±887	31±425	0	422±1614	12±204	0	0	107±918
3+	112±687	254±1334	317±1777	307±1939	130±1117	19±237	0	1017±2389	0	0	0	222±1280
<i>Total costs of social care</i>												
0	386±2008	423±2724	1365±6386	587±4163	429±2149	838±4052	412±2896	956±4554	90±984	328±2449	270±1467	517±3229
1-2	609±2486	868±3619	1844±6536	1028±5364	707±4068	1565±5438	722±3904	1854±5704	1059±4116	320±2537	559±1999	969±4182
3+	1357±3762	1703±4580	3395±8973	1878±5986	1429±5224	1584±5138	1829±6262	4524±8674	3018±6778	290±1860	1155±2697	1982±5849

Summary of this section

In this section, total costs, as well as the costs of medical care and social care, have been reported both at the private level and public level among the whole population. The main findings are summarised below:

- Cost are more frequently incurred for medical care than social care in the whole sample both at the private level and the public level.
- The distributions of costs of medical care and social care are different between the private and public levels. Costs of medical care are higher at the private level, while costs of social care are higher at the public level.
- The greater part of the cost of medical care comes from direct medical cost. For the costs of social care, the major costs are those for informal care, and within informal care costs the highest are for ADL. With some exceptions, paid home care costs are lower than the costs of informal care.
- Medication plays an important role in the cost of medical care at the private level. However, the prescription cost was not separately analysed at the public level as it was included in the cost of related services.
- Gender differences are not evident with regard to medical care and social care costs. Age is most clearly related to the cost of social care, while the relationship between age and medical care cost varies among sites.
- Participants with dementia have higher total costs and social costs, but not medical care costs. Costs increase with greater dementia severity.
- Physical disease is clearly associated with higher costs of medical care but is only modestly related to the cost of social care.

Section 5. Costs of care for participants with dementia and predictors of cost

In the previous section, costs have been calculated for all participants. This section reports costs among participants with dementia both at the private level and the public level. Cost distributions are shown in for key characteristics, including socio-demographic factors, clinical features of dementia, physical and psychiatric comorbidities, and different levels of dependency. Potential predictors are identified from characteristics of both the participants and their carers. Regression models are used to identify significant predictors.

5.1 Methodology

Cost generation and its distribution

Section 3 has described the methods for generating costs for each participant in the study. This section reports costs for those participants who had dementia. As with Sections 3 and 4, total cost was divided into the costs of medical care and social care. Cost of medical care was further divided into costs for direct medical care, non-direct care, and indirect care. Cost of social care was divided into informal care and paid care. Informal care cost was the sum of costs associated with ADL, IADL and supervision.

The cost data are summarised using means and standard deviations. Bar charts are provided to show the differences in cost among countries, and the distribution between formal and informal care costs. With regard to costs among participants with dementia, the following key factors were used to show the distribution of cost:

(1) Socio-demographic factors, including gender, age (65-69, 70-74, 75-79, 80+), education (no education, less than primary education, completed primary education, completed secondary education and higher education), marital status (single, married, other), whether the income was received by the participant (yes or no) and assets in

the family (below and above median level of assets in the sample for each country).

(2) Factors related to the symptoms of dementia included whether the participant had significant memory impairment (yes or no), number of impaired cognitive domains excluding memory (0 to 4), behavioural and psychological symptoms of dementia (BPSD) severity score (0, 1 to 4, 5+), overall severity (questionable and mild, moderate, severe) and subtype of dementia (not allocated, pure Alzheimer's disease (AD), pure Vascular Dementia (VD), mixed AD/VAD, pure Dementia with Lewy bodies (DLB), mixed AD/DLB, frontotemporal dementia (FTD))

(3) Other factors included the number of physical impairments causing at least some difficulty (three groups: 0, 1-2, 3+), whether the participant had depression (yes or no), number of ADL care (0, 1-3, 4-5), number of IADL care (0, 1, 2) and whether supervision was needed (yes or no).

The cut-off point of assets was determined according to the distribution of assets in that country among all participants. The distributions of number of assets in all countries are described in Table 5.1. The cut-off point was determined according to the number which was the closest number to the 50% percentile.

Diagnoses of dementia, depression and chronic diseases have been described in section 2. Only a brief summary is provided in this section. In brief, dementia was diagnosed using the previously validated 10/66 dementia diagnostic algorithm and/or DSM IV dementia criteria. Information in terms of memory and cognition was obtained from the Geriatric Mental State and cognitive tests, including the Community Screening Instrument for Dementia (CSI-D), and the modified CERAD 10 word list learning task with delayed recall. Informant reports of cognitive and functional decline were obtained from the CSI-D. BPSD was collected from the Neuropsychiatric Inventory (NPI). The severity of dementia was defined according to the clinical dementia rating (CDR). History and aetiology of dementia was determined according to the 'Dementia Diagnosis and Subtype (HAS-DDS)' schedule.

Physical impairments were measured using self-report questions. Only when a participant identified a problem as causing at least some difficulty was the impairment included in the physical impairment variable. The domains of the

Table 5.1. Distribution of number of assets, cumulative percentage by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Valid	2936	2006	1381	552	1965	1003	1000	1159	1002	1001	999	15004
Missing	8	5	0	0	0	0	0	1	0	4	0	18
Number of assets												
0	0.3%	0.3%	0.1%	0.7%	2.0%	0.2%	0.9%	0%	0%	1.3%	6.6%	1.0%
1	0.5%	2.2%	0.2%	3.3%	0%	0.4%	9.4%	0%	0%	4.2%	20.9%	3.1%
2	1.0%	6.8%	0.4%	6.9%	0%	1.3%	21.3%	0%	1.5%	13.2%	44.4%	7.1%
3	2.7%	15.2%	0.4%	16.1%	0%	3.8%	39.4%	0.4%	10.8%	36.4%	68.5%	14.1%
4	8.7%	32.1%	1.4%	36.2%	0%	7.5%	56.6%	3.3%	22.2%	62.1%	88.7%	23.8%
5	35.3%	54.2%	4.8%	69.0%	2.4%	16.3%	73.1%	52.1%	38.8%	75.1%	95.7%	41.4%
6	84.2%	90.7%	78.9%	98.0%	68.5%	65.4%	94.4%	95.2%	66.8%	95.7%	98.3%	83.8%
7	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Cut-off point for 50% level of Assets	5	5	6	4	6	6	4	5	5	4	2	5

impairments included problems with arthritis, vision, hearing problem, coughing, breathing, blood pressure, heart, gastrointestinal system, limbs and skin. Depression was measured according to a structured clinical interview, the Geriatric Mental State Examination and it was described according to the classification and definition of ICD-10.

Total cost, cost for medical care and cost for social care both in private level and public level are described for each characteristic.

Identification of cost predictors

Statistical methods

From observing the distribution of costs across the sample, it is clear that these data are highly skewed and that there are a large number with zero cost (Figure 4 and Figure 5).

Figure 4. Distribution of cost at the private level

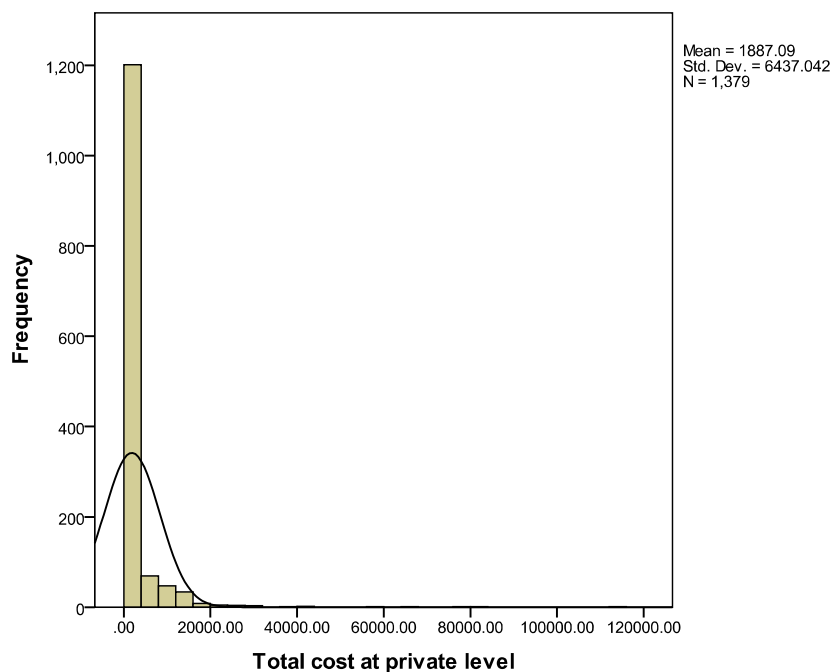
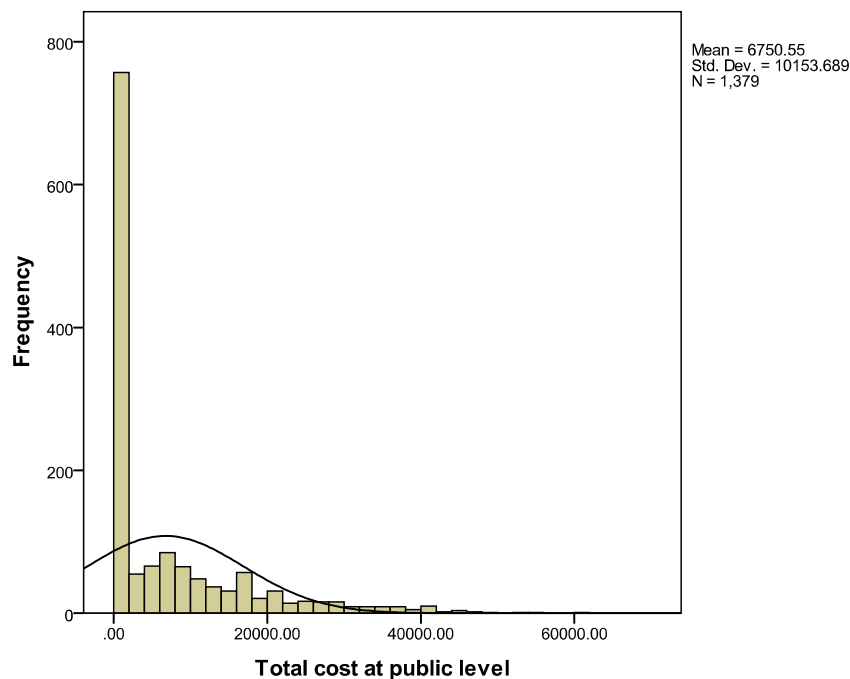


Figure 5. Distribution of cost at the public level



If this results in similarly distributed regression residuals then the widely-used ordinary least squares (OLS) linear regression model is not applicable as this assumes normally distributed residuals. Statistical methods which can deal with data with excessive zeros include zero-inflated negative binomial regression (ZINB) (Sousa et al., 2009), quantile regression (QR) (Koenker and Bassett, 1978), and two-part models (Katon et al., 2003; Willan and Briggs, 2006). Skewed data can be addressed by taking log transformations (Spottke et al., 2005) but this does not address the problem of excessive zeros and the results are difficult to interpret as it shows the mean of log cost. An alternative approach is to use bootstrapping which makes no assumptions about the underlying data distribution (Dodd et al., 2006). Bootstrapping is a method of randomly repeated independent sampling with replacement from the original database. After the bootstrapping procedure, simulated samples of the same size as the original database can be created and used for constructing confidence intervals and conducting statistical tests. This method allows linear regression to be used and so the regression coefficients represent the attributable cost of an independent variable when it changes one unit. Therefore, bootstrapped linear regression was used in modelling cost and was also used in Section 6 when estimating the attributable cost of dementia. In the bootstrapped models 1000 resamples were drawn and 95% confidence intervals for coefficients

were estimated according to the percentile method.

Potential predictors of cost

Variables that were seen as potential predictors of cost related to the characteristics of both the participants and their carers. Clinical and demographic predictors were considered. Details follow below.

- i. Demographic characteristics of the participants: gender, age, education, marital status, income, family assets. These were categorical variables with the exception of age and assets which were treated as continuous in the regression analysis.
- ii. Living arrangements of the participants: general arrangements (alone, with spouse only, with children, with other), living with children under 16 years old (yes/no)
- iii. Whether participants have private health insurance (yes/no)
- iv. Demographic characteristics of carers: gender, age (continuous), education (less than primary, completed primary, completed secondary, completed tertiary), marital status (single, married, other), in paid work (yes/no), relationship to the participants (spouse, child, child in law, other relative, non-relative).
- v. Symptoms of dementia: memory impairment score (continuous), number of impaired cognitive domains excluding memory, BPSD severity score (continuous).
- vi. Other mental or physical health problems: depression, hypertension (self-reported hypertension and/ or a blood pressure measurement meeting the World Health Organization/International Society of Hypertension criteria of SBP $\geq$ 140 mm Hg and/or diastolic blood pressure $\geq$ 90mm Hg), diabetes (self-reported), ischemic heart disease (self-reported), stroke (self-reported), COPD (self-reported), number of physical impairments causing at least some difficulty. All except the final variable were dichotomous variables (yes/no).

The CDR severity of dementia was not included as it was expected to be collinear with other dementia-related variables. The subtype of dementia would have been useful to include but many of the participants with dementia (26.2% to 83.3% across the seven countries) did not describe themselves as having a specific subtype of dementia.

In the model, all of the categorical variables were changed to dummy variables. This entailed leaving out one category against which the others were compared.

Dependent variables

Costs both at both the private level and the public level were analysed. For each level, four regression models were generated relating to the costs of medical care, social care, informal care, and total cost. Costs for paid care were same for both levels and so only one model relating to paid care was generated.

5.2 Results

Private level care costs for participants with dementia, by site

The numbers and percentages of participants with dementia incurring a cost at the private level are described in Table 5.2. The figures for medical care are much higher than for social care. Urban China has the highest percentage of participants incurring private level costs for both medical care and social care, while rural India and rural Peru have the lowest percentages for medical care and social care in respectively. Very few participants used paid care in rural Peru, Mexico, rural China or India.

Private level care costs among these participants with across the seven countries are shown in Table 5.3. The total cost per capita at the private level in the sample as a whole is I\$1,887. Of the total cost, 70.8% is due to social care, and 53.3% of social care cost is due to informal care. Cost varies across countries, ranging from I\$170 in urban and rural India to I\$8597 in urban China. Rural India has the lowest cost for medical care and urban India has the lowest cost for social care. Urban China has the highest cost for medical care and social care. Urban Peru has the second highest total cost, particularly due to the large contribution of paid care. A comparison of total costs across countries is further illustrated in Figure 6.

Costs for medical care are particularly due to direct medical costs in every country. Across the whole sample, the cost for social care is about two-thirds of the total cost, and the costs for informal care and paid care are similar. However, the situation regarding paid care varies across countries. There is no paid care in rural China and India and the cost is very low in Mexico, but very high in urban Peru and urban China. The proportion of total cost due to each component is shown in Figure 7.

Table 5.2. Number (%) of participants with dementia incurring private-level costs, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Medical care</i>												
Direct medical cost	222 (68.7%)	169 (69.8%)	22 (16.9%)	10 (27.8%)	88 (60.7%)	50 (53.8%)	35 (40.2%)	65 (77.4%)	29 (51.8%)	25 (33.3%)	49 (45.4%)	764 (55.4%)
Direct non-medical cost	22 (6.8%)	65 (26.9%)	29 (22.3%)	12 (33.3%)	27 (18.6%)	37 (39.8%)	22 (25.3%)	18 (21.4%)	2 (3.6%)	16 (21.3%)	51 (47.2%)	301 (21.8%)
Indirect cost of carers	32 (9.9%)	28 (11.6%)	6 (4.6%)	4 (11.1%)	12 (8.3%)	9 (9.7%)	5 (5.7%)	5 (6.0%)	1 (1.8%)	4 (5.3%)	21 (19.4%)	127 (9.2%)
Total cost for medical care	229 (70.9%)	177 (73.1%)	42 (32.3%)	15 (41.7%)	94 (64.8%)	64 (68.8%)	42 (48.3%)	65 (77.4%)	29 (51.8%)	32 (42.7%)	61 (56.5%)	850 (61.6%)
<i>Informal care</i>												
ADL costs	44 (13.6%)	30 (12.4%)	6 (4.6%)	3 (8.3%)	8 (5.5%)	9 (9.7%)	3 (3.4%)	7 (8.3%)	10 (17.9%)	1 (1.3%)	15 (13.9%)	136 (9.9%)
IADL costs	41 (12.7%)	21 (8.7%)	5 (3.8%)	3 (8.3%)	10 (6.9%)	5 (5.4%)	1 (1.1%)	4 (4.8%)	6 (10.7%)	2 (2.7%)	15 (13.9%)	113 (8.2%)
Supervision costs	22 (6.8%)	9 (3.7%)	5 (3.8%)	3 (8.3%)	11 (7.6%)	6 (6.5%)	2 (2.3%)	1 (1.2%)	3 (5.4%)	2 (2.7%)	5 (4.6%)	69 (5.0%)
<i>Informal care costs</i>	48 (14.9%)	32 (13.2%)	6 (4.6%)	3 (8.3%)	14 (9.7%)	10 (10.8%)	3 (3.4%)	8 (9.5%)	10 (17.9%)	2 (2.7%)	15 (13.9%)	151 (10.9%)
<i>Paid care</i>	27 (8.4%)	24 (9.9%)	29 (22.3%)	1 (2.8%)	14 (9.7%)	2 (2.2%)	1 (1.1%)	38 (45.2%)	0 (0%)	0 (0%)	0 (0%)	136 (9.9%)
<i>Total costs of social care</i>	63 (19.5%)	43 (17.8%)	30 (23.1%)	3 (8.3%)	23 (15.9%)	11 (11.8%)	4 (4.6%)	42 (50.0%)	10 (17.9%)	2 (2.7%)	15 (13.9%)	246 (17.8%)
<i>Total cost</i>	238 (73.7%)	185 (76.4%)	62 (47.7%)	16 (44.4%)	104 (71.7%)	68 (73.1%)	43 (49.4%)	74 (88.1%)	33 (58.9%)	32 (42.7%)	66 (61.1%)	921 (66.8%)

Table 5.3. Private level mean and standard deviation costs in 2008 international dollars among participants with dementia, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Medical care</i>												
Direct medical costs	121±241	19±47	94±380	17±47	1524±10083	246±438	336±1573	4584±11109	255±706	82±489	27±63	535±4421
Direct non-medical costs	18±102	2.1±13.5	14±36	16±31	27±125	13±25	27±88	15±51	1.1±5.7	14±76	6.4±11.7	14±73
Indirect cost of carers	1.8±8.1	3.3±29.1	1.3±8.5	2.6±9.9	1.7±8.1	1.8±6.6	1.2±6.6	1.1±5.0	0.1±0.8	0.2±1.0	0.9±4.4	1.7±13.7
Total cost for medical care	141±264	25±62	109±393	36±74	1552±10108	260±443	364±1585	4600±11130	256±710	96±564	34±71	551±4432
<i>Social care</i>												
<i>Informal care</i>												
ADL costs	627±2110	293±1390	504±4031	296±1130	278±1375	509±1832	44±239	713±2869	334±1010	33±288	85±256	385±1988
IADL costs	314±1353	100±529	207±1621	116±453	217±881	264±1739	9.6±89.3	236±1448	159±756	28±173	28±86	179±1084
Supervision costs	284±2761	63±399	134±1193	143±602	308±1346	108±527	65±521	114±1045	19±100	8.3±51.0	23±148	148±1502
<i>Informal care costs</i>	1225±4791	456±1834	844±6840	554±2176	803±2984	881±2937	118±737	1063±4674	512±1539	70±476	136±436	712±3686
<i>Paid care</i>	236±871	618±2042	2190±4448	341±2044	565±2164	68±618	34±319	2934±3276	0	0	0	624±2177
<i>Total costs for social care</i>	1461±5032	1074±2997	3034±8636	895±3187	1368±3986	949±2996	152±798	3997±5848	512±1539	70±476	136±436	1336±4501
<i>Total cost</i>	1601±5069	1099±3012	3143±8621	931±3186	2920±10758	1209±2953	516±1755	8597±12783	768±1768	166±731	171±442	1887±6437

Figure 6. Total mean private level cost of care for participants with dementia, by site

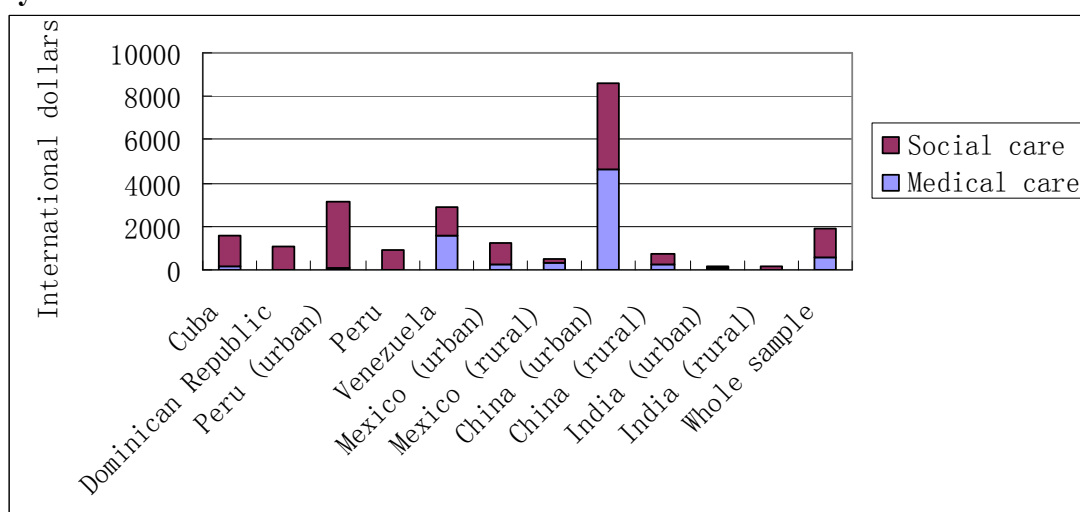


Figure 7. The distribution of private level care costs for participants with dementia, by site

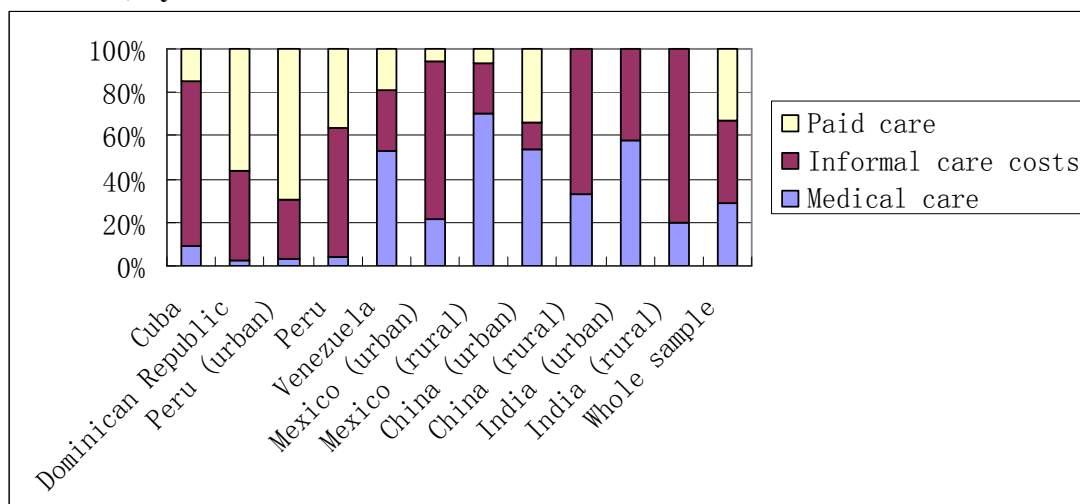
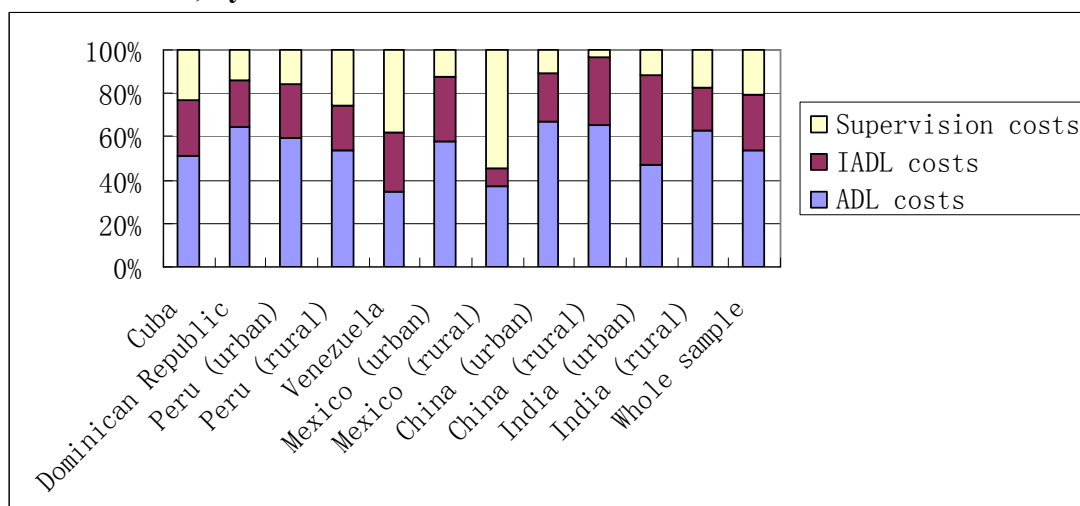


Figure 8. The distribution of private level informal care costs for participants with dementia, by site



With regard to informal care, the cost for help with ADL is higher than the cost for help with IADL and supervision, except in Venezuela and rural Mexico where the cost for supervision is the highest cost component of informal care. The distribution of informal care costs by site is summarised in Figure 8.

Public level care costs for participants with dementia, by site

The numbers and percentages of participants who have dementia incurring public level costs are shown in Table 5.4. In contrast to the findings at the private level, the figures for medical care are more similar to those for social care. Urban Mexico and urban China have the highest rates of medical care and social care costs at this level respectively. Rural China and urban India have the lowest percentages of participants with dementia incurring medical care and social care costs respectively.

Public level costs among participants with dementia across the seven countries are detailed in Table 5.5. The total cost per capita at the public level in the sample as a whole is I\$6570. Nearly all (96.4%) of the total is due to social care, and 90.4% of the cost of social care is due to informal care. Cost varies across countries, ranging from I\$2162 in urban and rural India to I\$15,894 in urban China. In comparison to the private level, the variation in medical care costs between the countries is less at this level. Here, the cost for medical care is smaller component of total cost than at the private level. Urban India has the lowest cost for medical care and social care, while urban China has the highest cost for medical care and social care. Urban Peru has the second highest total cost, and this is due to the contribution of informal care. Comparisons of the total mean costs across countries are shown in Figure 9.

Similar to the results at the private level, the cost for medical care is mainly related to direct medical costs. However, in the whole sample the cost for social care is here the largest component of total cost. Paid care only represents one-tenth of the cost for social care. The distribution of total cost is described in Figure 10.

With regard to informal care, the cost for help with ADL remains higher than the cost for help with IADL and supervision with the exception of Venezuela, where the cost for supervision is the major contributor to total informal care costs. The distribution of informal care costs is illustrated in Figure 11.

Table 5.4. Number (%) of participants with dementia incurring public-level costs, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Medical care</i>												
Direct medical cost	136 (42.1%)	103 (42.6%)	45 (34.6%)	12 (33.3%)	60 (41.4%)	60 (64.5%)	51 (58.6%)	37 (44.0%)	7 (12.5%)	25 (33.3%)	60 (55.6%)	596 (43.2%)
Direct non-medical cost	22 (6.8%)	65 (26.9%)	29 (22.3%)	12 (33.3%)	27 (18.6%)	37 (39.8%)	22 (25.3%)	18 (21.4%)	2 (3.6%)	16 (21.3%)	51 (47.2%)	301 (21.8%)
Indirect cost of carers	116 (35.9%)	94 (38.8%)	34 (26.2%)	13 (36.1%)	55 (37.9%)	57 (61.3%)	43 (49.4%)	31 (36.9%)	5 (8.9%)	25 (33.3%)	52 (48.1%)	525 (38.1%)
Total cost of medical care	140 (43.3%)	113 (46.7%)	49 (37.7%)	14 (38.9%)	64 (44.1%)	64 (68.8%)	52 (59.8%)	37 (44.0%)	7 (12.5%)	27 (36.0%)	62 (57.4%)	629 (45.6%)
<i>Informal care</i>												
ADL costs	151 (46.7%)	94 (38.8%)	71 (54.6%)	11 (30.6%)	41 (28.3%)	33 (35.5%)	24 (27.6%)	64 (76.2%)	27 (48.2%)	12 (16.0%)	32 (29.6%)	560 (40.6%)
IADL costs	137 (42.4%)	64 (26.4%)	60 (46.2%)	8 (22.2%)	45 (31.0%)	39 (41.9%)	14 (16.1%)	41 (48.8%)	15 (26.8%)	14 (18.7%)	30 (27.8%)	467 (33.9%)
Supervision costs	75 (23.2%)	30 (12.4%)	61 (46.9%)	7 (19.4%)	51 (35.2%)	28 (30.1%)	12 (13.8%)	12 (14.3%)	6 (10.7%)	11 (14.7%)	8 (7.4%)	301 (21.8%)
<i>Informal care costs</i>	165 (51.1%)	97 (40.1%)	74 (56.9%)	11 (30.6%)	67 (46.2%)	48 (51.6%)	24 (27.6%)	69 (82.1%)	27 (48.2%)	15 (20.0%)	32 (29.6%)	629 (45.6%)
<i>Paid care</i>	27 (8.4%)	24 (9.9%)	29 (22.3%)	1 (2.8%)	14 (9.7%)	2 (2.2%)	1 (1.1%)	38 (45.2%)	0 (0%)	0 (0%)	0 (0%)	136 (9.9%)
<i>Total costs of social care</i>	165 (51.1%)	99 (40.9%)	74 (56.9%)	11 (30.6%)	69 (47.6%)	49 (52.7%)	24 (27.6%)	71 (84.5%)	27 (48.2%)	15 (20.0%)	32 (29.6%)	636 (46.1%)
<i>Total cost</i>	230 (71.2%)	165 (68.2%)	92 (70.8%)	21 (58.3%)	104 (71.7%)	79 (84.9%)	61 (70.1%)	74 (88.1%)	28 (50.0%)	35 (46.7%)	71 (65.7%)	960 (69.6%)

Table 5.5. Public level mean and standard deviation costs in 2008 international dollars among participants with dementia, by site

Type of Cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Medical care</i>												
Direct medical costs	91±201	156±366	143±331	112±204	571±2963	278±452	459±1619	608±2052	24±75	35±166	47±109	216±1197
Direct non-medical costs	18±102	2.1±13.5	14±36	16±31	27±125	13±25	27±88	15±51	1.1±5.7	14±76	6.4±11.7	14±73
Indirect cost of carers	5.4±12.6	9.9±20.1	11±25	19±35	24±48	23±32	21±44	21±48	2.2±8.1	8.2±17.8	14±28	13±30
Total cost of medical care	114±254	168±385	167±368	148±256	622±3008	313±488	508±1641	643±2061	27±88	57±208	67±142	243±1219
<i>Informal care</i>												
ADL costs	2203±2889	2574±3926	5616±5957	3718±6161	1723±3984	2457±4249	2508±4677	8062±6535	4048±5595	1413±3687	1455±2389	2945±4597
IADL costs	1167±2150	1178±3187	2917±4968	1352±3692	1927±3789	2823±5392	600±1593	3160±5774	1713±4285	588±1417	430±754	1549±3568
Supervision costs	795±2166	840±2813	3136±6278	958±2588	3582±6860	2072±5810	1276±4686	1096±3389	208±646	857±2623	210±1040	1389±4147
<i>Informal care costs</i>	4164±5303	4591±7692	11669±13725	6028±10932	7232±10771	7351±10714	4383±9145	12317±10036	5968±8931	2858±6880	2095±3574	5883±9173
<i>Paid care</i>	236±871	618±2042	2190±4448	341±2044	565±2164	68±618	34±319	2934±3276	0	0	0	624±2177
<i>Total costs of social care</i>	4400±5594	5210±8350	13859±15661	6368±11376	7797±11289	7420±10688	4418±9186	15251±11368	5968±8931	2858±6880	2095±3574	6507±10016
<i>Total cost</i>	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154

Figure 9. Total mean public level cost of care for participants with dementia, by site

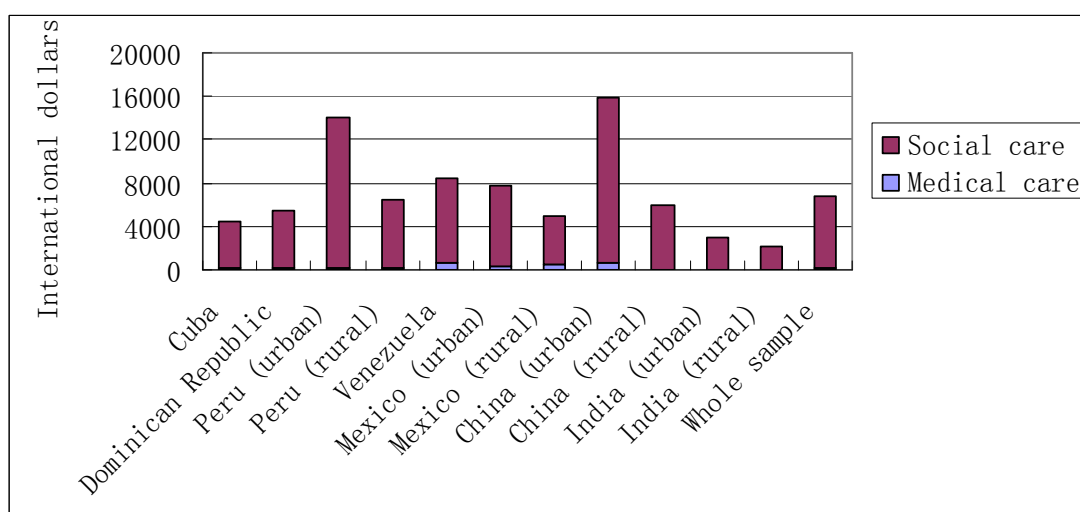


Figure 10. The distribution of public level care costs for participants with dementia, by site

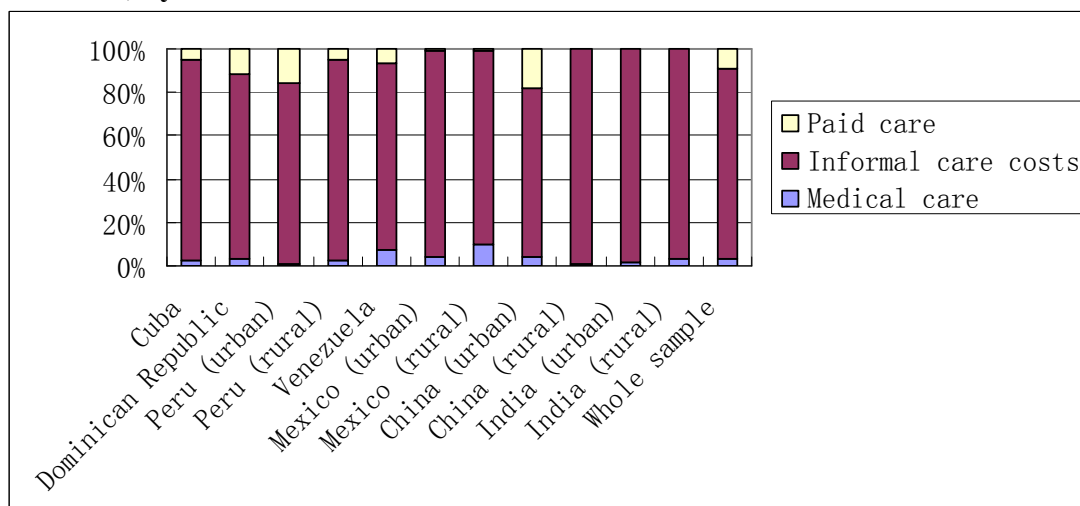
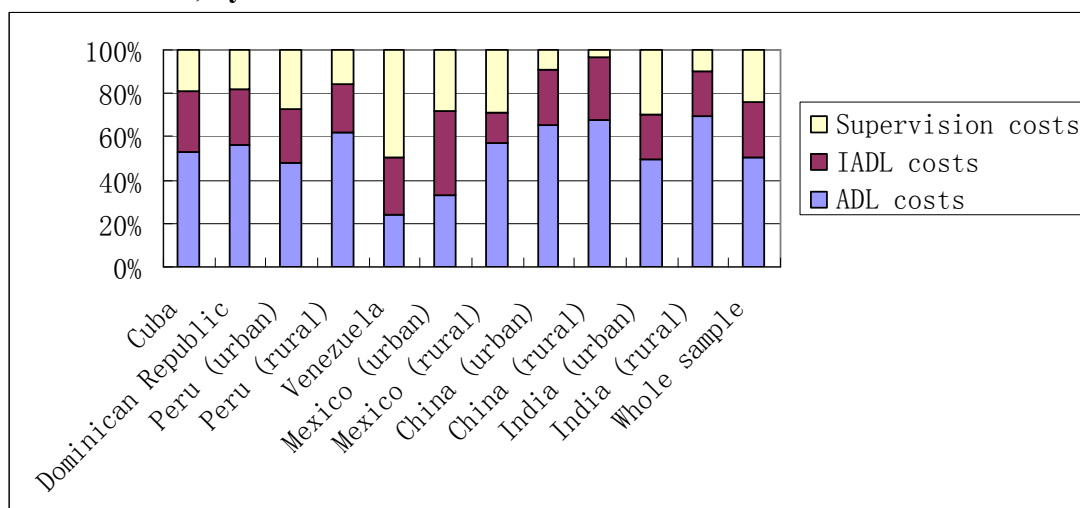


Figure 11. The distribution of public level informal care costs for participants with dementia, by site



Cost distribution

The relationships between the cost for medical care, cost for social care, and total cost at both the private and public levels and the participant characteristics described earlier are detailed in Tables 5.6 to 5.21. Detailed descriptions of cost distribution is not included in the thesis, as the main objective here is to identify predictors of cost. The figures for each site in different categories presented in these tables can be as a reference source for future cost-of-illness studies, but caution is required as the sample size sometimes is limited.

From these tables the following key findings have emerged:

- There is no big difference in costs between men and women in each country (Table 5.6).
- There is no tendency for cost at the private level to change with increasing age. However, this relationship is apparent for costs of social cares and total costs at the public level (Table 5.7).
- Higher costs occur for those with higher levels of education (Table 5.8).
- Married participants have the highest costs than non-married participants, except for the cost of social care at the private level (Table 5.9).
- Present of participant income is related to cost only at the private level (Table 5.10).
- Wealthier families (defined according to the number of assets) tend to have higher costs than poorer families (Table 5.11).
- There is no major difference in cost between those participants with and without impaired memory (Table 5.12).
- Cognitive impairment (Table 5.13), BPSD severity (Table 5.14) and overall severity of dementia (Table 5.15) is related to the cost of social care but not the cost of medical care.
- Pure VD has the highest cost for medical care among different subtypes of dementia. Total costs among pure VD Mixed AD/DLB are higher than for other types of dementia (Table 5.16).
- Participants with more physical impairments have higher costs (Table 5.17).

Table 5.6. Cost differences (in 2008 international dollars) between female and male participants with dementia, by site

Gender	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
Male	1448±3858	693±2097	3473±12744	536±1724	3507±18794	1014±2200	879±2687	8948±15408	838±1926	77±262	229±469	1965±8553
Female	1667±5515	1275±3320	2975±5527	1128±3728	2360±5930	1277±3184	305±799	8380±11022	720±1678	219±901	150±432	1794±5155
<i>Private level- Medical care cost</i>												
Male	118±165	18±27	120±427	38±101	3313±18786	355±571	662±2520	6168±13891	336±1021	29±68	41±76	877±6860
Female	150±296	28±72	104±378	35±58	1281±4801	227±389	191±520	3635±9046	201±376	135±711	32±70	415±2711
<i>Private level- social care cost</i>												
Male	1329±3763	675±2087	3353±12750	499±1728	194±1179	659±2237	216±1067	2780±4116	503±1662	48±252	188±468	1088±4810
Female	1517±5494	1247±3305	2871±5558	1093±3729	1080±3388	1050±3227	115±596	4746±6623	518±1474	83±571	118±424	1379±4258
<i>Public level-total cost</i>												
Male	4149±6071	5228±8572	11455±15152	9341±14002	4316±8216	8261±11038	4813±9253	13645±11227	8367±11201	3824±7948	3053±4265	6350±9889
Female	4671±5381	5443±8282	15342±15810	5104±9845	7277±11183	7550±10706	4990±9784	17278±11739	4342±6678	2373±6224	1835±3353	6623±10013
<i>Public level- medical care cost</i>												
Male	115±209	192±335	211±473	46±105	288±582	388±657	679±2454	902±2441	27±79	82±271	97±220	258±1016
Female	114±272	158±405	145±302	199±293	994±4001	288±416	408±895	483±1796	27±95	42±160	56±99	244±1320
<i>Public level- social care cost</i>												
Male	4034±6077	5036±8580	11244±15237	9295±13925	4028±8077	7873±10875	4133±9088	12743±10562	8340±11190	3743±7917	2956±4133	6092±9775
Female	4557±5380	5285±8274	15197±15793	4905±9871	6283±10107	7262±10698	4583±9322	16794±11668	4315±6644	2331±6212	1779±3318	6380±9849

Table 5.7. Cost differences (in 2008 international dollars) between participants with dementia in different age groups, by site

Age groups	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
65-69	1164±2953	111±449	2181±4212	33±66	844±2603	169±239	1360±1864	6152±3462	2014±3030	24±55	138±455	955±2531
70-74	2034±4056	265±1292	9754±25873	761±2118	3685±7087	1228±2949	200±454	6985±11239	1316±2039	216±855	205±489	1772±6757
75-79	1607±3576	1066±2685	2892±6165	31±37	8913±23558	1772±3302	308±764	5985±7995	588±1780	636±1597	49±90	2252±8274
80+	1546±5842	1503±3588	2587±4933	1801±4642	1493±3911	866±2676	594±2176	10372±15230	265±690	64±261	229±502	1975±6092
<i>Private level- medical care cost</i>												
65-69	156±160	14±19	236±718	33±66	188±294	169±239	99±142	1944±3024	360±572	24±55	32±53	200±783
70-74	163±334	21±78	281±651	13±24	746±1474	145±237	200±454	4756±11434	613±1432	29±77	38±83	410±2737
75-79	162±225	16±26	257±636	31±37	6480±23534	216±473	308±764	3308±6181	220±413	636±1597	49±90	960±7468
80+	128±264	31±70	34±93	52±103	594±3005	320±484	455±2029	5450±13209	63±121	15±25	21±49	516±3748
<i>Private level- social care cost</i>												
65-69	1008±2912	97±446	1945±4271	0	656±2635	0	1261±1731	4208±4051	1654±3033	0	106±454	754±2393
70-74	1872±4034	244±1288	9473±25935	748±2117	2938±7163	1082±2988	0	2229±3292	703±1545	186±854	166±492	1362±6208
75-79	1444±3488	1050±2678	2635±6231	0	2433±4906	1556±3363	0	2677±3862	367±1505	0	0	1292±3482
80+	1418±5810	1472±3570	2553±4943	1749±4649	899±2662	546±2694	139±855	4922±7006	202±694	49±257	208±478	1459±4504
<i>Public level-total cost</i>												
65-69	3178±4022	5272±10716	7347±12619	152±235	5268±12110	9496±13430	22258±20462	17982±10489	10984±12055	1098±3971	1939±3457	5378±10287
70-74	4046±5112	3832±6857	18350±17797	9683±13445	6702±11608	4170±6407	1905±5751	13986±12302	8623±9750	5353±10066	2450±4316	5485±9094
75-79	3030±4917	4224±6763	15859±15088	3006±5072	12294±13611	4602±5646	6624±11301	14404±9556	5909±9597	3870±7181	1183±2800	6492±9834
80+	5177±5927	6283±8837	13569±15799	9011±13645	8892±10993	9675±12626	3332±5805	16641±12493	3135±5993	1911±4795	2578±3285	7480±10483
<i>Public level- medical care cost</i>												
65-69	184±290	171±322	240±758	152±235	128±200	907±1283	1050±2079	45±83	86±210	39±71	67±103	169±498
70-74	152±250	121±293	489±660	50±110	346±471	197±232	320±393	738±2024	36±95	23±52	99±209	190±548
75-79	113±209	146±241	174±272	109±180	1895±6835	209±367	476±987	121±188	20±61	297±552	55±71	319±2132
80+	98±263	190±457	121±253	216±335	440±1330	373±542	514±1984	908±2537	10±33	14±26	32±62	247±995
<i>Public level- social care cost</i>												
65-69	2994±4072	5101±10700	7108±12746	0	5140±12098	8589±12146	21208±19216	17937±10556	10899±12009	1058±3937	1871±3422	5210±10157
70-74	3894±5140	3711±6905	17861±17940	9633±13485	6356±11632	3972±6419	1586±5717	13249±11915	8587±9736	5330±10052	2351±4201	5295±9037
75-79	2917±4894	4079±6758	15685±15059	2897±5084	10399±12783	4393±5660	6148±11019	14283±9491	5889±9584	3572±7095	1128±2764	6173±9609
80+	5079±5920	6093±8831	13448±15814	8794±13628	8452±10474	9302±12598	2817±5539	15733±12193	3124±5987	1896±4800	2546±3257	7232±10350

Table 5.8. Cost differences (in 2008 international dollars) between participants with dementia with different education levels, by site

Education levels	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
No education	1242±2770	1014±3444	44±73	529±1724	1279±3322	1062±3096	503±2167	7235±12454	656±1498	218±930	190±472	1035±4016
Less than primary	1614±4214	1129±2684	2366±5936	74±124	2306±7158	1756±3250	541±1284	7319±11895	2474±3585	20±36	83±130	1615±4621
Completed primary	1448±6493	708±2633	1819±4080	2410±5350	1571±3957	914±1917	657±1468	7236±6350	83±134	123±328	12±28	1637±5028
Completed secondary and higher	1962±4291	715±2270	5027±12402	0	24427±12402	214±244	330±592	11585±16537	1628±2768	104±180	50	4342±12523
<i>Private level- medical care cost</i>												
No education	110±188	16±33	44±73	30±42	430±630	286±482	427±2117	4408±10930	228±401	129±732	32±66	404±2871
Less than primary	126±191	34±86	37±66	74±124	1921±6895	228±453	359±833	5536±12186	79±158	20±36	83±130	523±3438
Completed primary	132±251	19±21	106±404	25±52	422±942	254±315	62±138	2966±4464	42±70	53±130	12±28	301±1267
Completed secondary and higher	186±367	17±22	141±451	0	24427±451	214±244	144±200	5376±14028	1628±2768	104±180	50	1499±9772
<i>Private level- social care cost</i>												
No education	1132±2782	998±3427	0	499±1728	849±3134	776±3130	76±502	2827±3277	429±1288	89±590	158±466	631±2320
Less than primary	1489±4157	1095±2664	2330±5931	0	385±1236	1528±3311	182±1044	1783±3061	2395±3456	0	0	1092±3133
Completed primary	1316±6480	689±2631	1712±4105	2385±5347	1149±3677	661±1982	595±1330	4270±4736	41±130	70±306	0	1336±4767
Completed secondary and higher	1776±4217	698±2268	4886±12429	0	0	0	186±417	6209±8562	0	0	0	2843±7737
<i>Public level-total cost</i>												
No education	4785±6536	4331±8290	8843±15171	3195±7512	9506±12724	6731±10872	3000±7432	13106±9784	5614±7899	1021±2963	2205±3614	4622±8293
Less than primary	4440±5539	5914±8458	15642±11991	6521±14424	7660±10498	8060±8541	6002±10353	10375±9841	19182±14655	5297±9881	2497±4621	6391±8880

Completed primary	4546±5653	4308±8238	14118±15519	8448±11644	4358±9261	7539±13118	11776±17976	16205±10510	727±1235	3991±7958	1401±3398	6978±10710
Completed secondary and higher	4372±5349	7306±9532	14154±16378	15210±21510	2626±3861	14633±15323	7910±7854	21544±12934	6401±6016	16727±14542	76	10062±12614
<i>Public level- medical care cost</i>												
No education	146±293	117±236	55±134	153±274	635±1933	272±382	541±2107	164±317	31±95	46±168	66±140	184±845
Less than primary	97±244	192±436	187±280	212±321	1354±5640	478±683	536±1108	745±1814	0	4.3±9.1	115±206	349±1902
Completed primary	113±247	126±319	124±345	143±226	415±888	198±194	187±197	670±2331	0	106±324	12±28	191±691
Completed secondary and higher	134±275	143±292	234±431	0	776±752	32±48	351±340	1026±2843	104±180	56±96	76	295±1114
<i>Public level- social care cost</i>												
No education	4639±6436	4214±8311	8788±15049	3042±7564	8871±11626	6459±10818	2460±7254	12941±9771	5583±7869	974±2920	2138±3553	4438±8156
Less than primary	4343±5532	5721±8486	15455±12026	6309±14392	6307±9006	7582±8409	5466±9578	9630±9205	19182±14655	5292±9876	2382±4456	6042±8581
Completed primary	4433±5669	4183±8258	13994±15525	8305±11610	3943±8975	7341±13119	11588±18080	15535±10728	727±1235	3886±7937	1389±3403	6787±10673
Completed secondary and higher	4238±5374	7163±9379	13920±16447	15210±21510	1850±4138	14601±15355	7558±7740	20518±12590	6297±5873	16671±14487	0	9766±12485

Table 5.9. Cost differences (in 2008 international dollars) between participants with dementia in different marital status groups, by site

Marital status	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
Never married	894±2448	451±1803	7932±20523	20±31	688±1445	2611±4204	1.9±3.4	-	-	-	-	1852±8357
Married	1537±3896	364±1637	2553±4813	414±1492	3907±18819	630±1572	407±929	7212±10529	1068±2032	342±1084	118±267	1925±7172
Divorced/separated/widowed	1805±5974	1359±3347	2468±5326	2228±5141	2519±6414	1332±3280	609±2137	10535±15354	560±1557	27±52	196±504	1804±5674
<i>Private level- medical care cost</i>												
Never married	166±242	42±111	29±60	20±31	342±631	137±196	1.9±3.4	-	-	-	-	131±299
Married	147±231	12±16	143±440	40±67	3396±18774	297±460	269±702	3815±8826	455±1050	183±848	37±72	823±6225
Divorced/separated/widowed	134±285	27±63	110±416	42±101	1450±5307	256±459	440±1962	5698±13796	118±245	27±52	33±71	478±3502
<i>Private level- social care cost</i>												
Never married	728±2366	408±1781	7903±20501	0	346±1339	2474±4279	0	-	-	-	-	1721±8352
Married	1390±3799	351±1635	2410±4863	374±1497	510±2230	333±1557	138±616	3397±4962	613±1747	159±713	81±260	1102±3237
Divorced/separated/widowed	1672±5957	1332±3331	2358±5345	2186±5144	1069±3450	1075±3328	169±912	4837±6892	442±1400	0	163±498	1326±4276
<i>Public level-Total cost</i>												
Never married	3132±4422	6319±12206	17400±20370	1141±2866	5098±9773	11050±14421	15490±22432	15490	15490	15490	15490	6789±12346
Married	4752±5828	4483±7382	13909±14317	6671±10510	5550±10708	8299±10084	6539±11910	14362±11043	9021±9944	4575±8319	2234±3790	7245±10156
Divorced/separated/widowed	4696±5693	5480±8155	13300±14817	9893±14914	7077±10447	7038±10687	3383±6235	18038±12208	3886±7653	1610±5291	2128±3592	6058±9366
<i>Public level- medical care cost</i>												
Never married	109±206	273±588	141±237	127±186	369±567	253±253	30±53	30	30	30	30	187±373
Married	130±260	113±228	195±429	207±324	578±1588	421±660	388±871	391±1444	50±129	101±305	91±204	230±764
Divorced/separated/widowed	109±262	172±395	163±358	83±181	973±4308	266±396	604±1996	996±2685	11±36	22±50	56±99	268±1501
<i>Public level- social care cost</i>												
Never married	3024±4426	6046±12169	17259±20399	1014±2868	4729±9796	10798±14430	15460±22463	15460	15460	15460	15460	6602±12353
Married	4623±5844	4371±7382	13714±14377	6464±10634	4972±9601	7878±9980	6151±11392	13972±10680	8972±9911	4475±8288	2144±3662	7014±9966
Divorced/separated/widowed	4587±5687	5308±8158	13137±14806	9810±14782	6104±9555	6772±10658	2779±5806	17042±12199	3875±7652	1588±5297	2072±3556	5789±9208

Table 5.10. Cost differences (in 2008 international dollars) between participants with dementia with and without income, by site

Having any income	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
Yes	1608±5245	1309±3454	4307±10375	601±2915	3259±14166	1170±2953	254±721	9022±13054	1106±2363	206±858	104±365	2237±7426
No	1563±4022	872±2437	1088±3124	1681±3773	2630±6652	1414±3048	888±2566	1877±2713	515±1116	136±628	361±576	1191±3671
<i>Private level- medical care cost</i>												
Yes	144±265	28±68	72±257	18±35	2252±13965	282±474	254±721	4857±11432	390±1011	206±858	24±62	693±5218
No	126±256	22±55	174±556	78±116	950±4808	148±199	521±2320	540±476	156±335	14±37	62±89	267±2108
<i>Private level- social care cost</i>												
Yes	1465±5215	1281±3432	4235±10384	584±2918	1007±2867	888±2994	0	4165±5954	716±2054	0	80±365	1543±5077
No	1437±3930	850±2434	913±3126	1603±3783	1679±4738	1266±3094	368±1218	1337±2990	359±1009	122±626	298±571	924±3009
<i>Public level-total cost</i>												
Yes	4442±5598	5695±8379	17182±16620	3896±7663	7023±10310	6987±10344	3440±8299	15727±11578	7718±10081	2634±6475	1267±3114	6817±10213
No	4907±5602	5034±8349	8453±11997	12471±15995	9619±12836	11612±12237	7029±10835	18534±13260	4703±7921	3124±7271	4719±3871	6618±10044
<i>Public level- medical care cost</i>												
Yes	116±250	177±403	170±276	80±200	626±1356	321±487	476±931	681±2120	28±80	103±310	47±99	243±823
No	106±279	159±366	161±494	302±307	618±3917	275±505	553±2318	49±74	26±95	22±49	126±215	244±1761
<i>Public level- social care cost</i>												
Yes	4326±5606	5518±8345	17011±16647	3816±7697	6397±9735	6666±10290	2964±7606	15046±11304	7690±10063	2530±6422	1221±3078	6574±10068
No	4801±5568	4874±8380	8292±12008	12168±16046	9001±12406	11337±12195	6477±10829	18484±13279	4677±7897	3102±7267	4593±3762	6374±9922

Table 5.11. Cost differences (in 2008 international dollars) between participants with dementia with different levels of household assets, by site

Household assets	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
Bottom 50%	1541±6339	603±1998	3025±9197	1817±4384	3003±11854	1007±2805	465±1950	5839±7762	1326±2232	87±540	102±245	1656±6559
Top 50%	1649±4066	1854±3995	3575±6197	45±90	2690±6917	1759±3320	642±1164	11354±15967	434±1348	355±1053	242±574	2210±6260
<i>Private level- medical care cost</i>												
Bottom 50%	113±226	16±32	70±313	27±53	1596±11304	239±408	354±1810	2362±5224	358±1078	14±36	24±60	427±4372
Top 50%	159±285	39±88	251±588	45±90	1427±5616	318±533	390±817	6838±14602	195±348	294±1030	45±80	724±4515
<i>Private level- social care cost</i>												
Bottom 50%	1428±6312	587±1993	2954±9200	1790±4383	1406±4040	768±2835	112±769	3477±5224	968±1848	74±538	78±242	1229±4849
Top 50%	1490±4018	1816±3976	3324±6294	0	1262±3881	1441±3410	252±874	4517±6434	239±1272	61±284	197±568	1487±3972
<i>Public level-total cost</i>												
Bottom 50%	4580±5852	4736±7907	13320±14082	7470±11686	7387±10706	6342±10235	3677±7711	14404±12084	6870±6880	2627±6780	1894±3300	6503±9956
Top 50%	4422±5402	6354±8945	16597±20450	5562±11311	11326±14105	11516±11360	8021±12684	17384±11070	5470±10051	3606±7301	2440±3975	7082±10426
<i>Public level- medical care cost</i>												
Yes	100±213	150±352	145±381	141±261	341±746	293±442	518±1849	667±2265	19±70	44±199	75±176	219±834
No	124±278	196±430	249±308	154±257	1413±5723	368±602	482±976	619±1862	31±98	88±230	59±96	277±1608
<i>Public level- social care cost</i>												
Bottom 50%	4479±5871	4586±7917	13176±14112	7329±11693	7046±10629	6049±10166	3158±7408	13737±11942	6851±6864	2584±6764	1819±3183	6284±9897
Top 50%	4298±5390	6157±8929	16348±20460	5408±11302	9913±12888	11148±11381	7540±12192	16765±10693	5439±10027	3518±7271	2382±3950	6805±10184

Table 5.12. Cost differences (in 2008 international dollars) between participants with dementia with and without memory impairment, by site

Memory impairment	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
Yes	1186±3663	918±2518	1911±4020	302±1245	3250±12496	1115±2994	440±1129	7458±8760	613±1699	274±954	176±406	1583±5871
No	1973±6688	805±2382	862±2543	1089±3524	2167±5783	1132±2561	691±2676	9099±16822	136±322	11±24	41±120	1381±5275
<i>Private level- medical care cost</i>												
Yes	137±237	24±54	112±422	42±81	1914±11969	242±474	204±572	4399±8217	78±126	152±742	41±74	592±4955
No	130±206	25±68	88±319	31±65	1000±4290	298±401	691±2676	4235±12876	95±194	11±24	25±75	319±2681
<i>Private level- social care cost</i>												
Yes	1048±3631	894±2518	1798±4044	260±1248	1336±3942	873±3023	236±987	3059±4808	535±1660	122±626	135±392	990±3148
No	1843±6646	781±2365	774±2548	1058±3510	1168±4059	834±2618	0	4865±10113	41±130	0	16±98	1062±4384
<i>Public level-total cost</i>												
Yes	3228±4802	4375±7458	12199±14789	4043±10295	8483±11791	7304±10726	3276±5921	13398±11927	4364±8802	2026±5316	2277±3242	5663±9455
No	4805±5793	4404±6859	6625±12411	9914±12378	5722±9290	7439±10176	6507±12291	18460±11002	5392±10977	3256±7748	621±2192	5330±8608
<i>Public level- medical care cost</i>												
Yes	116±258	150±351	207±436	163±240	759±3592	315±481	278±411	652±1969	4.7±24.7	87±269	69±98	267±1458
No	123±274	181±422	94±167	142±311	421±958	323±518	986±2806	188±389	15±48	12±35	42±115	210±807
<i>Public level- social care cost</i>												
Yes	3112±4829	4224±7484	11992±14854	3880±10285	7724±11174	6990±10647	2998±5906	12746±11428	4360±8799	1938±5281	2208±3203	5395±9269
No	4682±5763	4223±6832	6531±12373	9771±12363	5301±8855	7116±10159	5521±11474	18272±10913	5377±10983	3244±7736	578±2110	5120±8474

Table 5.13. Cost differences (in 2008 international dollars) between participants with dementia with different numbers of impaired cognitive domains (excluding memory), by site

Cognitive impairment	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level- total cost</i>												
0	1133±3605	228±529	1321±3858	59±85	361±450	2796±4721	21±40	3677±5569	104±285	185±686	140±392	564±2191
1	481±1510	574±1859	1342±3304	2.0±4.9	1633±4329	1070±3120	604±2495	8021±10644	87±151	219±991	76±159	987±3468
2	637±1747	738±2211	1535±4601	98±128	1118±2831	1107±2541	382±841	6051±10077	602±1360	27±61	183±420	1126±3674
3	3054±6380	1698±3337	4684±5538	4443±5605	6980±22128	1677±3322	784±1803	7934±7176	1918±2836	0	429±718	3694±9143
4	3606±8793	3530±6042	7737±20419	3650±7295	4103±6584	105±99	799±1401	26432±29444	1150±1483	156±221	1312±1668	4859±12060
<i>Private level- medical care cost</i>												
0	61±59	11±10	30±94	59±85	258±367	214±260	21±40	3260±4731	73±173	39±100	28±60	191±1136
1	139±267	27±62	133±431	2.0±4.9	847±3577	258±505	576±2491	5939±10765	40±102	219±991	34±75	465±2791
2	156±336	21±63	36±88	98±128	530±1217	329±453	278±616	1298±2048	157±164	27±61	42±93	252±770
3	133±202	27±77	130±447	36±34	5428±21917	95±135	239±519	3081±5768	736±1258	0	49±77	1098±7848
4	151±237	30±47	238±652	1.5±2.9	201±327	105±99	204±198	18950±29605	55±76	156±221	66±94	985±7020
<i>Private level- social care cost</i>												
0	1072±3578	216±527	1291±3867	0	102±324	2581±4835	0	418±1182	32±114	146±683	112±375	372±1796
1	342±1505	546±1857	1208±3323	0	786±2649	812±3141	28±162	2082±3304	47±123	0	41±146	522±2045
2	481±1726	717±2213	1498±4604	0	588±2079	778±2603	104±589	4753±9580	445±1407	0	141±423	874±3442
3	2921±6262	1671±3304	4554±5619	4407±5588	1552±4722	1582±3348	545±1808	4853±3211	1182±2517	0	380±722	2596±4719
4	3456±8766	3501±6008	7499±20464	3648±7296	3902±6494	0	595±1330	7482±4777	1095±1519	0	1246±1762	3874±9542
<i>Public level-total cost</i>												
0	2387±4942	1185±2580	5991±8824	301±390	1541±3391	3625±4417	245±265	4891±7494	682±2027	1627±3880	1463±2651	2048±4523
1	1427±2621	2293±4485	7614±13276	1757±6176	3497±6868	3721±6317	2760±8703	11752±10969	4248±9629	1296±5012	1652±3063	3036±6764
2	2972±4721	3757±7054	10629±15716	9688±17223	6721±9763	8497±9672	5037±9426	15523±12665	3350±6086	3082±8093	2657±3855	5924±9692
3	7357±6270	9391±9061	20721±15659	17902±10570	14466±15018	19340±15186	6487±7473	20107±9208	11217±10818	11710±12879	4267±4664	12830±12130
4	9933±4950	16890±11040	25565±13902	19824±10371	16900±12817	20997±29695	20680±11543	24028±10979	13976±4157	18541±11064	14828±2607	15498±10941
<i>Public level- medical care cost</i>												
0	50±99	147±340	110±197	301±390	50±99	190±212	245±265	114±173	12±42	73±240	53±88	92±209
1	117±253	194±461	251±558	41±127	336±777	285±420	782±2519	1120±2679	0	56±221	52±84	256±971
2	125±228	122±224	129±225	224±197	517±1000	387±607	420±845	118±314	7.6±24.0	20±21	66±151	210±502

3	112±278	205±461	173±390	157±268	1830±6508	216±380	241±351	882±2742	76±154	0	99±145	431±2455
4	114±291	135±253	141±247	27±54	156±293	384±543	159±204	649±808	26±58	83±118	538±761	156±332
<i>Public level- social care cost</i>												
0	2336±4950	1038±2500	5881±8830	0	1490±3414	3436±4208	0	4777±7333	671±2022	1555±3828	1410±2626	1956±4496
1	1310±2598	2098±4511	7362±13378	1716±6187	3161±6506	3436±6312	1978±7732	10632±9667	4248±9629	1240±4960	1600±3019	2780±6516
2	2847±4705	3635±7043	10500±15664	9464±17192	6204±9703	8110±9588	4616±9126	15405±12659	3342±6091	3062±8102	2592±3771	5715±9626
3	7245±6318	9186±9049	20548±15742	17745±10391	12636±13929	19124±15167	6246±7577	19225±9519	11141±10786	11710±12879	4168±4590	12400±11956
4	9819±4941	16754±11004	25424±13770	19797±10411	16744±12796	20613±29152	20521±11623	23380±10554	13950±4186	18458±10946	14290±3368	15343±10867

Table 5.14. Cost differences (in 2008 international dollars) among participants with dementia with different BPSD severity scores, by site

BPSD severity score	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
0	972±2650	160±532	1759±4450	40±79	482±985	287±633	1038±3149	8701±13332	260±819	175±819	13±49	1950±6565
1-4	762±2264	752±2002	2553±4660	16±38	2290±6115	900±2251	190±664	5683±5924	879±1894	223±881	270±560	1215±3387
5+	2297±6532	1284±3346	3864±11024	2540±5020	4193±14533	1665±3620	547±1309	12897±17239	2084±3024	67±145	229±498	2308±7781
<i>Private level- medical care cost</i>												
0	148±340	24±59	7.1±19.7	40±79	164±204	287±633	843±3107	5360±12364	91±156	4.9±9.1	13±49	1060±5541
1-4	121±297	23±72	115±452	16±38	834±4021	266±419	89±291	2024±3769	289±506	181±857	21±48	280±1582
5+	151±217	26±59	128±394	61±99	2615±14099	249±407	359±854	6106±14009	226±400	67±145	59±92	521±5151
<i>Private level- social care cost</i>												
0	824±2632	136±528	1752±4454	0	318±878	0	195±686	3341±4821	169±812	170±816	0	889±2775
1-4	641±2241	729±2003	2438±4697	0	1456±4864	634±2279	101±580	3659±3852	589±1660	42±236	249±543	934±2893
5+	2146±6486	1259±3328	3736±11040	2478±5037	1578±4110	1416±3689	187±1060	6791±9700	1858±2821	0	169±504	1787±5747
<i>Public level-total cost</i>												
0	2962±4462	5420±10507	7482±10719	178±354	2152±3702	2515±3323	2906±5751	15104±11205	1897±4302	1209±3148	578±1859	4714±8271
1-4	3384±5299	4612±8271	12786±14938	1729±5929	6251±10762	6165±11085	5171±11134	13361±11320	7556±7877	427±1599	2142±3348	5479±9598
5+	5627±5833	5580±8239	16149±16732	14527±14652	11791±12968	10192±11242	4297±7088	22006±12340	18696±13559	8194±10775	3500±4406	8251±10852
<i>Public level- medical care cost</i>												
0	167±299	105±262	80±176	178±354	136±283	269±383	954±3084	587±1770	7.6±30.6	70±296	19±50	249±1151
1-4	98±211	196±459	208±528	135±271	316±834	314±476	382±897	654±2175	48±131	55±192	38±57	200±678
5+	112±266	166±373	160±252	167±208	1012±4224	325±527	378±797	845±2837	12±33	46±78	122±204	271±1500
<i>Public level- social care cost</i>												
0	2795±4460	5314±10341	7402±10771	0	2016±3729	2246±3243	1952±5075	14517±10782	1889±4303	1139±3057	558±1864	4465±8040
1-4	3286±5309	4415±8330	12578±15021	1594±5962	5936±10641	5851±10994	4789±10613	12708±11210	7508±7822	372±1464	2104±3334	5279±9511
5+	5515±5829	5414±8234	15989±16715	14360±14642	10778±12368	9867±11225	3919±6749	21160±12479	18683±13565	8148±10771	3379±4301	7979±10716

Table 5.15. Cost differences (in 2008 international dollars) between participants with different levels of dementia, by site

Severity of dementia	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
Questionable and mild	658±1992	499±1662	1702±3907	610±2323	2597±11818	1056±2885	494±1807	5475±7440	216±697	173±756	110±302	1080±4711
Moderate and severe	3096±7534	2770±4804	5866±13310	2922±6524	3741±7488	2071±3289	735±1190	14215±17768	2427±2782	62±140	1052±995	4188±9454
<i>Private level- medical care cost</i>												
Questionable and mild	129±228	23±59	83±340	41±78	1748±11470	254±450	364±1654	3076±6958	85±143	98±584	30±68	439±4088
Moderate and severe	159±312	30±70	159±479	3.5±5.2	1054±5359	292±418	364±598	7344±15936	770±1300	62±140	94±93	870±5285
<i>Private level- social care cost</i>												
Questionable and mild	529±1981	476±1659	1619±3923	569±2319	849±3156	802±2916	130±773	2400±3425	130±689	75±492	80±288	641±2314
Moderate and severe	2937±7479	2740±4776	5708±13346	2918±6526	2687±5391	1778±3414	372±1051	6872±7947	1657±2578	0	958±1077	3318±7588
<i>Public level-total cost</i>												
Questionable and mild	1962±3556	2593±5030	9667±13965	4994±10630	5096±9321	6661±9647	3838±8526	11740±9730	2635±6491	2253±5934	1622±2960	4164±8127
Moderate and severe	8558±5852	13125±10630	22260±15454	15951±12477	16850±13167	13785±14525	15659±12760	23371±11095	16076±7758	12180±12604	9961±3788	14126±11644
<i>Public level- medical care cost</i>												
Questionable and mild	112±235	162±384	186±429	153±266	440±1182	284±429	533±1716	289±989	5.4±25.9	58±214	54±97	203±715
Moderate and severe	119±282	187±390	132±208	113±199	1083±5354	476±738	257±414	1281±3117	91±158	33±75	265±390	358±2064
<i>Public level- social care cost</i>												
Questionable and mild	1850±3562	2431±5038	9481±14030	4841±10599	4655±8824	6376±9598	3305±8023	11451±9613	2630±6493	2194±5910	1568±2916	3962±8005
Moderate and severe	8439±5856	12938±10628	22128±15373	15838±12636	15768±12941	13308±14550	15402±12945	22091±11213	15985±7773	12146±12557	9697±3730	13768±11523

Table 5.16. Cost differences (in 2008 international dollars) between participants with different subtypes of dementia, by site

Subtypes of dementia	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
Not allocated	467±2195	312±1368	369±1136	360±1409	1141±2653	487±1377	392±1938	3982±5188	381±1040	100±523	142±447	555±2045
Pure AD	1516±3369	1126±2937	5229±12677	1487±4605	1874±5863	1044±2565	1292±1913	10873±13718	246±542	656±1540	336±245	2364±6771
Pure VD	2336±4154	1453±3029	3435±5154	89±174	1993±5162	1210±2720	308±319	10886±15802	2351±2907	84±112	290±325	3243±7776
Mixed AD/VAD	1036±1940	2976±6628	0	0	3918±5541	0	0	-	4640±4594	0	469	1744±4324
Pure DLB	1762±3918	1224±2964	3897±5614	3937±6734	378±300	304	0	-	-	5.5±7.7	60±83	1474±3431
Mixed AD/DLB	7938±18688	1528±3244	5263±7452	5263	24767±7452	1241±2640	424±686	5254	5254	0	813±1115	5566±16731
FTD	3579±10258	301±639	1087±3526	1087	4884±7986	4863±6119	0	4003±5492	360	20	162±179	2460±5954
<i>Private level- medical care cost</i>												
Not allocated	147±291	26±69	163±492	27±50	358±956	258±389	392±1938	1998±3290	68±147	31±84	26±60	229±1068
Pure AD	119±249	15±26	106±390	28±66	1029±4920	256±474	410±968	4374±10470	91±115	523±1530	87±90	486±3194
Pure VD	167±245	20±28	20±45	89±174	1492±5051	466±630	308±319	7283±15215	1094±1629	84±112	76±132	1434±6665
Mixed AD/VAD	92±131	71±132	0	0	332±469	0	0	-	876±730	0	42	109±248
Pure DLB	260±369	8.9±18.3	7.6±10.8	56±34	378±300	304	0	-	-	5.5±7.7	13±9	111±232
Mixed AD/DLB	261±343	21±28	308±790	308	16602±790	51±70	424±686	0	-	0	12±18	1950±14295
FTD	162±195	58±144	65±93	65	75±128	126±316	0	660±764	360	20	162±179	116±227
<i>Private level- social care cost</i>												
Not allocated	320±2082	286±1363	206±1058	333±1411	783±2469	228±1351	0	1985±3543	313±1038	69±518	116±439	327±1589
Pure AD	1398±3349	1111±2937	5123±12694	1459±4614	846±2898	788±2592	882±1794	6499±8896	155±557	134±422	249±276	1877±5788
Pure VD	2169±4036	1433±3025	3415±5154	0	501±1461	744±2784	0	3603±3421	1258±2395	0	214±370	1808±3413
Mixed AD/VAD	943±1958	2905±6549	0	0	3587±5072	0	0	-	3764±5323	0	427	1634±4259
Pure DLB	1502±3893	1215±2962	3890±5621	3880±6721	0	0	0	-	-	0	48±82	1363±3438
Mixed AD/DLB	7677±18679	1507±3231	4955±7623	4955	8166±9212	1189±2660	0	5254	5254	0	801±1132	3616±9388
FTD	3417±10251	244±627	1022±3540	1022	4809±8035	4737±6211	0	3343±4728	0	0	0	2344±5955
<i>Public level-total cost</i>												
Not allocated	1795±3874	1877±5126	6813±11683	2288±6422	4336±8285	5106±8430	2609±7587	10517±10409	2524±5124	819±3019	1503±3170	2939±6719

Pure AD	4672±5175	5710±8891	15730±16298	7660±11675	9225±11671	8177±12689	3448±5129	15978±11177	4366±6248	10154±10166	5431±2932	7693±10420
Pure VD	7452±6764	8762±9547	20771±13112	18369±18797	10547±14835	10408±9806	18609±13325	19956±11431	17007±10898	10729±15140	8099±826	12555±11907
Mixed AD/VAD	7950±6962	7942±9577	3380±5854	14196	9796±13738	20671±29070	8038±11367	8038	25544±9087	11908±16841	7252	9408±10232
Pure DLB	4682±5628	2582±4475	24068±11087	9706±16665	5559±10274	17199	9448±13361	9448	9448	20±28	852±1369	6407±9798
Mixed AD/DLB	10632±4881	7891±9039	22350±20735	22350	19127±14887	4976±8201	13935±15473	11066	11066	25007	3620±4985	11738±12313
FTD	3284±6407	3651±8288	10306±17913	10306	12174±10950	10064±9877	2810±3315	21508±18905	0	46	8106±7068	7907±11719
<i>Public level- medical care cost</i>												
Not allocated	106±273	189±478	165±440	148±257	258±489	297±431	669±2052	118±220	8.8±32.8	25±52	48±83	181±733
Pure AD	129±266	119±289	129±207	147±312	857±4869	288±351	272±438	933±2897	6.9±30.0	271±528	72±73	274±1836
Pure VD	100±239	162±301	130±203	116±169	904±2059	561±810	286±305	895±2144	114±194	12±16	160±247	381±1183
Mixed AD/VAD	79±107	172±304	0	0	41±58	58±82	308±435	308	114±161	0	108	110±210
Pure DLB	54±79	366±676	118±119	242±272	932±1278	21	0	-	-	20±28	58±38	289±644
Mixed AD/DLB	156±285	109±208	383±845	383	706±996	7.5±16.8	193±464	0	-	0	47±67	208±499
FTD	67±143	141±304	327±530	327	244±382	330±529	233±329	0	0	46	564±540	228±401
<i>Public level- social care cost</i>												
Not allocated	1689±3870	1688±5141	6648±11735	2141±6468	4078±8166	4810±8382	1940±6658	10399±10358	2515±5126	794±3005	1455±3147	2759±6599
Pure AD	4543±5171	5591±8877	15601±16226	7513±11767	8368±10987	7889±12652	3176±5142	15045±11142	4360±6241	9884±10244	5359±2892	7420±10269
Pure VD	7352±6777	8600±9560	20640±13128	18252±18661	9642±13779	9846±9535	18323±13291	19061±11075	16893±10928	10717±15157	7939±688	12174±11641
Mixed AD/VAD	7872±7016	7770±9558	3380±5854	14196	9755±13796	20613±29152	7730±10932	7730	25430±9248	11908±16841	7145	9298±10240
Pure DLB	4627±5596	2215±4058	23950±11176	9464±16392	4626±10595	17178	9448±13361	9448	9448	0	794±1375	6118±9801
Mixed AD/DLB	10476±4919	7782±9044	21967±21080	21967	18420±15292	4969±8200	13742±15669	11066	11066	25007	3572±5052	11530±12371
FTD	3217±6444	3510±8278	9979±18046	9979	11929±11036	9734±10053	2577±3644	21508±18905	0	0	7542±6558	7679±11764

Table 5.17. Cost differences (in 2008 international dollars) between participants with different numbers of physical impairments, by site

Different number of impairments	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
0	1525±6212	608±2320	3207±5581	16±29	2090±4800	555±1453	823±1656	3718±3474	201±617	146±717	300±716	1375±4404
1-2	1371±3521	1002±2550	3713±12546	1346±4066	1887±6243	1730±3750	532±2199	6243±8326	555±1171	216±800	99±243	1622±5256
3+	2742±6476	1625±3901	2173±4874	1073±2415	5103±17841	1054±2565	278±695	15304±18672	4007±3862	45±36	222±510	3118±9871
<i>Private level- medical care cost</i>												
0	88±160	11±17	188±573	16±29	123±229	270±506	325±778	1024±2287	14±39	119±695	10±18	143±587
1-2	168±323	25±69	57±224	35±89	1076±5102	243±355	510±2195	2393±4402	314±846	53±120	22±60	371±1985
3+	182±218	36±72	57±111	75±65	3944±17723	279±522	150±217	10312±18050	571±534	45±36	64±90	1470±8734
<i>Private level- social care cost</i>												
0	1437±6196	598±2319	3020±5645	0	1967±4833	286±1416	498±1540	2693±3221	187±620	27±191	289±717	1232±4379
1-2	1203±3466	977±2549	3656±12543	1312±4066	811±3337	1487±3826	22±142	3850±6769	241±889	163±799	77±240	1251±4752
3+	2560±6410	1588±3871	2116±4882	998±2444	1158±3285	775±2582	128±653	4992±5355	3436±3546	0	158±496	1649±4149
<i>Public level-total cost</i>												
0	3952±5284	3740±7649	13390±16540	3180±7185	10220±12171	8540±11372	6956±11457	13842±11924	1162±2917	3836±8060	2113±4528	6409±10393
1-2	4242±5464	5317±8651	12771±14394	7530±13404	5868±11189	9067±11908	3494±8339	14251±11378	6740±9218	1273±3512	1712±3061	6060±9564
3+	7221±6304	6778±8350	16995±16028	8697±9907	8702±11610	4316±6530	5886±9972	19796±11303	15130±11466	45±0	2853±3998	8579±10738
<i>Public level- medical care cost</i>												
0	81±194	79±241	192±515	138±206	104±246	196±330	492±1024	25±67	0	69±255	29±40	114±348
1-2	140±296	154±347	168±246	123±254	1003±5105	286±491	658±2228	377±1524	39±107	33±48	45±94	250±1573
3+	107±219	259±496	124±188	247±348	910±1743	507±593	270±328	1439±3031	17±39	45±0	117±205	408±1184
<i>Public level- social care cost</i>												
0	3871±5282	3662±7658	13198±16615	3042±7234	10116±12211	8344±11411	6464±11209	13817±11950	1162±2917	3767±8034	2084±4529	6295±10393
1-2	4102±5455	5163±8659	12603±14384	7407±13351	4865±10060	8782±11828	2836±7552	13874±10986	6701±9192	1240±3520	1667±3020	5810±9376
3+	7114±6350	6518±8349	16872±15983	8450±10133	7792±10750	3809±6236	5616±10011	18356±11481	15113±11470	0	2736±3878	8170±10531

- Participants with depression have higher cost for medical care than those without depression (Table 5.18).
- The number of types of ADL (Table 5.19) and IADL (Table 5.20) help needed is related to the cost of social care especially at public level.
- Supervision is only related to the cost of social care (Table 5.21).

Cost predictors

Private level medical care cost model

Results from the bootstrapped linear regression model for private level medical care costs are shown in Table 5.22. Participants in urban China have significantly higher costs (on average by I\$3864) compared to participants from Cuba (the reference category). Costs are significantly associated with the number of physical impairments (each additional impairment adding I\$335 to cost). Participants living with children, having male carers or non-relative carers, or suffering with COPD had reduced costs of medical care than otherwise. This model could explain 11% of cost variation.

Public level medical care cost model

In this model participants living in Venezuela, rural Mexico, or urban China have significantly higher medical care costs than people living in Cuba (Table 5.23). Participants with married carers have higher cost than those in other marital situations. If the participant had had a stroke then their cost was on average I\$167 more than otherwise. If the main carer was male carers or a non-relative then this had a negative association with the cost. This model could only explain 6% of cost variation.

Private level informal care cost model

Private level informal care costs are significantly higher for participants living with other people or who have carers who are in paid employment (Table 5.24). Participants with more severe cognitive impairment or BPSD also have significantly higher costs. Participants with dementia living in the Dominican Republic, urban Peru, and rural Mexico have significantly lower costs than those living in Cuba. The amount of variation in these informal care costs explained by the model was 13%.

Table 5.18. Cost differences (in 2008 international dollars) between participants with dementia with and without depression, by site

Having depression	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
Yes	2843±5897	1037±2516	267±670	1075±2417	8112±24571	888±1850	495±1160	5254	1778±3133	50±63	99±171	2059±9511
No	1493±4987	1119±3154	3409±8965	902±3352	1942±4678	1248±3065	519±1817	8637±12855	647±1538	182±778	184±475	1862±5863
<i>Private level- medical care cost</i>												
Yes	193±272	21±31	267±670	77±137	7056±24492	293±505	495±1160	0	90±144	50±63	53±98	1036±9027
No	136±263	26±69	95±358	28±54	514±2385	256±439	349±1632	4655±11186	276±748	102±602	31±65	480±3267
<i>Private level- social care cost</i>												
Yes	2650±5791	1015±2517	0	998±2444	1055±3139	595±1881	0	5254	1688±3012	0	46±157	1024±3084
No	1356±4958	1093±3136	3314±8978	874±3350	1428±4134	992±3109	170±841	3982±5882	371±1243	80±507	153±468	1382±4671
<i>Public level-total cost</i>												
Yes	5450±6526	4965±7219	9720±9835	14960±17841	10334±13664	5971±8169	4483±8274	13972	20102±13860	9722±11648	2979±3654	7039±9756
No	4432±5509	5505±8688	14424±16042	4827±9144	8058±11405	7946±11026	4976±9720	15917±11683	4302±6561	1986±5499	2010±3637	6709±10214
<i>Public level- medical care cost</i>												
Yes	111±165	149±300	501±704	88±139	1978±7112	395±631	284±394	0	0	63±92	107±154	410±2622
No	115±261	174±408	136±308	160±273	366±1074	304±471	533±1727	651±2072	30±93	56±219	60±139	219±839
<i>Public level- social care cost</i>												
Yes	5339±6555	4816±7224	9218±9950	14872±17757	8356±12424	5576±8008	4199±8376	13972	20102±13860	9659±11674	2872±3574	6629±9488
No	4318±5507	5331±8682	14288±16048	4668±9158	7692±11114	7642±10984	4443±9325	15266±11437	4272±6521	1931±5462	1950±3575	6490±10095

Table 5.19. Cost differences (in 2008 international dollars) among participants with dementia who received different level of ADL care, by site

Number of ADL care needed	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
0	212±724	143±929	245±908	32±58	2468±12019	630±2313	392±1826	4207±6295	62±107	128±635	16±38	595±4584
1-3	1804±2497	2086±3419	4389±6123	0	2171±3650	556±628	1310±2107	10178±13648	1092±2245	25±32	265±232	2681±5808
4-5	3664±8019	2860±4661	5918±12287	3272±5570	7728±9119	4073±4629	563±1066	9886±14248	1875±2421	477±1300	631±764	4304±8937
<i>Private level- medical care cost</i>												
0	113±214	23±63	141±457	32±58	1728±11676	248±444	392±1826	3023±4651	62±107	107±615	16±38	392±4297
1-3	197±472	23±28	5.7±13.4	0	600±1289	449±547	170±307	5909±13045	134±207	25±32	60±83	782±4387
4-5	164±227	29±70	108±379	50±109	2077±6772	104±214	365±755	4773±12379	730±1262	42±102	85±114	782±4728
<i>Private level- social care cost</i>												
0	100±700	120±925	104±798	0	740±3025	382±2311	0	1184±2329	0	21±168	0	202±1430
1-3	1608±2541	2063±3419	4383±6121	0	1571±3281	108±338	1140±2128	4269±3834	958±2176	0	205±250	1899±3436
4-5	3500±7964	2831±4630	5811±12310	3222±5582	5650±7679	3969±4704	198±768	5113±7101	1145±2109	435±1305	546±790	3522±7498
<i>Public level-total cost</i>												
0	461±1968	343±1218	604±1846	169±282	3514±7145	2643±5755	452±1767	4162±7930	2.6±14.1	265±1181	34±52	1007±3680
1-3	5778±3941	10722±8457	14310±10373	6084	17720±12195	15228±12055	8757±4500	13978±7445	7168±8658	9670±6222	4292±1146	11122±9463
4-5	10300±4433	14577±8506	28602±11923	22427±10480	26924±9565	18858±11064	21411±11951	21745±10183	16642±7672	19209±7001	8191±2600	17090±10789
<i>Public level- medical care cost</i>												
0	116±246	167±397	225±503	169±282	584±3382	282±421	452±1767	593±2219	2.6±14.1	38±142	34±52	226±1379
1-3	96±210	180±338	80±125	0	741±1949	576±746	359±374	283±463	24±55	540±772	124±133	284±848
4-5	119±281	166±384	132±201	109±193	673±1408	151±239	829±1576	806±2365	76±154	24±55	153±258	260±980
<i>Public level- social care cost</i>												
0	345±1954	176±1150	379±1749	0	2930±6323	2361±5665	0	3569±7379	0	227±1088	0	781±3347
1-3	5682±3950	10542±8481	14230±10324	6084	16979±11552	14652±12088	8398±4332	13695±7448	7145±8663	9130±6558	4168±1102	10838±9263
4-5	10181±4448	14411±8507	28470±11898	22318±10389	26250±9825	18707±10998	20583±11386	20939±9987	16566±7686	19185±6980	8038±2489	16830±10682

Table 5.20. Cost differences (in 2008 international dollars) between participants with dementia who received different level of IADL care, by site

Number of IADL care needed	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
0	759±5003	552±2394	1057±3240	31±56	2152±11784	874±2288	442±1826	6183±7718	327±977	31±83	15±37	977±5208
1	2555±4855	2651±3939	3429±4790	5331±7214	5350±9079	1406±2775	946±1417	12203±16752	2172±2874	6.0±10.6	534±655	3585±7787
2	3742±5435	2393±4079	6172±13064	2000±3465	3544±5689	1955±4479	642±347	1180±1417	696±984	1748±2135	845±986	3861±8679
<i>Private level- medical care cost</i>												
0	123±219	24±60	117±422	31±56	1509±11449	207±347	347±1699	2990±6214	227±766	31±83	15±37	400±4104
1	143±293	31±70	46±116	84±152	2512±8030	483±695	420±836	6840±15193	282±490	6.0±10.6	69±103	1082±5895
2	279±392	13±11	115±403	4.9±8.4	349±676	176±263	642±347	1180±1417	696±984	873±1960	178±98	258±639
<i>Private level- social care cost</i>												
0	636±5000	528±2383	939±3244	0	643±2964	667±2308	95±709	3193±3979	100±486	0	0	578±3074
1	2412±4800	2620±3917	3383±4821	5247±7260	2837±5055	923±2855	525±1229	5363±7478	1890±2719	0	464±688	2502±4765
2	3462±5278	2380±4077	6057±13087	1996±3456	3195±5854	1779±4543	0	0	0	875±1582	667±1010	3602±8718
<i>Public level-total cost</i>												
0	1014±2571	1844±4143	3188±8667	1389±3690	2721±6334	1566±3384	1893±5566	10789±9354	1504±3174	298±2156	155±778	2006±5255
1	9483±5242	15384±9541	16431±10248	23727±14197	21316±11602	11539±9763	21080±11293	21187±11468	18046±8711	12832±9104	7246±3027	14020±9812
2	8134±3841	13772±6549	29502±10994	25688±4222	20729±10873	21255±11475	18657±3317	21816±12775	19731±867	16293±8802	8253±1594	20976±12174
<i>Public level- medical care cost</i>												
0	122±267	179±421	176±455	157±268	281±609	208±306	411±1647	588±2125	15±56	25±51	33±52	187±744
1	86±206	130±262	185±309	183±260	1862±6600	545±712	1078±1690	735±2114	50±144	180±504	146±245	384±2080
2	198±347	208±248	149±209	0	655±2177	370±554	620±327	381±656	114±161	217±431	215±187	274±857
<i>Public level- social care cost</i>												
0	892±2551	1664±4099	3012±8699	1231±3717	2440±6209	1359±3384	1482±5412	10201±8792	1489±3142	273±2135	122±782	1819±5132
1	9396±5242	15255±9534	16246±10394	23544±14026	19454±11842	10994±9945	20002±10534	20452±11498	17997±8730	12652±9266	7099±2946	13636±9657
2	7936±3819	13564±6616	29354±10961	25688±4222	20074±9812	20885±11398	18037±3644	21434±12522	19618±1028	16076±8998	8038±1498	20702±12057

Table 5.21. Cost differences (in 2008 international dollars) among participants with dementia who receive or do not receive supervision, by site

Need supervision	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Private level-total cost</i>												
Yes	3427±8488	1841±3242	5845±11733	4665±6244	3907±6598	2206±4250	973±1867	7110±7549	1276±1254	959±1760	1234±994	3613±7823
No	1049±3256	994±2971	755±2679	30±55	2385±12449	780±2071	443±1739	8844±13481	708±1820	29±81	86±206	1405±5908
<i>Private level- medical care cost</i>												
Yes	144±232	17±23	98±358	62±130	798±3572	304±504	195±296	2549±3567	272±551	482±1457	129±131	358±1733
No	140±273	26±65	119±425	30±55	1961±12283	241±417	391±1703	4942±11917	254±731	29±81	27±59	605±4927
<i>Private level- social care cost</i>												
Yes	3284±8437	1824±3242	5747±11755	4603±6272	3109±5872	1902±4355	777±1902	4560±7055	1004±1377	477±1208	1105±1080	3255±7683
No	909±3221	968±2954	636±2670	0	424±1870	539±2083	52±358	3903±5676	453±1560	0	59±201	800±2858
<i>Public level-total cost</i>												
Yes	10725±4534	18860±8633	27512±12388	27088±8785	20313±11112	17984±12613	20799±14090	19543±10148	11927±4510	17780±7440	10541±3202	18648±11386
No	2636±4400	3470±6322	2104±4614	1550±3726	1966±5330	3317±5728	2385±5369	15286±11795	5283±9112	360±1394	1492±2733	3428±6722
<i>Public level- medical care cost</i>												
Yes	119±253	125±232	143±229	131±230	531±1530	439±539	616±1336	203±385	60±97	135±323	270±383	251±748
No	113±255	174±402	189±458	152±265	671±3570	260±457	490±1691	716±2215	23±87	43±182	51±88	241±1321
<i>Public level- social care cost</i>												
Yes	10606±4539	18735±8630	27369±12386	26958±8660	19782±10746	17546±12661	20184±13429	19340±10055	11867±4447	17646±7584	10271±3114	18398±11286
No	2523±4404	3296±6302	1915±4628	1399±3759	1295±3705	3058±5691	1895±4950	14570±11494	5260±9096	316±1312	1441±2699	3188±6507

Table 5.22. Linear regression model of private level medical care cost

Variables	Observed coefficients	Bootstrapped 95% confidence interval
Centre		
Cuba	Reference	
Dominican Republic	-121	-633 to 499
Urban Peru	-749	-1838 to 102
Rural Peru	-418	-1303 to 360
Venezuela	1806	-145 to 4761
Urban Mexico	-244	-902 to 389
Rural Mexico	194	-388 to 840
Urban China	3864	1619 to 6937*
Rural China	-35	-838 to 942
Urban India	868	-7.7 to 2335
Rural India	450	-239 to 1458
Male	237	-218 to 882
Age	-9.2	-36 to 12
Education level of participants		
No education	Reference	
Less than primary	-164	-965 to 463
Completed primary	-437	-1136 to 86
Completed secondary or higher	484	-938 to 2276
Marital status of participants		
Single	Reference	
Married	439	-176 to 1360
Divorced/widowed	316	-313 to 1203
Living arrangement of participants		
Living alone	Reference	
Living with spouse	118	-578 to 1096
Living with children	-586	-1323 to -48*
Living with other relatives	-339	-1123 to 358
Living with children under 16	-254	-656 to 100
Participants with any income	-11	-375 to 443
Number of assets in the family	88	-38 to 207
Participant has private insurance	804	-32 to 1952
Male carers	-595	-1187 to -178*
Age of carers	3.2	-12 to 24
Education level of carers		
Less than primary	Reference	
Completed primary	170	-248 to 606
Completed secondary	468	-193 to 1268
Completed tertiary	802	-376 to 2587
Marital status of carers		
Single	Reference	
Married	231	-168 to 810
Divorced/widowed	274	-228 to 935
Carers with paid work	2.7	-310 to 333
Carers' relationship to participants		
Spouse	Reference	
Children	-303	-1369 to 588
Children in law or other relatives	-437	-1313 to 307
Non-relative	-759	-1623 to -36*
Depression	794	-242 to 2302
Hypertension	174	-209 to 639
Diabetes	-385	-1392 to 466
Ischemic heart disease	-646	-1502 to 29
Stroke	-194	-1227 to 719
COPD	-1033	-2182 to -203*
Number of physical impairment	335	50 to 780*
Memory impairment score	61	-53 to 169

Number of cognitive impairment (not include memory)	236	-97 to 674
BPSD severity score	-25	-82 to 20
Constant	-427	-3358 to 1564

* Significant at 95% level, $R^2=0.11$, adjusted $R^2=0.07$

Table 5.23. Linear regression model of public level medical care cost

Variables	Observed coefficients	Bootstrapped 95% confidence interval
Centre		
Cuba	Reference	
Dominican Republic	-78	-359 to 111
Urban Peru	-69	-407 to 170
Rural Peru	-77	-570 to 238
Venezuela	574	73 to 1290*
Urban Mexico	160	-90 to 362
Rural Mexico	431	146 to 799*
Urban China	452	57 to 942*
Rural China	-166	-562 to 124
Urban India	105	-65 to 322
Rural India	148	-73 to 431
Male	-6.8	-211 to 189
Age	-1.3	-8.5 to 6.5
Education level of participants		
No education	Reference	
Less than primary	186	-35 to 440
Completed primary	-20	-191 to 112
Completed secondary or higher	143	-24 to 331
Marital status of participants		
Single	Reference	
Married	-43	-194 to 115
Divorced/widowed	27	-109 to 203
Living arrangement of participants		
Living alone	Reference	
Living with spouse	-82	-469 to 179
Living with children	1.5	-395 to 305
Living with other relatives	38	-335 to 351
Living with children under 16	-206	-530 to 7.2
Participants with any income	-128	-388 to 65
Number of assets in the family	36	-18 to 103
Participant has private insurance	206	-67 to 629
Male carers	-145	-284 to -40*
Age of carers	0.2	-4.6 to 5
Education level of carers		
Less than primary	Reference	
Completed primary	153	-39 to 406
Completed secondary	-12	-206 to 148
Completed tertiary	-44	-330 to 208
Marital status of carers		
Single	Reference	
Married	139	1.9 to 313*
Divorced/widowed	241	-69 to 724
Carers with paid work	73	-96 to 318
Carers' relationship to participants		
Spouse	Reference	
Children	44	-126 to 204
Children in law or other relatives	-32	-233 to 132
Non-relative	-209	-464 to -16*
Depression	204	-58 to 664
Hypertension	-105	-383 to 73
Diabetes	8.4	-218 to 182
Ischemic heart disease	-68	-242 to 94
Stroke	167	10 to 325*
COPD	-88	-298 to 114
Number of physical impairment	1.3	-60 to 46
Memory impairment score	26	-22 to 93

Number of cognitive impairment (not include memory)	1.2	-53 to 70
BPSD severity score	-0.3	-7.2 to 9.4
Constant	35	-587 to 649

* Significant at 95% level, $R^2=0.06$, adjusted $R^2=0.02$

Table 5.24. Linear regression model of private level informal care cost

Variables	Observed coefficients	Bootstrapped 95% confidence interval
Centre		
Cuba	Reference	
Dominican Republic	-660	-1311 to -51*
Urban Peru	-769	-1405 to -240*
Rural Peru	17	-1013 to 1146
Venezuela	-536	-1119 to 78
Urban Mexico	-387	-1341 to 481
Rural Mexico	-918	-1747 to -229*
Urban China	315	-1074 to 1955
Rural China	-275	-1291 to 653
Urban India	-122	-768 to 562
Rural India	-152	-825 to 458
Male	-26	-316 to 294
Age	12	-8.5 to 33
Education level of participants		
No education	Reference	
Less than primary	-11	-342 to 336
Completed primary	-57	-535 to 437
Completed secondary or higher	172	-557 to 859
Marital status of participants		
Single	Reference	
Married	-11	-575 to 545
Divorced/widowed	84	-492 to 656
Living arrangement of participants		
Living alone	Reference	
Living with spouse	541	-88 to 1306
Living with children	-27	-423 to 342
Living with other relatives	801	133 to 1548*
Living with children under 16	-130	-444 to 159
Participants with any income	29	-277 to 361
Number of assets number in the family	28	-70 to 128
Participant has private insurance	-117	-471 to 261
Male carers	-73	-648 to 723
Age of carers	0.07	-9.7 to 9.2
Education level of carers		
Less than primary	Reference	
Completed primary	-189	-503 to 103
Completed secondary	-86	-458 to 265
Completed tertiary	139	-365 to 686
Marital status of carers		
Single	Reference	
Married	-19	-522 to 523
Divorced/widowed	-252	-811 to 313
Carers with paid work	1480	1025 to 2004*
Carers' relationship to participants		
Spouse	Reference	
Children	543	-27 to 1150
Children in law or other relatives	227	-294 to 785
Non-relative	-99	-688 to 481
Depression	-109	-527 to 286
Hypertension	-81	-566 to 312
Diabetes	97	-321 to 575
Ischemic heart disease	603	-481 to 1741
Stroke	56	-444 to 572
COPD	274	-337 to 991
Number of physical impairment	45	-78 to 166
Memory impairment score	-69	-195 to 38

Number of cognitive impairment (not include memory)	374	133 to 665*
BPSD severity score	43	5.1 to 86*
Constant	-1825	-4416 to 417

* Significant at 95% level, $R^2=0.13$, adjusted $R^2=0.09$

Public level informal care cost model

Public level informal care costs are significantly greater for participants living in Peru, Mexico, China, and India than for those living in Cuba (Table 5.25). Older age, higher education attainment, and not living alone all are associated with higher costs. Participants with carers who are divorced have higher costs compared to those with single carers. There are higher costs if the participants had diabetes, stroke, greater physical impairment, severe cognitive impairment or more severe BPSD symptoms. Finally, participants with older carers have lower costs for informal care than those with younger carers. This model was relatively powerful, explaining 33% of the variation in public level informal care costs.

Private level social care cost model

Participants living in urban China have significantly higher private level social care costs than those living in Cuba (Table 5.26). Living with spouses or other persons, having income, having more assets in the family, having carers who are in paid work, having carers who are children or non-relatives all are associated with higher private level social care costs. More severe cognitive impairment or more severe BPSD are also associated with higher costs. One-fifth of the variation in cost was explained by this model.

Public level social care cost model

The predictors of cost for social care at the public level are similar to those at the private level (Table 5.27). Participants living in Peru, Mexico, China, or India have significantly higher costs than those living in Cuba. Older age and higher education level, and not living alone all predict higher costs. Higher costs are associated with diabetes, stroke, more physical impairment, more severe cognitive impairment and more severe BPSD symptom. If the carers are older then the costs are lower and men also have lower costs than women (on average by I\$1174). Thirty-five percent of variation could be explained by this regression model.

Paid home care model

Participants living in the Dominican Republic, urban Peru, or urban China have higher cost for paid home care than those living in Cuba (Table 5.28). Costs are significantly higher for participants who are married, with income, and having more

Table 5.25. Linear regression model of public level informal care costs

Variables	Observed coefficients	Bootstrapped 95% confidence interval
Centre		
Cuba	Reference	
Dominican Republic	30	-1281 to 1401
Urban Peru	5975	3194 to 8827*
Rural Peru	6729	2789 to 11484*
Venezuela	1106	-687 to 2794
Urban Mexico	5548	3186 to 7981*
Rural Mexico	2639	526 to 4661*
Urban China	9245	6849 to 11883*
Rural China	6539	3309 to 10124*
Urban India	3999	1911 to 6103*
Rural India	3931	2045 to 5819*
Male	-947	-2025 to 193
Age	76	8.4 to 138*
Education level of participants		
No education	Reference	
Less than primary	1372	72 to 2572*
Completed primary	1866	539 to 3182*
Completed secondary or higher	2178	332 to 3853*
Marital status of participants		
Single	Reference	
Married	538	-1316 to 2164
Divorced/widowed	367	-1344 to 2097
Living arrangement of participants		
Living alone	Reference	
Living with spouse	4091	2586 to 5540*
Living with children	3523	2259 to 4848*
Living with other relatives	3951	2286 to 5612*
Living with children under 16	-921	-1946 to 148
Participants with any income	-357	-1440 to 691
Number of assets in the family	82	-297 to 471
Participant has private insurance	-1103	-2665 to 565
Male carers	-753	-1771 to 211
Age of carers	-60	-99 to -20*
Education level of carers		
Less than primary	Reference	
Completed primary	614	-745 to 1844
Completed secondary	-299	-1728 to 1025
Completed tertiary	374	-1199 to 1944
Marital status of carers		
Single	Reference	
Married	1502	-62 to 2966
Divorced/widowed	1833	76 to 3526*
Carers with paid work	-284	-1172 to 660
Carers' relationship to participants		
Spouse	Reference	
Children	-1564	-3230 to 191
Children in law or other relatives	-1087	-2990 to 872
Non-relative	272	-2129 to 2763
Depression	804	-658 to 2281
Hypertension	-20	-889 to 805
Diabetes	1545	164 to 2803*
Ischemic heart disease	312	-1248 to 1808
Stroke	1987	578 to 3390*
COPD	280	-1456 to 2095
Number of physical impairment	433	105 to 759*
Memory impairment score	-131	-371 to 100

Number of cognitive impairment (not include memory)	2480	2016 to 2932*
BPSD severity score	155	60 to 251*
Constant	-9727	-15588 to -3826*

* Significant at 95% level, $R^2=0.33$, adjusted $R^2=0.30$

Table 5.26. Linear regression model of private level social care costs

Variables	Observed coefficients	Bootstrapped 95% confidence interval
Centre		
Cuba	Reference	
Dominican Republic	-200	-958 to 491
Urban Peru	292	-557 to 1200
Rural Peru	330	-764 to 1490
Venezuela	-336	-1035 to 377
Urban Mexico	-479	-1494 to 471
Rural Mexico	-734	-1663 to 57
Urban China	2394	772 to 4324*
Rural China	-113	-1244 to 925
Urban India	223	-566 to 992
Rural India	174	-647 to 934
Male	-253	-630 to 153
Age	16	-6.2 to 39
Education level of participants		
No education	Reference	
Less than primary	-44	-453 to 344
Completed primary	-18	-607 to 558
Completed secondary or higher	391	-459 to 1151
Marital status of participants		
Single	Reference	
Married	335	-293 to 1024
Divorced/widowed	328	-336 to 971
Living arrangement of participants		
Living alone	Reference	
Living with spouse	835	61 to 1727*
Living with children	164	-440 to 717
Living with other relatives	1110	201 to 2077*
Living with children under 16	-263	-644 to 102
Participants with any income	388	27 to 754*
Number of assets in the family	133	13 to 265*
Participant has private insurance	-307	-737 to 159
Male carers	-151	-778 to 663
Age of carers	-5.5	-19 to 8.2
Education level of carers		
Less than primary	Reference	
Completed primary	-234	-685 to 160
Completed secondary	-328	-796 to 142
Completed tertiary	-18	-684 to 641
Marital status of carers		
Single	Reference	
Married	-13	-569 to 631
Divorced/widowed	-437	-1091 to 207
Carers with paid work	1871	1360 to 2410*
Carers' relationship to participants		
Spouse	Reference	
Children	848	168 to 1573*
Children in law or other relatives	606	-69 to 1332
Non-relative	1326	441 to 2246*
Depression	-54	-562 to 478
Hypertension	-162	-696 to 270
Diabetes	32	-430 to 583
Ischemic heart disease	638	-495 to 1920
Stroke	109	-465 to 671
COPD	295	-432 to 1091
Number of physical impairment	14	-128 to 143
Memory impairment score	-45	-183 to 83

Number of cognitive impairment (not include memory)	599	330 to 918*
BPSD severity score	56	11 to 103*
Constant	-3407	-6185 to -831*

* Significant at 95% level, $R^2=0.20$, adjusted $R^2=0.16$

Table 5.27. Linear regression model of public level social care costs

Variables	Observed coefficients	Bootstrapped 95% confidence interval
Centre		
Cuba	Reference	
Dominican Republic	489	-920 to 1964
Urban Peru	7036	4000 to 10162*
Rural Peru	7042	3066 to 11712*
Venezuela	1307	-608 to 3136
Urban Mexico	5457	3170 to 7907*
Rural Mexico	2823	604 to 4858*
Urban China	11324	8640 to 14248*
Rural China	6701	3326 to 10455*
Urban India	4343	2227 to 6485*
Rural India	4257	2181 to 6195*
Male	-1174	-2315 to -30*
Age	81	10 to 145
Education level of participants		
No education	Reference	
Less than primary	1340	-28 to 2570
Completed primary	1904	555 to 3299*
Completed secondary or higher	2397	495 to 4100*
Marital status of participants		
Single	Reference	
Married	885	-1004 to 2583
Divorced/widowed	611	-1129 to 2372
Living arrangement of participants		
Living alone	Reference	
Living with spouse	4385	2872 to 5904*
Living with children	3714	2417 to 5217*
Living with other relatives	4259	2509 to 6095*
Living with children under 16	-1054	-2123 to 8.1
Participants with any income	3.3	-1138 to 1156
Number of assets in the family	188	-188 to 578
Participant has private insurance	-1293	-2961 to 516
Male carers	-830	-1880 to 248
Age of carers	-66	-109 to -22*
Education level of carers		
Less than primary	Reference	
Completed primary	570	-808 to 1915
Completed secondary	-541	-2026 to 769
Completed tertiary	217	-1485 to 1885
Marital status of carers		
Single	Reference	
Married	1507	-75 to 3101
Divorced/widowed	1647	-174 to 3389
Carers with paid work	106	-848 to 1116
Carers' relationship to participants		
Spouse	Reference	
Children	-1260	-3031 to 623
Children in law or other relatives	-707	-2731 to 1335
Non-relative	1697	-1035 to 4631
Depression	859	-651 to 2444
Hypertension	-100	-1005 to 782
Diabetes	1480	67 to 2794*
Ischemic heart disease	347	-1318 to 1975
Stroke	2040	564 to 3515*
COPD	301	-1566 to 2200
Number of physical impairment	401	51 to 741*
Memory impairment score	-107	-359 to 132

Number of cognitive impairment (not include memory)	2704	2205 to 3187*
BPSD severity score	167	69 to 271*
Constant	-11309	-17091 to -5182*

* Significant at 95% level, $R^2=0.35$, adjusted $R^2=0.32$

Table 5.28. Linear regression model of paid home care

Variables	Observed coefficients	Bootstrapped 95% confidence interval
Centre		
Cuba	Reference	
Dominican Republic	459*	90 to 822*
Urban Peru	1061*	419 to 1755*
Rural Peru	312	-81 to 738
Venezuela	200	-102 to 554
Urban Mexico	-92	-408 to 247
Rural Mexico	184	-114 to 500
Urban China	2079*	1293 to 2910*
Rural China	162	-219 to 571
Urban India	344	-8.6 to 734
Rural India	326	-95 to 725
Male	-227*	-432 to -26*
Age	4.5	-6.9 to 15
Education level of participants		
No education	Reference	
Less than primary	-33	-246 to 152
Completed primary	38	-199 to 298
Completed secondary or higher	218	-165 to 608
Marital status of participants		
Single	Reference	
Married	346*	23 to 718*
Divorced/widowed	244	-33 to 525
Living arrangement of participants		
Living alone	Reference	
Living with spouse	293	-83 to 652
Living with children	191	-199 to 594
Living with other relatives	308	-169 to 796
Living with children under 16	-134	-346 to 89
Participants with any income	359*	177 to 559*
Number of assets in the family	105*	45 to 178*
Participant has private insurance	-190	-482 to 106
Male carers	-78	-309 to 170
Age of carers	-5.6	-15 to 3.4
Education level of carers		
Less than primary	Reference	
Completed primary	-45	-302 to 223
Completed secondary	-242	-544 to 40
Completed tertiary	-157	-506 to 182
Marital status of carers		
Single	Reference	
Married	5.8	-305 to 337
Divorced/widowed	-186	-529 to 154
Carers with paid work	390*	168 to 611*
Carers' relationship to participants		
Spouse	Reference	
Children	304	-39 to 675
Children in law or other relatives	379*	21 to 783*
Non-relative	1425*	828 to 2159*
Depression	54	-196 to 298
Hypertension	-81	-282 to 111
Diabetes	-66	-305 to 170
Ischemic heart disease	35	-299 to 426
Stroke	53	-212 to 358
COPD	21	-353 to 441
Number of physical impairment	-32	-98 to 32
Memory impairment score	24	-29 to 78

Number of cognitive impairment (not include memory)	224*	120 to 337*
BPSD severity score	12	-6.1 to 34
Constant	-1582*	-2920 to -355*

* Significant at 95% level, $R^2=0.24$, adjusted $R^2=0.21$

family assets. Participants with carers who have paid work also have significantly higher paid home care costs as do those with carers who are ‘other’ relatives, or non-relatives. Cognitive impairment is again a strong predictors of cost. Finally, men have lower costs than women. Just under one-quarter of variation was explained.

Private level total cost model

The model with all private level costs summed shows that participants living in urban China have higher cost than those living in Cuba (Table 5.29). Having more family assets and having carers in paid work are predictors of total cost at the private level. Higher costs are also associated with greater physical and cognitive impairment. The model could explain 17% of variation in these costs.

Public level total cost model

The final model shows that participants living in Peru, Mexico, China, or India have higher public level total costs than those living in Cuba (Table 5.30). Older age, higher education level, and not living alone all predict higher costs. Diabetes, stroke, more physical impairments, severe cognitive impairment or BPSD symptoms each have a positive impact on cost. Male participants have lower total costs than females. Participants with older carers have lower costs than those with younger carers. Living with children younger than 16 years old has a negative association with total cost. This model could explain one-third of the variation in costs.

Summary of section

The total cost per capita at the private level in the sample as a whole is I\$1887, while the cost at the public level is I\$6570. The distribution of costs is different for private level and public level. At the public level, 96.4% cost is from social care, and 90.4% of cost of social care is from informal care. Medical care costs are more prominent at the private level than that at public level (29.2% vs 3.6%). Informal care and paid home care contribute similar proportions to the cost of social care at the private level, while informal care is 90.4% of the cost of social care at the public level.

Physical impairment increases the cost of medical care and total cost at the private

level, while stroke predicts higher medical costs at the public level. Diabetes, stroke, and physical impairment predict higher costs of informal care, social care and total cost at the public level only

Cognitive impairment and BPSD has no significant association with the cost of medical care, but predict higher costs of informal care and social care both at the private level and the public level, and only increase total costs at the public level. Cognitive impairment is also associated with higher costs of paid care and total cost at the private level.

Participants with dementia who are in the older age group, with a higher educational level, or who are not living alone have higher costs of informal care, social care and total cost at the public level. Male participants have lower costs of paid home care, social care and total cost at the public level.

Younger age of carers is associated with higher costs of informal care, social care and total cost at the public level. Participants with male carers have higher costs of medical care both at the private level and the public level.

Finally, it was found that higher economic status (reflected by having income, more assets in the family, or carers with paid work) predicts higher costs of paid home care, and social care and total cost at the private level only.

Table 5.29. Linear regression model of private level total costs

Variables	Observed coefficients	Bootstrapped 95% confidence interval
Centre		
Cuba	Reference	
Dominican Republic	-321	-1234 to 591
Urban Peru	-456	-1825 to 774
Rural Peru	-88	-1577 to 1301
Venezuela	1470	-621 to 4527
Urban Mexico	-722	-1877 to 370
Rural Mexico	-539	-1627 to 464
Urban China	6259	3379 to 9627*
Rural China	-147	-1435 to 1267
Urban India	1091	-186 to 2676
Rural India	625	-438 to 1851
Male	-16	-619 to 725
Age	7.7	-28 to 38
Education level of participants		
No education	Reference	
Less than primary	-208	-1146 to 531
Completed primary	-455	-1348 to 345
Completed secondary or higher	875	-725 to 2781
Marital status of participants		
Single	Reference	
Married	775	-178 to 1926
Divorced/widowed	645	-196 to 1654
Living arrangement of participants		
Living alone	Reference	
Living with spouse	953	-35 to 2190
Living with children	-421	-1376 to 372
Living with other relatives	771	-391 to 1906
Living with children under 16	-516	-1073 to 20
Participants with any income	378	-147 to 958
Number of assets in the family	221	50 to 406*
Participant has private insurance	498	-439 to 1679
Male carers	-745	-1570 to 290
Age of carers	-2.2	-24 to 23
Education level of carers		
Less than primary	Reference	
Completed primary	-64	-678 to 539
Completed secondary	140	-687 to 1109
Completed tertiary	785	-632 to 2665
Marital status of carers		
Single	Reference	
Married	218	-506 to 1128
Divorced/widowed	-163	-975 to 817
Carers with paid work	1873	1275 to 2478*
Carers' relationship to participants		
Spouse	Reference	
Children	546	-642 to 1697
Children in law or other relatives	170	-897 to 1309
Non-relative	567	-627 to 1787
Depression	740	-509 to 2280
Hypertension	13	-644 to 645
Diabetes	-353	-1445 to 607
Ischemic heart disease	-6.5	-1385 to 1339
Stroke	-84	-1352 to 994
COPD	-738	-1892 to 443
Number of physical impairment	349	26 to 811*
Memory impairment score	16	-147 to 179

Number of cognitive impairment (not include memory)	835	377 to 1399*
BPSD severity score	31	-42 to 96
Constant	-3834	-8069 to -493*

* Significant at 95% level, $R^2=0.17$, adjusted $R^2=0.14$

Table 5.30. Linear regression model of public level total cost

Variables	Observed coefficients	Bootstrapped 95% confidence interval
Centre		
Cuba	Reference	
Dominican Republic	411	-1026 to 1853
Urban Peru	6968	3920 to 10072*
Rural Peru	6966	2997 to 11729*
Venezuela	1881	-98 to 3841
Urban Mexico	5617	3299 to 8125*
Rural Mexico	3254	1023 to 5450*
Urban China	11776	8999 to 14739*
Rural China	6536	3123 to 10244*
Urban India	4449	2327 to 6606*
Rural India	4406	2373 to 6295*
Male	-1180	-2394 to -25*
Age	80	7.4 to 144*
Education level of participants		
No education	Reference	
Less than primary	1527	133 to 2772*
Completed primary	1885	479 to 3281*
Completed secondary or higher	2541	599 to 4239*
Marital status of participants		
Single	Reference	
Married	842	-1092 to 2542
Divorced/widowed	639	-1123 to 2395
Living arrangement of participants		
Living alone	Reference	
Living with spouse	4303	2812 to 5966*
Living with children	3716	2307 to 5322*
Living with other relatives	4298	2432 to 6234*
Living with children under 16	-1259	-2335 to -155*
Participants with any income	-125	-1265 to 1063
Number of assets in the family	225	-171 to 622
Participant has private insurance	-1086	-2798 to 654
Male carers	-974	-2029 to 81
Age of carers	-66	-111 to -20*
Education level of carers		
Less than primary	Reference	
Completed primary	723	-704 to 2113
Completed secondary	-552	-2112 to 794
Completed tertiary	173	-1629 to 1988
Marital status of carers		
Single	Reference	
Married	1647	50 to 3227*
Divorced/widowed	1889	-34 to 3713
Carers with paid work	180	-782 to 1215
Carers' relationship to participants		
Spouse	Reference	
Children	-1216	-2930 to 690
Children in law or other relatives	-739	-2784 to 1363
Non-relative	1488	-1236 to 4487
Depression	1063	-498 to 2662
Hypertension	-205	-1207 to 706
Diabetes	1488	70 to 2864*
Ischemic heart disease	279	-1376 to 1966
Stroke	2208	717 to 3663*
COPD	214	-1652 to 2094
Number of physical impairment	403	49 to 756*
Memory impairment score	-80	-343 to 182

Number of cognitive impairment (not include memory)	2705	2195 to 3197*
BPSD severity score	167	68 to 271*
Constant	-11273	-17157 to -5209*

* Significant at 95% level, $R^2=0.35$, adjusted $R^2=0.32$

Section 6. Attributable cost of dementia

The previous section has reported costs for those people with dementia in the 10/66 survey. This section focuses on the entire 10/66 sample and determines the cost of care that is attributable to dementia and each level of severity, and other chronic diseases. Regression methods are used to calculate the attributable costs. Subsequently, the attributable costs per capita are used for generating the total cost at the country level by linking these to the prevalence of dementia among people aged 65 years and over.

6.1. Methodology

As discussed in Section 1, both the subtraction method and the regression method can be used for the estimation of attributable costs. The advantages and disadvantages of the two methods have also been discussed. Regression methods were chosen as the most appropriate approach to generate the attributable cost, as it would be difficult to select proper matching controls for the subtracting method.

In the analysis, linear regression models were generated to estimate the care costs that can be attributed specifically to dementia. For this, the whole sample was used. As in Section 5, bootstrapping was used because of the non-normal distribution of data (see Tables 4.1 and 4.4). That can resolve the potential problem of using regression models when data are highly skewed.

As discussed in Section 5, a number of potential predictors of cost exist and the impact that these actually did have on the cost among dementia patients has been described. In the analysis of costs that are attributed to dementia, similar variables were entered into the models to control for their influence. The variables included in the model were:

- Social-demographic characteristics of the participants (gender, age, education, marital status, income of the participants and number of family assets)

- Living arrangements of the participants (general living arrangement, living with children under 16 years old)
- Whether the participant had private health insurance
- Social-demographic factors of carers (gender, age, education, marital status, paid work, relationship to the participants)
- Other mental or physical problems (depression, hypertension, diabetes, ischemic heart disease, stroke, COPD, number of physical impairments causing at least some difficulty)

Two bootstrapped linear regression models were generated for each dependent variable. In the first model, a variable indicating whether dementia was present (yes/no) was entered into the regression model as an independent variable, along with the above variables. In the second model, dummy variables were generated for each severity level of dementia according to CDR criteria (with no dementia as the reference group), and these were entered into the model.

The public level cost perspective was used in these analyses. This was mainly because the public level is broader and has more policy implications. Another reason is that cost estimations are more stable at the public level and there is unlikely to be excessively high costs calculated through sampling error. Furthermore, the cost attributed to dementia identified in this section will be used in section 7 to estimate the cost of dementia at a country level and for this purpose it is more appropriate to consider the cost at the public rather than the private level. Consequently, models were run with five dependent relating to the public level cost of medical care, social care, informal care, total cost at the public level, and the cost of paid home care.

The costs attributable to the presence of dementia and the severity of dementia were calculated for each project country and for the whole sample. Costs attributed to other conditions were presented as well in order to show the differences compared to dementia. These results were based on the first model with a variable indicating whether dementia was present. In the analyses for each country the location of the setting (urban/rural) was (where appropriate) entered into the model as a variable to control for. In the analyses for the whole sample the centre variable was converted to dummy variables (with Cuba as the reference category) and those were also entered

into the model.

Finally, based on the results from the two models, the costs of dementia for each project country were calculated. The process involved in these calculations was as follows:

- The population size of each country and the percentage of the population older than 65 in 2008 was extracted from the World Population Data Sheet from the website of the Population Reference Bureau (<http://www.prb.org/publications/datasheets/2008/2008wpds.aspx>).
- The prevalence of dementia at each severity level was taken from the 10/66 database.
- The cost per person with dementia and cost at each level of severity (described in Tables 6.1 and 6.2), separated into total cost, medical care, social care (in turn divided into informal care and paid home care) was extracted.
- The product of the population size, proportion aged 65 and over, proportion with each severity level of dementia, and the cost of care for each level was calculated to estimate the total cost of dementia at the country level.

To facilitate an interpretation of the implications that the total costs have and to make relevant comparisons among project countries, the total cost was expressed as an equivalent percentage figure of GDP for each country. Data on GDP per capita for each country in 2008 was obtained from the WHO-CHOICE database (see Table 8.4b), with the figures presented in international dollars. These figures were multiplied by the total population size of each country to generate total GDP. Dividing the total dementia cost by this figure and multiplying by 100 shows the cost of dementia as an equivalent percentage of GDP. The advantage of this method is the figure may be more easily understood by policy makers as indicating the impact that dementia has. However, a limitation here is that GDP does not include all the components which have been included in the dementia costs, particularly the cost of unpaid family care.

Only relevant figures are selected and presented in tables of this section. Results of full models are shown in Appendix (Table A3.1 to A3.16).

6.2. Results

Attributable costs of dementia

The costs that can be attributed to the presence or not of dementia in the seven 10/66 project countries are shown in Table 6.1. All centres clearly have increased mean total costs associated with dementia. In India, dementia is associated with the lowest increase, while participants in Peru have the highest increase. The table also shows that the increase in cost is due to the impact on social care, rather than medical care. With regard to social care, the main cost driver comes from informal care in each country. However, in Cuba, the Dominican Republic, Peru and China the costs for paid care are also increased significantly because of dementia.

Table 6.1. Mean cost per year attributable to dementia in 2008 international dollars

Type of cost	Cuba	Dominica n Republic	Peru	Venezuela	Mexico	China	India	Whole sample
Medical care	-5.5	-44	-42	296	16	148	-29	12
Social care	3856*	3847*	10375*	3201*	4765*	8540*	1793*	5114*
Informal care	3658*	3433*	8870*	2986*	4720*	7344*	1793*	4653*
Paid home care	198*	415*	1505*	215	45	1195*	-	493*
Total cost	3851*	3804*	10332*	3497*	4781*	8687*	1764*	5164*

* Statistically significant at 95% level of confidence

Attributable costs of dementia severity

The costs attributable to dementia, by level of severity, are shown in Table 6.2. Not having dementia is the reference category. For mild, moderate and severe dementia, the costs for social care and total cost increase with severity. However, this tendency is not detected for cost of medical care. In the Dominican Republic, decreases in medical costs are found for moderate dementia. Interestingly, for the whole sample the presence of questionable and mild dementia seems to increase medical costs compared to not having dementia, and moderate dementia increase as well but without statistical significance, which might be because of large standard errors.

Table 6.2. Mean attributable cost of dementia by level of severity in 2008 international dollars

Type of cost	Cuba	Dominican Republic	Peru	Venezuela	Mexico	China	India	Whole sample
Medical care								
Questionable and mild	69	-15	109	100	71	-16	35	49*
Moderate	40	-136*	-45	2084	-30	661	-109	240
Severe	20	-46	-108	- ¹	365	-150	308	-4.8
Social care								
Questionable and mild	301*	348*	1429*	334*	450*	767*	279*	612*
Moderate	7269*	9801*	17920*	10105*	10646*	15517*	8612*	11670*
Severe	9277*	16662*	23474*	- ¹	28139*	22154*	12787*	13868*
Informal care								
Questionable and mild	297*	291*	1262*	313*	461*	694*	279*	561*
Moderate	6594*	8649*	15147*	9919*	10356*	13409*	8612*	10404*
Severe	9010*	14736*	20920*	- ¹	26675*	18590*	12787*	12750*
Paid home care								
Questionable and mild	4.4	57	167*	21	-11	73	-	51*
Moderate	675*	1152*	2772*	185	290	2108*	-	1266*
Severe	267*	1925*	2553	- ¹	1464	3564	-	1118*
Total cost								
Questionable and mild	370*	333*	1538*	434*	521*	750*	314*	662*
Moderate	7309*	9664*	17875*	12189*	10616*	16179*	8504*	11910*
Severe	9297*	16615*	23366*	- ¹	28504*	22004*	13095*	13863*

* Statistically significant at 95% level of confidence

¹ Results are omitted because dementia cases are too few.

Costs attributed to other conditions

Increases in the costs of medical care are found for participants with depression, hypertension, diabetes and stroke in some countries (Table 6.3). Across the whole sample, diabetes and stroke increase medical care costs. Increases in costs for social care and total cost are associated with depression, hypertension, diabetes and stroke in most countries. However, these increases are typically smaller than those observed for dementia. An exception is India, where the increase in costs for social care and total cost associated with for stroke is higher than the cost increase associated with dementia.

Relatively small decreases in costs for social care and total cost are associated with hypertension, ischemic heart disease and COPD in some countries. However, in China there is a significant increase in the cost of social care and total cost associated with for COPD.

Table 6.3. Mean cost attributable to the presence of different conditions in 2008
international dollars

Type of cost	Cuba	DR**	Peru	Venezuela	Mexico	China	India	Whole sample
Medical care								
Dementia	-5.5	-44	-42	296	16	148	-29	12
Depression	91*	21	92	466	-34	36	-19	72
Hypertension	32	-35	122*	15	65	-10	-31	23
Diabetes	-1.9	58	73	72	102	160*	212*	102*
Ischemic heart disease	11	-19	-47	61	-116	75	9.0	-18
Stroke	4.5	94*	81	256	237*	259*	1066	174*
COPD	-49	43	266	-48	-94	-164	-3.3	26
Social care								
Dementia	3856*	3847*	10375*	3201*	4765*	8540*	1793*	5114*
Depression	448	177	1214	1737*	495	7624*	608*	487*
Hypertension	-177*	-5.3	-115	38	-230	-396*	-79	-189*
Diabetes	1.2	-38	536	657*	679*	616	553*	303*
Ischemic heart disease	-265*	397	-89	-276	9.8	-207	-364	-211
Stroke	973*	1311*	3461*	776	1819*	3813*	2185*	2085*
COPD	-144	-561*	-720	-111	93	2125*	212	-34
Informal care								
Dementia	3658*	3433*	8870*	2986*	4720*	7344*	1793*	4653*
Depression	406	138	1301	1674*	439	8162*	608*	624*
Hypertension	-179*	-32	-119	103	-219	-269	-79	-68
Diabetes	7.1	-65	411	619*	682*	416	553*	303*
Ischemic heart disease	-231*	520	124	-246	-150	-66	-364	-117
Stroke	853*	1080*	3217*	816	1832*	3070*	2185*	1820*
COPD	-176	-449*	-662	-212	106	2015*	212	13
Paid home care								
Dementia	198*	415*	1505*	215	45	1195*	-	493*
Depression	43	39	-87	63	56	-539	-	-6.3
Hypertension	2.0	27	4.0	-65	-10	-127*	-	-11
Diabetes	-5.9	27	126	38	-2.2	200	-	34
Ischemic heart disease	-33*	-123*	-214	-29	159	-141	-	-48
Stroke	120*	231	244	-41	-13	743*	-	226*
COPD	32	-112	-58	100	-13*	110	-	-2.9
Total cost								
Dementia	3851*	3804*	10332*	3497*	4781*	8687*	1764*	5164*
Depression	540	197	1306	2203*	461	7660*	588*	705*
Hypertension	-145	-40	7.0	53	-165	-406*	-109	-50
Diabetes	-0.7	20	610	729*	781*	776*	764*	420*
Ischemic heart disease	-253*	378	-136	-215	-106	-132	-355	-158
Stroke	977*	1405*	3542*	1032	2056*	4072*	3251*	2218*
COPD	-193	-518	-454	-159	-1.6	1961*	209	18

* Statistically significant at 95% level of confidence

** DR: Dominican Republic

Attributable costs of dementia at the country level

Population information, GDP per capita in 2008, prevalence of dementia, and total

costs of dementia for each type of care in 2008 at the country level are shown in Table 6.4. Cost for medical care is much lower compared with cost of social care in every country. Informal care is the main component of social care costs. The total cost is obviously largely influenced by population size (China has the highest total cost and figure and the Dominican Republic the lowest). The attributable costs of dementia are equivalent to between 0.1% and 1.2% of GDP in the project countries. This suggests that dementia has the biggest impact in Cuba and has the least impact in Venezuela.

Table 6.4. Total attributable cost of dementia in 2008 international dollars at the country level

Items	Cuba	Dominican Republic	Peru	Venezuela	Mexico	China	India
Population in 2008 (millions)	11.2	9.9	27.9	27.9	107.7	1324.7	1149.3
% of population aged 65+	12%	6%	6%	5%	6%	8%	5%
GDP per capita in 2008 (I\$)	4125	8138	8522	12665	14494	6136	2925
Prevalence of dementia	11.0%	12.0%	8.6%	7.4%	9.0%	6.5%	9.1%
Annual cost of care (I\$ millions)							
Medical care	-1	-3	-6	31	9	1019	-152
Social care	570	274	1494	330	2771	58827	9376
Informal care	541	245	1277	308	2745	50589	9376
Paid home care	29	30	217	22	26	8232	-
Total cost (I\$millions)	569	271	1487	361	2781	59840	9225
Total cost as % of GDP	1.2%	0.3%	0.6%	0.1%	0.2%	0.7%	0.3%

The prevalence of dementia at each severity level of dementia and the costs attributable to dementia severity for each type of care are shown in Table 6.5. The average attributable cost is higher for moderate or severe dementia, but the total cost at the country level is lower because of the low prevalence. At the country level, the costs for medical care for people with moderate or severe dementia are lower than the costs for people with mild dementia, except in the Dominican Republic, Venezuela and China. The cost for social care is the lowest for severe dementia patients in Peru, Mexico, China and India. Similar tendencies can be found for total cost.

Table 6.5. Total attributable cost of dementia by severity level in 2008 international dollars at the country level

Items	Cuba	Dominican Republic	Peru	Venezuela	Mexico	China	India
Prevalence from 10/66 study							
Mild	5.5%	9.0%	5.9%	4.8%	6.1%	3.6%	4.8%
Moderate	2.4%	2.3%	1.9%	1.9%	1.0%	1.9%	0.6%
Severe	1.8%	1.1%	0.7%	0.2%	0.1%	0.1%	0.1%
Annual cost of care (I\$ millions)							
Medical care							
Mild	2.9	-3.7	12	-4.7	49	-53	764
Moderate	1.2	-1.9	-1.4	55	-1.7	1333	-34
Severe	0.4	-0.3	-1.3	-	2.4	-16	18
Social care							
Mild	148	93	609	117	1578	24047	5164
Moderate	239	136	580	270	708	32557	2990
Severe	227	109	278	-	182	2394	735
Informal care							
Mild	142	77	512	110	1582	19968	5164
Moderate	217	120	490	265	689	28075	2990
Severe	221	97	248	-	173	2008	735
Paid home care							
Mild	7	16	97	7	-5	4075	-
Moderate	22	16	90	5	19	4482	-
Severe	7	13	30	-	9	386	-
Total cost							
Mild	151	89	621	113	1627	23990	5930
Total cost as % of GDP	0.3%	0.1%	0.3%	0.03%	0.1%	0.3%	0.2%
Moderate	240	134	579	325	706	33888	2955
Total cost as % of GDP	0.5%	0.2%	0.2%	0.09%	0.05%	0.4%	0.09%
Severe	228	109	277		185	2378	752
Total cost as % of GDP	0.5%	0.1%	0.1%		0.01%	0.03%	0.02%

Summary of section

This section has reported provided information on the costs that can be attributed specifically to dementia and these costs were compared with other chronic diseases. Costs attributable to different severity levels were also reported. The results show that all countries have significant increases in cost for those with dementia. The increase in cost is due to the impact on social care (particularly informal care), rather than medical care. The attributable costs increase with progression of the disease, but only for social care and total cost, not for medical care. Dementia clearly has a

higher attributable cost than that of any other chronic diseases measured except in India, but again only for social care and total cost, not for medical care. In India, stroke has the highest attributable cost, and dementia was the second.

Total cost at country level is largely influenced by population size. The attributable costs of dementia are equivalent to between 0.1% and 1.2% of GDP in the project countries. Although the average cost is higher for moderate or severe dementia, the total cost in a country is lower for these severity levels because of the lower prevalence.

Section 7. Sensitivity analyses

The calculation of costs described in previous sections required assumptions to be made about the unit costs of services (including carer time) to be used. In this section, sensitivity analyses are carried out to see the impact of making different assumptions about these unit costs. As stated in Section 3, for both medical care and social care there are alternative costing methods that can be considered; for medical care the two alternative methods are the ‘percentage method’ and the ‘GDP-ratio method’, while for social care the five alternative methods are the ‘10/66 salary method’, ‘replacement cost approach’, ‘leisure time method’, ‘carers characteristics method’ and ‘all informal care method’.

All of the sensitivity analyses are performed from the public level perspective. The costs that have already been calculated (described in Sections 3 and 4) are termed the ‘base-case’ in this section. The basis for the estimation of the cost for medical care was the UK unit cost method, while for social care costs were based on average earnings from the ILO. The results from the base-case analysis will be compared with results using the alternative methods both for the whole sample and for participants with dementia.

7.1. Percentage method

The ‘percentage method’ assumes that an individual has the same percentage of out of pocket expenditure on total health expenditure as summarised at the country level, and out-of-pocket expenditure information collected from the survey is used to generate the total cost. However, this approach is only applied for calculating the total costs of primary health centre care, hospital doctors, other government health workers and admission to hospital. The costs for other types of medical care, including private doctors, dentists and traditional healers remains based entirely on out of pocket spending because these are unlikely to be subsidised (at least not to any great extent).

WHO has released a global health expenditure database over the past ten years. The

database provides internationally comparable numbers on national health expenditures. The information is based on publicly available reports, including national health account reports, reports from the Ministry of Finance, Central Bank, National Statistics Offices, public expenditure information and reports from the World Bank and the International Monetary Fund. Estimates in the database are taken and adjusted from these resources and are updated every year. The database includes health expenditure indicators, health expenditure data, macroeconomic data and WHO Global Health Observatory (GHO) indicators.

For these analyses, the relevant information includes:

- Total health expenditure (THE) as a percentage of GDP.
- General government expenditure on health (GGHE) as a percentage of THE.
- Private expenditure on health (PvtHE) as a percentage of THE.
- Out of pocket expenditure as a percentage of PvtHE.
- Out of pocket expenditure as a percentage of THE, which is used to determine which country has the largest proportional out of pocket expenditure. Estimates of this indicator in the database are not available for all of the countries. For those without the estimation (Cuba, the Dominican Republic, Mexico, Peru and Venezuela), a formula is used to calculate the indicator.

Out of pocket expenditure as a percentage of THE = PvtHE as a percentage of THE
 × out of pocket expenditure as a percentage of PvtHE

The above data for the countries in different years is shown in Table 7.1. Data for 2010 is not available for Mexico. From the table, it is seen that among all the countries, India has (proportionally) the lowest government expenditure on health but the highest private expenditure on health and the largest proportional out of pocket expenditure on healthcare. Cuba has the largest percentage of government expenditure, but the lowest private expenditure on health and the smallest out of pocket expenditure as a percentage of total health expenditure. Cuba has seen a big increase in total health expenditure over time. The percentage of out-of-pocket expenditure as a percentage of total health expenditure decreased from 2002 to 2009/10 in most counties, but not in Peru and Venezuela.

Table 7.1. Health expenditure in project countries (2002-2010)

Indicators	Countries	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total health expenditure (THE) as percentage of (GDP)	China	5	5	5	5	5	4	5	5	5
	Cuba	6	6	6	8	8	10	11	12	11
	Dominican Republic	6	6	5	5	6	5	6	6	6
	India	5	4	4	4	4	4	4	4	4
	Mexico	6	6	6	6	6	6	6	6	-
	Peru	5	5	4	4	5	5	6	5	5
	Venezuela	6	6	6	5	6	6	5	6	5
General government expenditure on health (GGHE) as percentage of THE	China	36	36	38	39	41	47	50	52	54
	Cuba	88	89	90	93	93	95	95	93	91
	Dominican Republic	32	33	29	32	37	36	37	41	43
	India	23	23	23	24	25	26	28	30	29
	Mexico	44	44	45	45	45	45	47	48	-
	Peru	58	59	59	59	56	59	62	58	54
	Venezuela	39	38	41	43	42	47	45	40	35
Private expenditure on health (PvtHE) as percentage of THE	China	64	64	62	61	59	53	50	48	46
	Cuba	12	11	10	7	7	5	5	7	9
	Dominican Republic	68	67	71	68	63	64	63	59	57
	India	77	77	77	76	75	74	72	70	71
	Mexico	56	56	55	55	55	55	53	52	-
	Peru	42	41	41	41	44	41	38	42	46
	Venezuela	61	62	59	57	58	53	55	60	65
Out of pocket expenditure as percentage of PvtHE	China	90	88	86	85	83	83	81	79	79
	Cuba	100	100	93	100	100	100	100	100	100
	Dominican Republic	71	70	69	67	64	65	66	66	66
	India	92	92	89	90	89	88	87	86	86
	Mexico	95	95	95	94	94	93	93	92	-
	Peru	82	79	79	79	82	85	87	85	86
	Venezuela	93	93	91	89	88	88	90	91	91
Out of pocket expenditure as percentage of THE	China	58	56	54	52	49	44	40	37	37
	Cuba*	12	11	9	7	7	5	5	7	9
	Dominican Republic*	48	47	49	46	41	42	42	39	37
	India	71	71	69	68	67	65	63	60	61
	Mexico*	53	53	52	52	51	51	49	48	-
	Peru*	35	33	33	32	36	35	33	36	39
	Venezuela*	56	57	53	51	51	47	49	54	59

Source: WHO Global Health Expenditure Database

<http://apps.who.int/nha/database/DataExplorerRegime.aspx>

* Not available from the database; figures calculated according to the formula in the text.

The out-of-pocket costs for different services have been described in Table 4.9. The percentage of out of pocket expenditure on total health expenditure at the country level has been obtained (or derived) from the WHO Global Health Expenditure Database for each project country and these figures have been used to ‘uplift’ the out of pocket expenditures to reflect total costs.

Data from Table 7.1 that were specific to the interview year in each country were

used (see Table 7.2).

Table 7.2. Out of pocket expenditure as percentage of total health expenditure for project countries

Items	China	Cuba	Dominican Republic	India	Mexico	Peru	Venezuela
Interview year	2004	2004	2005	2004	2006	2005	2005
Percentage of total health expenditure	54%	9%	46%	69%	51%	32%	51%

The comparison between costs estimated using the percentage method and the base-case estimates are shown in Table 7.3a for the whole sample and Table 7.3b for participants with dementia.

For the whole sample, using the percentage method substantially changes the direct medical cost and cost for medical care, except in urban Mexico and rural India. Across all countries the total cost increases 38% using the percentage method. The largest proportional difference is for urban China (188%), while in Cuba, Peru, urban Mexico and rural India the proportional differences are less than 10%. In most countries, the tendency is to increase the cost. However, in the Dominican Republic and rural Peru use of the percentage method serves to decrease total cost.

Among participants with dementia, although use of the percentage method again substantially changes the cost of medical care, the change in total cost across all countries is only 8.5%. The change in urban China is still the largest but is reduced to about 40%. This is because participants with dementia use relatively less medical care, and it is the latter that is mostly affected by the percentage method.

Table 7.3a. Total cost of health services in 2008 international dollar among all participants using the percentage method, by site

Type of Cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Direct medical costs	Percentage method	122±329	22±98	402±4803	49±398	1022±8685	441±2532	526±6931	4511±15324	232±2151	92±745	65±1120	638±5961
	Base-case	96±212	159±488	312±1556	104±475	372±1376	441±1201	273±766	211±777	23±255	24±164	63±850	192±879
Total cost of health services	Percentage method	160±986	32±112	444±4820	70±415	1061±8702	479±2539	568±6949	4526±15343	233±2153	104±757	78±1136	665±5986
	Base-case	134±960	169±502	354±1579	124±505	411±1415	478±1226	315±814	226±789	25±258	35±180	77±865	219±991
Total costs	Percentage method	747±2663	959±3670	2327±8418	934±4874	2084±9892	1718±5427	1376±8118	6588±17092	696±3526	427±2574	644±2429	1629±7506
	Base-case	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408
	Difference	3.6%	-13%	4.0%	-5.5%	45%	0%	22%	188%	43%	19%	0%	38%

Table 7.3b. Total cost of health services in 2008 international dollars among participants with dementia using the percentage method, by site

Type of Cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Direct medical costs	Percentage method	122±242	24±84	151±735	36±97	2106±14856	249±446	380±1638	7568±19818	341±1113	96±609	29±68	793±7098
	Base-case	91±201	156±366	143±331	112±204	571±2963	278±452	459±1619	608±2052	24±75	35±166	47±109	216±1197
Total cost of health services	Percentage method	145±265	36±98	176±758	72±142	2157±14885	285±468	429±1659	7604±19863	345±1122	118±693	49±96	819±7115
	Base-case	114±254	168±385	167±368	148±256	622±3008	313±488	508±1641	643±2061	27±88	57±208	67±142	243±1219
Total costs	Percentage method	4545±5617	5246±8360	14035±15642	6440±11394	9954±18363	7705±10678	4846±9370	22854±23859	6313±9228	2976±6958	2144±3623	7327±12699
	Base-case	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154
	Difference	0.7%	-2.5%	0.1%	-1.2%	18.2%	-0.4%	-1.6%	43.8%	5.3%	2.1%	-0.8%	8.5%

7.2. GDP ratio method

According to the World Bank (The World Bank), ‘GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.’ GDP per capita is gross domestic product divided by midyear population.

Information regarding GDP per capita can be found in a number of databases, although there are some small differences between them. GDP per capita data provided by the World Bank from 2002 to 2010 are shown in Table 7.4a. All these figures are in current U.S. dollars. Data are not available for Cuba in the year of 2009 and 2010.

Table 7.4a. GDP per capita from the World Bank (2002-2010)

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	1,135	1,274	1,490	1,731	2,069	2,651	3,414	3,749	4,428
Cuba	3,006	3,203	3,400	3,789	4,682	5,201	5,565	-	-
Dominican Republic	2,999	2,364	2,414	3,670	3,825	4,334	4,739	4,776	5,215
India	484	563	668	762	857	1,105	1,067	1,192	1,475
Mexico	6,324	6,740	7,224	7,973	8,831	9,485	9,893	7,852	9,123
Peru	2,136	2,279	2,559	2,881	3,312	3,807	4,456	4,412	5,401
Venezuela	3,683	3,257	4,304	5,475	6,788	8,243	11,138	11,490	13,590

Data are in current U.S. dollars.

Source: World bank

<http://data.worldbank.org/indicator/NY.GDP.PCAP.CD/countries?display=default>

Information on GDP per capita provided by WHO-CHOICE for the years 2007 and 2008 is shown in Table 7.4b. These data are available in local currency units (LCU) and international Dollar (I\$).

Table 7.4b. GDP per capita in WHO-CHOICE database (2007-2008)

Year	Country	China	Cuba	Dominican Republic	India	Mexico	Peru	Venezuela
2007	GDP per capita in LCU	19,999	5,230	139,011	42,483	105,658	11,798	17,587
	GDP per capita in I\$	5,517	3,844	7,679	2,764	14,107	7,691	12,036
2008	GDP per capita in LCU	23,482	5,596	158,411	47,185	113,343	13,100	23,755
	GDP per capita in I\$	6,136	4,125	8,138	2,925	14,494	8,522	12,665

Source: WHO-CHOICE http://www.who.int/choice/country/country_specific/en/index.htm

The WHO Global Health Expenditure Database also provides information on GDP per capita. Data from 2002 to 2010 are shown in Table 7.4c. Figures are available in current national currency units (NCU), current US dollars and constant US dollars for the year 2005.

Table 7.4c. GDP per capita from WHO Global Health Expenditure Database (2002-2010)

Countries	Unit	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	In current NCU	9,305	10,442	12,225	14,065	16,364	20,003	23,511	25,394	29,504
	In current US\$	1,124	1,262	1,477	1,716	2,052	2,629	3,383	3,718	4,358
	In constant (2005) US\$	1,295	1,419	1,552	1,716	1,922	2,190	2,391	2,591	2,852
Cuba	In current NCU	2,999	3,197	3,398	3,793	4,692	5,215	5,412	5,541	5,713
	In current US\$	2,999	3,197	3,398	3,793	4,692	5,632	5,412	5,541	5,713
	In constant (2005) US\$	3,119	3,229	3,411	3,793	4,252	4,563	4,750	4,818	4,916
Dominican Republic	In current NCU	52,323	68,701	99,566	110,101	126,598	143,120	163,080	171,357	191,582
	In current US\$	2,812	2,228	2,364	3,621	3,794	4,303	4,710	4,756	5,195
	In constant (2005) US\$	3,428	3,369	3,362	3,621	3,950	4,225	4,384	4,476	4,759
India	In current NCU	22,546	24,909	28,845	32,512	37,025	42,146	46,810	51,594	61,178
	In current US\$	464	535	637	737	817	1,019	1,076	1,066	1,338
	In constant (2005) US\$	600	640	681	737	789	849	884	906	972
Mexico	In current NCU	68,045	74,077	83,118	88,705	98,661	105,658	113,343	109,571	120,632
	In current US\$	7,044	6,865	7,362	8,138	9,051	9,667	10,184	8,110	9,547
	In constant (2005) US\$	8,467	7,749	7,972	8,138	8,464	8,677	8,728	8,091	8,497
Peru	In current NCU	7,511	7,929	8,733	9,494	10,847	11,913	13,037	13,291	14,947
	In current US\$	2,136	2,279	2,559	2,881	3,313	3,808	4,459	4,413	5,291
	In constant (2005) US\$	2,560	2,630	2,728	2,881	3,069	3,298	3,527	3,591	3,859
Venezuela	In current NCU	4,267	5,215	8,118	11,404	14,521	17,627	23,808	24,552	34,913
	In current US\$	3,675	3,245	4,293	5,457	6,763	8,210	11,089	11,435	13,522
	In constant (2005) US\$	4,781	4,333	5,033	5,457	5,892	6,195	6,457	6,143	5,969

Source: WHO Global Health Expenditure Database
<http://apps.who.int/nha/database/DataExplorerRegime.aspx>

The World Economic Outlook Database produced by the IMF provides information on GDP per capita for most countries. However, data are not available for Cuba. As

shown in Table 7.4d, GDP per capita are presented in constant NCUs, current NCUs, current US dollars and current International dollars, based on PPP, for the years 2002 to 2011.

Table 7.4d. GDP per capita from IMF World Economic Outlook Database (2002-2010)

Country	Units	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	Constant NCU	4,798	5,246	5,742	6,353	7,122	8,092	8,823	9,588	10,526
	Current NCU	9,368	10,510	12,299	14,144	16,456	20,117	23,648	25,541	29,669
	Current US \$	1,132	1,270	1,486	1,726	2,064	2,645	3,404	3,739	4,382
	Current I\$	2,882	3,217	3,614	4,102	4,748	5,550	6,187	6,794	7,544
Dominican Republic	Constant NCU	27,718	27,159	27,029	29,011	31,540	33,609	34,750	35,308	37,371
	Current NCU	54,146	70,899	102,447	112,922	129,394	145,741	165,411	173,032	192,554
	Current US \$	2,911	2,315	2,430	3,712	3,879	4,379	4,777	4,815	5,227
	Current I\$	5,805	5,808	5,686	6,197	6,955	7,626	8,060	8,275	8,860
India	Constant NCU	25,957	27,317	28,934	31,071	33,549	36,384	38,101	40,126	43,563
	Current NCU	23,409	25,578	28,549	32,128	36,554	41,748	47,038	52,163	63,100
	Current US \$	481	549	630	729	807	1,009	1,081	1,077	1,371
	Current I\$	1,673	1,798	1,973	2,190	2,441	2,724	2,916	3,104	3,408
Mexico	Constant NCU	73,877	74,094	76,331	78,046	81,354	83,247	83,531	77,753	81,152
	Current NCU	67,502	74,063	83,223	88,961	98,928	106,940	114,130	110,463	120,316
	Current US \$	6,991	6,865	7,374	8,163	9,077	9,786	10,255	8,174	9,522
	Current I\$	10,875	11,136	11,959	12,483	13,432	14,143	14,506	13,645	14,406
Peru	Constant NCU	4,901	5,022	5,191	5,461	5,794	6,180	6,683	6,637	7,111
	Current NCU	7,681	8,086	8,876	9,613	10,935	11,889	12,949	13,138	14,707
	Current US \$	2,184	2,324	2,600	2,916	3,339	3,800	4,425	4,361	5,205
	Current I\$	5,376	5,624	5,998	6,475	7,092	7,784	8,603	8,635	9,358
Venezuela	Constant NCU	1,552	1,404	1,628	1,760	1,896	2,021	2,086	1,980	1,912
	Current NCU	4,329	5,285	8,209	11,505	14,612	17,686	23,815	24,473	34,670
	Current US \$	3,729	3,285	4,354	5,453	6,796	8,226	11,077	11,383	10,049
	Current I\$	8,120	7,500	8,925	9,992	11,110	12,189	12,860	12,333	12,048

Source: International Monetary Fund, World Economic Outlook Database, September 2011

<http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx>

There are, therefore, several sources for data on GDP per capita. The IMF World Economic Outlook Database provides data in constant NCUs, current NCUs, current

US \$s and current I\$\$. However, there are no figures for Cuba. The World Bank provides GDP per capita in current US \$s, but with no data available for Cuba for 2009 and 2010. WHO-CHOICE is the only database which provides information in I\$\$, but with data only available for 2007 and 2008. Data from the Global Health Expenditure Database are quite similar to those from WHO-CHOICE for 2007 and 2008. Although the Global Health Expenditure Database does not provide PPP-based estimates, I\$ can be calculated according to PPP exchange rates.

Considering that cost is presented in 2008 figures, the GDP data in I\$ from the WHO-CHOICE database was appropriate to use. There is only one ratio between each country and the UK for outpatient and inpatient services (see Table 7.5). Interestingly, the ratios generated according to GDP are quite similar to the average ratios for outpatient and inpatient services from the former table (Table 3.11b).

Table 7.5. Ratio between the project country cost and UK costs based on GDP method and WHO-CHOICE method

Countries to UK	Health services, from GDP	Average ratios of outpatient service and inpatient service, from WHO-CHOICE
China	0.165	0.164
Cuba	0.111	0.111
Dominican Republic	0.219	0.274
India	0.079	0.080
Mexico	0.390	0.385
Peru	0.230	0.227
Venezuela	0.341	0.336

The ratios in Table 7.5 were applied to UK unit costs to generate unit costs specific to each country specific figures as shown in Table 7.6.

Table 7.6. PPP based unit costs of health and social care services in 2008 international dollars based on ratios generated from GDP method

Service types	China	Cuba	Dominican Republic	India	Mexico	Peru	Venezuela
Government Primary care, I\$ per minute	0.28	0.19	0.37	0.13	0.66	0.39	0.58
Government hospital doctor I\$ per minute	0.79	0.53	1.05	0.38	1.87	1.10	1.64
Prescriptions, I\$ per prescription	4.32	2.91	5.74	2.07	10.22	6.03	8.93
Other government health worker, I\$ per minute in clinic	0.10	0.07	0.13	0.05	0.23	0.14	0.20
Hospital services, I\$ per bed day	39.12	26.32	51.92	18.73	92.47	54.53	80.85

The comparison between costs based on the GDP ratio method and the base-case estimates are shown in Table 7.7a for the whole sample and Table 7.7b for participants with dementia. Compared with results from the base-case analysis, the costs do not differ substantially when the alternative GDP ratio method is used, for the whole sample and individual countries (Table 7.7a). The overall difference in costs is only 1.2%, and this varies between 0% in rural China to 4.2% in the Dominican Republic. For participants with dementia patients, the differences are even smaller (Table 7.7b). This is because the ratios from the WHO-CHOICE database are similar to the ratios based on GDP (see Table 7.5).

7.3. 10/66 salary method

The average income for participants' occupations recorded in the 10/66 study could be calculated in every country. Only carers with full-time paid work were considered in these analyses as there was no information about the hours of work for part-time workers. The average income calculated for each country, based on the distribution of job types, is shown in Table 7.8. This average income for each occupation type was used as the unit cost for activities performed by carers of working age. For those carers not of working age, or with missing data, average income was applied.

When the 10/66 salary method was used the cost of help with ADL, IADL and supervision were affected as were total informal care costs, total social care costs and total care costs. Comparisons between findings based on the 10/66 salary method and the base-case estimates are shown in Table 7.9a for the whole sample and Table 7.9b for participants with dementia.

For the whole sample, the 10/66 salary method substantially decreased the cost in each category compared to the base-case estimation. The difference ranged from 19% in Cuba to 79% in urban India. For participants with dementia the differences were greater, which is because most of the costs in these cases were related to informal care.

Table 7.7a. Total cost of health services in 2008 international dollars among all participants using the GDP ratio method, by site

Type of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Direct medical costs	GDP ratio method	82±227	113±458	297±1566	94±482	361±1397	420±1226	258±767	219±1037	24±271	25±178	58±859	178±907
	Base-case	96±212	159±488	312±1556	104±475	372±1376	441±1201	273±766	211±777	23±255	24±164	63±850	192±879
Total cost of health services	GDP ratio method	120±963	123±468	339±1588	114±508	400±1435	457±1250	300±813	234±1046	25±274	36±194	72±874	205±1016
	Base-case	134±960	169±502	354±1579	124±505	411±1415	478±1226	315±814	226±789	25±258	35±180	77±865	219±991
Total cost	GDP ratio method	707±2650	1050±3702	2222±7115	978±4891	1422±4838	1697±5004	1108±4374	2297±6413	488±2736	360±2468	637±2293	1169±4420
	Base-case	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408
	Difference	-1.9%	-4.2%	-0.7%	-1.0%	-0.8%	-1.2%	-1.4%	0.3%	0.0%	0.3%	-0.8%	-1.2%

Table 7.7b. Total cost of health services in 2008 international dollars among participants with dementia using the GDP ratio method, by site

Type of Cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Direct medical costs	GDP ratio method	78±217	109±300	133±353	93±168	563±2996	252±410	445±1622	758±2844	18±59	47±267	39±88	209±1301
	Base-case	91±201	156±366	143±331	112±204	571±2963	278±452	459±1619	608±2052	24±75	35±166	47±109	216±1197
Total cost of health services	GDP ratio method	101±260	121±314	158±387	129±220	614±3042	288±445	493±1644	793±2849	22±72	68±298	59±120	236±1320
	Base-case	114±254	168±385	167±368	148±256	622±3008	313±488	508±1641	643±2061	27±88	57±208	67±142	243±1219
Total cost	GDP ratio method	4501±5594	5331±8364	14016±15636	6497±11380	8412±11812	7708±10729	4911±9530	16044±11774	5990±8947	2926±6908	2154±3630	6743±10179
	Base-case	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154
	Difference	-0.3%	-0.9%	-0.1%	-0.3%	-0.1%	-0.3%	-0.3%	0.9%	-0.1%	0.4%	-0.4%	-0.1%

Table 7.8. Average income per month recorded in 10/66 study, in 2008 international dollars

Occupation	Cuba		China		Dominica Republic ¹		India		Mexico		Peru		Venezuela	
	Average income	Reported number	Average income	Reported number	Average income	Reported number	Average income	Reported number	Average income	Reported number	Average income	Reported number	Average income	Reported number
Manager/administrator	244	65	427	57	262	8	49	8	462	18	168	63	321	18
Professional	289	490	539	49	352	95	206	46	784	94	105	163	294	182
Associate professional	206	280	400	23	242	51	167	15	533	75	110	96	249	164
Clerical worker /secretary	128	66	323	28	206	61	119	23	486	72	164	18	227	169
Shop keeper	203	38	261	13	402	78	53	46	159	138	119	24	164	29
Skilled labourer	197	117	304	88	270	49	113	58	169	71	121	17	193	89
Semi-skilled labourer	162	54	171	5	165	109	51	92	276	52	32	39	125	18
Unskilled labourer	167	100	170	62	139	160	44	110	224	186	180	15	77	16
Agricultural worker	0	3	60	563	14	8	50	194	76	63	189	26	0	1
Average income across occupations including agricultural workers	231		163		235		73		327		119		239	
Average income across occupations excluding agricultural workers	231		340		238		85		350		115		239	

¹ The original data for Dominica Republic is the income per day. It is assumed that there are 20 working days in a month.

Table 7.9a. Public level social care costs and total costs in international dollars among all participants estimated using 10/66 salary method, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	10/66 salary method	221±942	223±876	104±377	54±302	75±523	194±902	154±795	357±1247	75±478	20±160	50±186	155±757
	Base-case	293±1245	517±1946	803±2897	408±2170	209±1396	432±1893	383±1893	1132±3468	308±1762	155±1230	393±1364	442±1978
IADL costs	10/66 salary method	120±722	77±534	51±253	29±232	102±552	194±978	61±386	112±720	34±410	8.0±61.4	16±59	82±562
	Base-case	158±940	178±1218	392±1924	219±1729	289±1564	444±2153	157±995	347±2020	133±1167	60±458	128±476	225±1401
Supervision costs	10/66 salary method	74±602	48±445	50±299	23±230	151±899	155±1071	93±861	34±368	2.5±28.6	14±133	5.5±64.5	67±595
	Base-case	101±829	113±1033	388±2317	192±1918	422±2487	349±2404	266±2417	120±1286	19±229	108±1087	44±522	194±1654
Informal care costs	10/66 salary method	415±1760	348±1472	206±781	106±617	329±1537	543±2225	308±1623	502±1855	111±799	42±315	70±265	304±1457
	Base-case	552±2338	808±3320	1583±6010	819±4669	920±4243	1224±4797	806±4145	1600±5040	460±2714	324±2453	565±2006	861±3869
Total costs of social care	10/66 salary method	450±1907	467±1911	506±2194	151±1036	432±2012	558±2247	310±1636	965±3098	115±807	42±315	70±265	407±1891
	Base-case	587±2471	927±3663	1884±6955	864±4842	1022±4563	1240±4818	809±4156	2062±6168	463±2717	324±2453	565±2006	964±4251
Total cost	10/66 salary method	584±2134	636±1981	860±2691	275±1174	843±2500	1036±2578	626±1956	1191±3314	139±852	77±368	147±940	626±2172
	Base-case	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408
	Difference	-19%	-42%	-62%	-72%	-41%	-40%	-44%	-48%	-72%	-79%	-77%	-47%

Table 7.9b. Public level social care costs and total costs in international dollars among participants with dementia estimated using 10/66 salary method, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	10/66 salary method	1651±2188	1102±1785	718±762	542±909	634±1542	1206±2279	954±1916	2673±2961	1061±1637	185±484	176±303	1100±1900
	Base-case	2203±2889	2574±3926	5616±5957	3718±6161	1723±3984	2457±4249	2508±4677	8062±6535	4048±5595	1413±3687	1455±2389	2945±4597
IADL costs	10/66 salary method	882±1654	510±1399	376±654	190±504	684±1338	1266±2588	239±674	1098±2267	526±1657	79±192	50±92	605±1495
	Base-case	1167±2150	1178±3187	2917±4968	1352±3692	1927±3789	2823±5392	600±1593	3160±5774	1713±4285	588±1417	430±754	1549±3568
Supervision costs	10/66 salary method	578±1536	359±1213	394±797	142±382	1276±2475	954±2643	513±1989	320±1054	32±98	113±351	23±102	499±1557
	Base-case	795±2166	840±2813	3136±6278	958±2588	3582±6860	2072±5810	1276±4686	1096±3389	208±646	857±2623	210±1040	1389±4147
Informal care costs	10/66 salary method	3110±3976	1970±3423	1489±1761	874±1592	2594±3955	3425±5355	1707±3850	4091±4796	1620±2926	378±913	249±434	2204±3674
	Base-case	4164±5303	4591±7692	11669±13725	6028±10932	7232±10771	7351±10714	4383±9145	12317±10036	5968±8931	2858±6880	2095±3574	5883±9173
Total costs for social care	10/66 salary method	3346±4305	2589±4326	3679±5176	1215±2726	3159±4775	3494±5348	1741±3901	7024±6549	1620±2926	378±913	249±434	2828±4564
	Base-case	4400±5594	5210±8350	13859±15661	6368±11376	7797±11289	7420±10688	4418±9186	15251±11368	5968±8931	2858±6880	2095±3574	6507±10016
Total cost	10/66 salary method	3460±4308	2757±4340	3846±5174	1363±2717	3781±5705	3807±5398	2249±4439	7667±6994	1646±2940	435±957	316±521	3071±4788
	Base-case	4514±5593	5378±8354	14026±15641	6516±11371	8419±11769	7733±10731	4925±9539	15894±11615	5995±8951	2915±6902	2162±3641	6750±10154
	Difference	-23%	-49%	-73%	-79%	-55%	-51%	-54%	-52%	-73%	-85%	-85%	-55%

7.4. Replacement cost method

This method assumes that the care provided by family members could potentially be replaced by paid home carers (if they were available). Therefore, the unit cost for paid home carers can be used as a proxy value for this care. As described in Section 3, the unit cost of paid home carers was determined according to the minimum wages from the TRAVAIL database of ILO and these data have been described in Table 3.20.

The comparison between costs produced using the replacement cost method and the base-case estimates are shown in Table 7.10a for the whole sample and Table 7.10b for those participants with dementia. For the whole sample, the replacement cost method resulted in large decreases in each category of cost compared with the base-case. The reduction ranged from 36% in Cuba to 68% in urban India. For participants with dementia the reductions are also substantial because of the high use of informal care in this group. Interestingly, the results from using the replacement method and the 10/66 salary method are quite similar.

7.5. Leisure time method

As stated in Section 3, time spent by family members or friends providing care can be separated into loss of working time and loss of leisure time. For those carers with full-time or part-time jobs, time spent providing care was firstly considered as resulting in a loss of working time if the carers reported they had cut back from work or stopped work to provide care. The maximum amount of lost working time was based on their reported loss of working hours. The remainder of the time was treated as leisure time. For those not in paid work, all of the time was treated as leisure time.

In the base-case analysis, the values for working time and leisure time are the same. In sensitivity analyses, two scenarios were used. The first was to assume the value of leisure time was equal to 50% of the value of working time. The second one was to change the percentage to 150%. The reason for considering a value that is lower or

Table 7.10a. Public level social care costs and total costs in international dollars among all participants estimated using the replacement cost method, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	Replacement method	157±667	219±823	330±1190	167±891	132±882	101±445	90±445	354±1083	96±550	38±302	96±334	169±773
	Base-case	293±1245	517±1946	803±2897	408±2170	209±1396	432±1893	383±1893	1132±3468	308±1762	155±1230	393±1364	442±1978
IADL costs	Replacement method	85±503	75±515	161±790	90±710	183±988	104±506	37±234	108±631	42±365	15±112	31±117	92±594
	Base-case	158±940	178±1218	392±1924	219±1729	289±1564	444±2153	157±995	347±2020	133±1167	60±458	128±476	225±1401
Supervision costs	Replacement method	54±444	48±437	159±951	79±787	266±1571	82±565	62±568	38±402	5.9±71.5	26±267	11±128	85±749
	Base-case	101±829	113±1033	388±2317	192±1918	422±2487	349±2404	266±2417	120±1286	19±229	108±1087	44±522	194±1654
Informal care costs	Replacement method	296±1252	342±1405	650±2468	336±1917	581±2680	288±1128	189±974	500±1574	144±848	79±602	138±492	346±1632
	Base-case	552±2338	808±3320	1583±6010	819±4669	920±4243	1224±4797	806±4145	1600±5040	460±2714	324±2453	565±2006	861±3869
Total costs of social care	Replacement method	330±1403	461±1862	951±3600	381±2161	684±3056	303±1175	192±988	962±2894	147±856	79±602	138±492	449±2099
	Base-case	587±2471	927±3663	1884±6955	864±4842	1022±4563	1240±4818	809±4156	2062±6168	463±2717	324±2453	565±2006	964±4251
Total cost	Replacement method	464±1698	630±1935	1305±3913	505±2246	1095±3413	781±1715	507±1379	1189±3118	172±900	115±633	215±1052	668±2356
	Base-case	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408
	Difference	-36%	-43%	-42%	-49%	-24%	-55%	-55%	-48%	-65%	-68%	-67%	-44%

Table 7.10b. Public level social care costs and total costs in international dollars among participants with dementia estimated using the replacement cost method, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	Replacement method	1179±1547	1089±1661	2306±2446	1526±2530	1088±2516	578±999	589±1099	2518±2042	1265±1748	346±904	357±586	1167±1839
	Base-case	2203±2889	2574±3926	5616±5957	3718±6161	1723±3984	2457±4249	2508±4677	8062±6535	4048±5595	1413±3687	1455±2389	2945±4597
IADL costs	Replacement method	625±1152	498±1348	1198±2040	555±1516	1217±2393	664±1268	141±374	987±1804	535±1339	144±347	105±185	641±1481
	Base-case	1167±2150	1178±3187	2917±4968	1352±3692	1927±3789	2823±5392	600±1593	3160±5774	1713±4285	588±1417	430±754	1549±3568
Supervision costs	Replacement method	426±1160	355±1190	1287±2578	393±1062	2263±4333	487±1366	300±1102	342±1059	65±202	210±643	51±255	622±1970
	Base-case	795±2166	840±2813	3136±6278	958±2588	3582±6860	2072±5810	1276±4686	1096±3389	208±646	857±2623	210±1040	1389±4147
Informal care costs	Replacement method	2230±2840	1942±3254	4791±5635	2475±4488	4568±6804	1728±2518	1030±2150	3848±3135	1864±2790	701±1687	514±876	2430±3960
	Base-case	4164±5303	4591±7692	11669±13725	6028±10932	7232±10771	7351±10714	4383±9145	12317±10036	5968±8931	2858±6880	2095±3574	5883±9173
Total costs of social care	Replacement method	2466±3181	2561±4179	6981±8172	2816±5165	5134±7431	1796±2550	1064±2208	6782±5111	1864±2790	701±1687	514±876	3054±5006
	Base-case	4400±5594	5210±8350	13859±15661	6368±11376	7797±11289	7420±10688	4418±9186	15251±11368	5968±8931	2858±6880	2095±3574	6507±10016
Total cost	Replacement method	2580±3181	2729±4198	7148±8158	2963±5163	5755±8096	2110±2627	1572±2910	7425±5599	1891±2811	758±1718	581±949	3297±5212
	Base-case	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154
	Difference	-43%	-49%	-49%	-55%	-32%	-73%	-68%	-53%	-68%	-74%	-73%	-51%

higher than that of working time has been discussed in Section 3. In brief, this is based on the neoclassical model of labour-leisure choice (Sendi and Brouwer, 2004). Individuals are considered to seek maximum satisfaction (or utility) from consuming goods (or income) and engaging in leisure. When the person needs to choose from undertaking work or enjoying leisure, he or she will consider the value of time according to his or her budget. Therefore, the value of lost leisure time may be lower or higher than the value of lost work time, according to the person's spending patterns decision.

It was not clear in what order help with ADLs, IADLs or supervision was provided and so the split between work and leisure time cannot be readily investigated for these. Therefore, the focus of these sensitivity analyses is on changes to overall informal care costs, social care costs and total costs. The impact that the leisure time method has on costs is shown in Table 7.11a for the whole sample and Table 7.11b for participants with dementia. For the whole sample, decreasing or increasing the value of leisure time changed total costs by around one-third of the total cost in every centre. The rate is slightly higher among participants with dementia patients.

7.6. Carers characteristics method

Average wages differ according to gender, and a person in working age may be more productive than one who is not in working age. Table 2.15 in Section 2 showed the characteristics of carers of participants with dementia in the 10/66 survey. In brief, 77.6% of carers are female in the sample as a whole, ranging from 35.7% in rural China to 83.1% in urban Peru; 77.4% of carers are in working age in the sample as a whole, ranging from 54.5% in urban China to 96.3% in rural India. Working age in this thesis refer to people in 18 to 64 years old.

Information on average wages in a country as a whole was presented in Table 3.21. In the ILO TRAVAIL wage database, information of the average wage for men and women is available for Mexico, Peru and Venezuela. Other countries, including China, Cuba, the Dominican Republic, and India have to be estimated based on imputation. Gender differences in average wages in different WHO regions in the

Table 7.11a. Public level social care costs and total costs in international dollars among all participants estimated using different unit costs for loss of working time and loss of leisure time, by site

Types of cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Base-case</i>												
Informal care costs	552±2338	808±3320	1583±6010	819±4669	920±4243	1224±4797	806±4145	1600±5040	460±2714	324±2453	565±2006	861±3869
Total costs of social care	587±2471	927±3663	1884±6955	864±4842	1022±4563	1240±4818	809±4156	2062±6168	463±2717	324±2453	565±2006	964±4251
Total cost	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408
<i>Leisure time 50% of working time</i>												
Informal care costs	298±1246	450±1842	815±3102	437±2447	475±2188	653±2550	450±2284	814±2563	274±1605	176±1347	304±1091	458±2046
Total costs of social care	333±1398	570±2249	1116±4166	481±2705	578±2598	668±2578	453±2294	1277±3793	277±1610	176±1347	304±1091	561±2486
Total cost	467±1694	738±2310	1470±4438	605±2775	989±3003	1147±2872	768±2565	1503±3998	302±1638	212±1366	381±1506	780±2718
Difference	-35%	-33%	-34%	-39%	-31%	-33%	-32%	-34%	-38%	-41%	-41%	-34%
<i>Leisure time 150% of working time</i>												
Informal care costs	806±3444	1166±4833	2351±8934	1202±6920	1365±6308	1796±7074	1161±6033	2386±7528	646±3840	471±3567	826±2931	1264±5712
Total costs of social care	841±3569	1285±5146	2652±9828	1246±7060	1468±6594	1811±7093	1164±6043	2848±8610	649±3843	471±3567	826±2931	1366±6069
Total cost	975±3694	1454±5174	3006±9932	1370±7105	1879±6790	2290±7226	1479±6227	3074±8769	674±3859	506±3577	902±3156	1586±6192
Difference	35%	33%	34%	39%	31%	33%	32%	34%	38%	41%	40%	34%

Table 7.11b. Public level social care costs and total costs in international dollars among participants with dementia estimated using different unit costs for loss of working time and loss of leisure time, by site

Types of cost	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
<i>Base-case</i>												
Informal care costs	4164±5303	4591±7692	11669±13725	6028±10932	7232±10771	7351±10714	4383±9145	12317±10036	5968±8931	2858±6880	2095±3574	5883±9173
Total costs of social care	4400±5594	5210±8350	13859±15661	6368±11376	7797±11289	7420±10688	4418±9186	15251±11368	5968±8931	2858±6880	2095±3574	6507±10016
Total cost	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154
<i>Leisure time 50% of working time</i>												
Informal care costs	2227±2790	2533±4219	5952±7105	3307±5731	3774±5609	3879±5543	2338±4798	6304±5101	3562±5285	1595±3862	1141±1969	3124±4821
Total costs of social care	2463±3140	3151±5005	8142±9399	3648±6589	4340±6285	3947±5536	2373±4841	9238±6784	3562±5285	1595±3862	1141±1969	3748±5809
Total cost	2577±3142	3320±5018	8309±9384	3795±6581	4962±7050	4261±5586	2880±5292	9881±7180	3589±5307	1652±3889	1208±2037	3992±5996
Difference	-43%	-38%	-41%	-42%	-41%	-45%	-42%	-38%	-40%	-43%	-44%	-41%
<i>Leisure time 150% of working time</i>												
Informal care costs	6102±7857	6650±11241	17386±20383	8748±16258	10690±15985	10824±15955	6428±13524	18330±15036	8374±12645	4121±9927	3049±5199	8642±13580
Total costs of social care	6337±8124	7268±11843	19576±22167	9089±16539	11255±16441	10892±15922	6462±13564	21264±16222	8374±12645	4121±9927	3049±5199	9266±14363
Total cost	6452±8121	7436±11842	19743±22145	9237±16542	11877±16801	11206±15971	6970±13879	21907±16399	8401±12665	4178±9946	3116±5265	9510±14478
Difference	43%	38%	41%	42%	41%	45%	42%	38%	40%	43%	44%	41%

World Alzheimer's Report 2010 (Wimo and Prince, 2010) reported ratios between men vs all persons, and women vs all persons. The table was revised in accordance with the need for this thesis (Table 7.12).

Table 7.12. Gender differences in average wage in China, Cuba, Dominican Republic, and India

Countries	WHO region	Men vs All	Women vs All	Women vs Men
China	Asia East	1.20	0.80	0.67
Cuba	Latin America Central	1.10	0.82	0.74
Dominican Republic	Latin America Central	1.10	0.82	0.74
India	Asia South	1.04	0.84	0.81

Revised from Wimo, A. and M. Prince (2010). World Alzheimer Report 2010: The global economic impact of dementia.

Information provided in Table 7.12 can be used for the imputations of average wages for men and women in China, Cuba, the Dominican Republic, and India. For example, the ratio of 'Men vs All' in China can be multiplied with the average wage in that country to generate the average wage for men. The average wages for men and women for different countries are shown in Table 7.13. PPPs in 2008 were used to convert these into international dollars.

Table 7.13. Monthly average wages for men and women in different countries in 2008

Countries	Local currency	PPPs in 2008	Average wage in the Local currency			Average wage in international dollars		
			Whole population	Male	Female	Whole population	Male	Female
China*	Yuan	3.822	2436	2923	1949	637	765	510
Cuba*	Pesos	1.357	421	463	345	310	341	254
Dominican Republic*	Dominican peso	19.431	10609	11670	8699	546	601	448
India*	Rupee	16.217	8466	8805	7111	522	543	439
Mexico	Pesos	7.470	5627	6188	4821	753	828	645
Peru	Nuevo sol	1.507	1340	1568	1004	889	1040	666
Venezuela	Bolivar Fuerte**	1.873	1265	1310	915	676	699	489

* Wage estimation for men and women is based on the ratios provided in World Alzheimer Report (Wimo and Prince, 2010)

** Venezuelan Bolivar Fuerte = 1000Venezuelan Bolivar

The value for a person not of working age was determined to be 50% of the value of people of working age based on the World Alzheimer Report 2010 (Wimo and Prince, 2010). The average wages for men and women and for persons of working age and not of working age were used as the unit costs of informal care separately. Therefore, the focus of these sensitivity analyses is on changes to overall informal care costs, social care costs and total costs. The impact of the carers characteristics method with regard to gender is shown in Table 7.12a for the whole sample and 7.12b for participants with dementia. The impact that the carers characteristics method with regard to working age is described in Table 7.13a for the whole sample and 7.13b for participants with dementia. The impact that of both of these combined is described in Table 7.14a for the whole sample and 7.14b for participants with dementia. For more straightforward comparisons, the differences between the estimation from the carers' characteristics method and the base-case from the former six tables are summarised in Table 7.15.

For the whole sample, decreasing the value of female informal care and increasing the value of male informal care resulted in decreases in each category of cost by around 10% compared with the base-case for the sample as a whole, ranging from 3% in rural China to 15% in rural Peru and Venezuela. The decrease among dementia patients is slightly larger, due to more female carers for participants with dementia, which has been reported in section 2 (Table 2.12 and Table 2.15).

For the whole sample, attaching less value to time lost by people not of working age leads to 9% decreases in total cost in the sample as a whole, and this varies across the sites from 4% in India and Venezuela, to 15% in urban China. The decrease in costs of care for participants with dementia is slightly more in Cuba, the Dominican Republic, urban Peru, Venezuela, rural Mexico, China and rural India, but smaller in rural Peru, urban Mexico and urban India.

When considering the two factors together, larger decreases are shown for participants with dementia except in urban Mexico and India. However, as stated in Table 7.15, these decreases cannot be simply added together to generate the combined decrease. The real combined decreases rate may be smaller than the mathematical sum of the two separate figures.

Table 7.12a. Public level social care costs and total costs in international dollars among all participants estimated using different average wage for male and female carers, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	Carers characteristics method	255±1084	444±1652	660±2419	330±1773	160±1059	386±1690	349±1724	1036±3180	297±1679	132±1051	346±1202	384±1725
	Base-case	293±1245	517±1946	803±2897	408±2170	209±1396	432±1893	383±1893	1132±3468	308±1762	155±1230	393±1364	442±1978
IADL costs	Carers characteristics method	136±810	154±1024	323±1612	174±1326	227±1261	397±1946	141±881	321±1822	130±1200	54±411	112±419	194±1212
	Base-case	158±940	178±1218	392±1924	219±1729	289±1564	444±2153	157±995	347±2020	133±1167	60±458	128±476	225±1401
Supervision costs	Carers characteristics method	89±750	99±919	321±1977	170±1732	325±1940	308±2114	238±2136	112±1289	17±209	95±986	40±479	164±1418
	Base-case	101±829	113±1033	388±2317	192±1918	422±2487	349±2404	266±2417	120±1286	19±229	108±1087	44±522	194±1654
Informal care costs	Carers characteristics method	480±2036	697±2839	1305±5100	674±3960	712±3280	1091±4239	728±3707	1468±4716	444±2617	281±2142	498±1783	742±3344
	Base-case	552±2338	808±3320	1583±6010	819±4669	920±4243	1224±4797	806±4145	1600±5040	460±2714	324±2453	565±2006	861±3869
Total costs of social care	Carers characteristics method	515±2168	816±3198	1605±6023	718±4129	815±3637	1106±4261	731±3720	1931±5836	448±2621	281±2142	498±1783	844±3732
	Base-case	587±2471	927±3663	1884±6955	864±4842	1022±4563	1240±4818	809±4156	2062±6168	463±2717	324±2453	565±2006	964±4251
Total cost	Carers characteristics method	649±2370	984±3241	1959±6208	843±4191	1226±3948	1584±4458	1046±3934	2157±6001	472±2642	316±2155	574±2081	1063±3902
	Base-case	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408
	Difference	-10%	-10%	-12%	-15%	-15%	-8%	-7%	-6%	-3%	-12%	-11%	-10%

Table 7.12b. Public level social care costs and total costs in international dollars among participants with dementia estimated using different average wage for male and female carers, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	Carers characteristics method	1908±2504	2215±3325	4568±4978	2928±4887	1282±2910	2167±3706	2292±4275	7244±5814	3844±5253	1188±3101	1292±2134	2532±3950
	Base-case	2203±2889	2574±3926	5616±5957	3718±6161	1723±3984	2457±4249	2508±4677	8062±6535	4048±5595	1413±3687	1455±2389	2945±4597
IADL costs	Carers characteristics method	1010±1890	1008±2654	2409±4232	1084±2890	1526±3181	2521±4964	533±1392	2853±4995	1693±4482	526±1283	381±672	1334±3123
	Base-case	1167±2150	1178±3187	2917±4968	1352±3692	1927±3789	2823±5392	600±1593	3160±5774	1713±4285	588±1417	430±754	1549±3568
Supervision costs	Carers characteristics method	692±1904	737±2498	2638±5504	860±2635	2687±5179	1788±4980	1136±4084	970±3028	208±660	727±2207	202±1050	1160±3472
	Base-case	795±2166	840±2813	3136±6278	958±2588	3582±6860	2072±5810	1276±4686	1096±3389	208±646	857±2623	210±1040	1389±4147
Informal care costs	Carers characteristics method	3610±4595	3960±6560	9615±11945	4871±9219	5495±8170	6476±9348	3961±8096	11066±9168	5744±8679	2442±5803	1876±3295	5026±7866
	Base-case	4164±5303	4591±7692	11669±13725	6028±10932	7232±10771	7351±10714	4383±9145	12317±10036	5968±8931	2858±6880	2095±3574	5883±9173
Total costs of social care	Carers characteristics method	3846±4884	4579±7260	11805±13739	5212±9654	6060±8760	6545±9324	3995±8150	14000±10426	5744±8679	2442±5803	1876±3295	5650±8702
	Base-case	4400±5594	5210±8350	13859±15661	6368±11376	7797±11289	7420±10688	4418±9186	15251±11368	5968±8931	2858±6880	2095±3574	6507±10016
Total cost	Carers characteristics method	3961±4884	4747±7263	11972±13720	5360±9648	6682±9343	6858±9370	4503±8503	14643±10628	5771±8700	2498±5828	1943±3356	5893±8841
	Base-case	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154
	Difference	-12%	-12%	-15%	-18%	-21%	-11%	-9%	-8%	-4%	-14%	-10%	-13%

Table 7.13a. Public level social care costs and total costs in international dollars among all participants estimated using different average wage for carers in working age and not in working age, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	Carers characteristics method	241±1054	470±1836	701±2651	373±2050	198±1349	394±1775	337±1665	881±2818	265±1602	147±1205	374±1299	383±1771
	Base-case	293±1245	517±1946	803±2897	408±2170	209±1396	432±1893	383±1893	1132±3468	308±1762	155±1230	393±1364	442±1978
IADL costs	Carers characteristics method	131±805	162±1112	352±1815	172±1260	271±1454	393±1942	142±910	274±1623	126±1153	58±448	123±462	199±1251
	Base-case	158±940	178±1218	392±1924	219±1729	289±1564	444±2153	157±995	347±2020	133±1167	60±458	128±476	225±1401
Supervision costs	Carers characteristics method	80±660	101±912	343±2124	177±1863	392±2366	313±2203	242±2268	103±1200	19±229	106±1085	41±509	175±1537
	Base-case	101±829	113±1033	388±2317	192±1918	422±2487	349±2404	266±2417	120±1286	19±229	108±1087	44±522	194±1654
Informal care costs	Carers characteristics method	453±1968	733±3084	1396±5520	722±4242	861±4074	1100±4391	721±3749	1258±4224	410±2571	310±2425	538±1917	757±3528
	Base-case	552±2338	808±3320	1583±6010	819±4669	920±4243	1224±4797	806±4145	1600±5040	460±2714	324±2453	565±2006	861±3869
Total costs of social care	Carers characteristics method	488±2104	852±3424	1696±6531	766±4433	964±4398	1115±4414	724±3760	1720±5405	414±2574	310±2425	538±1917	860±3921
	Base-case	587±2471	927±3663	1884±6955	864±4842	1022±4563	1240±4818	809±4156	2062±6168	463±2717	324±2453	565±2006	964±4251
Total cost	Carers characteristics method	622±2310	1021±3467	2051±6696	890±4488	1375±4661	1593±4612	1038±3991	1947±5569	438±2592	346±2436	614±2165	1079±4083
	Base-case	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408
	Difference	-14%	-7%	-8%	-10%	-4%	-7%	-8%	-15%	-10%	-4%	-4%	-9%

Table 7.13b. Public level social care costs and total costs in international dollars among participants with dementia estimated using different average wage for carers in working age and not in working age, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	Carers characteristics method	1804±2458	2319±3717	4953±5708	3549±6004	1627±3832	2355±4138	2202±4083	6228±5557	3451±5174	1397±3685	1389±2272	2562±4173
	Base-case	2203±2889	2574±3926	5616±5957	3718±6161	1723±3984	2457±4249	2508±4677	8062±6535	4048±5595	1413±3687	1455±2389	2945±4597
IADL costs	Carers characteristics method	951±1818	1063±2900	2613±4726	1268±3615	1767±3322	2675±5280	541±1446	2529±4743	1635±4276	572±1403	419±747	1374±3258
	Base-case	1167±2150	1178±3187	2917±4968	1352±3692	1927±3789	2823±5392	600±1593	3160±5774	1713±4285	588±1417	430±754	1549±3568
Supervision costs	Carers characteristics method	633±1747	743±2469	2722±5701	789±1956	3460±6777	1989±5775	1147±4234	888±3025	208±646	857±2623	182±982	1250±3889
	Base-case	795±2166	840±2813	3136±6278	958±2588	3582±6860	2072±5810	1276±4686	1096±3389	208±646	857±2623	210±1040	1389±4147
Informal care costs	Carers characteristics method	3388±4505	4125±7151	10288±12836	5605±10234	6854±10551	7019±10558	3890±8155	9644±9124	5294±8677	2826±6876	1990±3377	5185±8532
	Base-case	4164±5303	4591±7692	11669±13725	6028±10932	7232±10771	7351±10714	4383±9145	12317±10036	5968±8931	2858±6880	2095±3574	5883±9173
Total costs of social care	Carers characteristics method	3624±4794	4744±7798	12478±15029	5946±10720	7420±11051	7087±10534	3924±8203	12578±10732	5294±8677	2826±6876	1990±3377	5809±9400
	Base-case	4400±5594	5210±8350	13859±15661	6368±11376	7797±11289	7420±10688	4418±9186	15251±11368	5968±8931	2858±6880	2095±3574	6507±10016
Total cost	Carers characteristics method	3738±4790	4912±7808	12646±15016	6094±10727	8042±11522	7401±10574	4432±8619	13221±10988	5320±8688	2883±6892	2057±3423	6052±9540
	Base-case	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154
	Difference	-17%	-9%	-10%	-6%	-4%	-4%	-10%	-17%	-11%	-1%	-5%	-10%

Table 7.14a. Public level social care costs and total costs in international dollars among all participants estimated using different average wage for different working age male and female carers, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	Carers characteristics method	210±912	402±1553	566±2149	300±1644	151±1022	351±1573	306±1513	798±2543	255±1497	126±1030	328±1142	330±1517
	Base-case	293±1245	517±1946	803±2897	408±2170	209±1396	432±1893	383±1893	1132±3468	308±1762	155±1230	393±1364	442±1978
IADL costs	Carers characteristics method	113±696	140±938	284±1455	136±966	212±1142	350±1767	127±806	251±1430	123±1186	51±403	108±402	170±1069
	Base-case	158±940	178±1218	392±1924	219±1729	289±1564	444±2153	157±995	347±2020	133±1167	60±458	128±476	225±1401
Supervision costs	Carers characteristics method	71±599	88±797	275±1666	154±1651	301±1826	273±1905	215±1975	97±1230	17±209	93±984	37±469	146±1287
	Base-case	101±829	113±1033	388±2317	192±1918	422±2487	349±2404	266±2417	120±1286	19±229	108±1087	44±522	194±1654
Informal care costs	Carers characteristics method	393±1707	631±2631	1125±4432	590±3543	665±3122	975±3854	648±3327	1145±3905	395±2456	270±2119	473±1702	646±2985
	Base-case	552±2338	808±3320	1583±6010	819±4669	920±4243	1224±4797	806±4145	1600±5040	460±2714	324±2453	565±2006	861±3869
Total costs of social care	Carers characteristics method	428±1844	750±2987	1425±5463	634±3731	767±3486	990±3878	651±3341	1608±5075	398±2460	270±2119	473±1702	749±3389
	Base-case	587±2471	927±3663	1884±6955	864±4842	1022±4563	1240±4818	809±4156	2062±6168	463±2717	324±2453	565±2006	964±4251
Total cost	Carers characteristics method	562±2076	918±3035	1780±5664	758±3799	1179±3803	1468±4097	966±3578	1834±5234	423±2478	306±2131	550±1967	968±3569
	Base-case	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408
	Difference	-22%	-16%	-20%	-23%	-18%	-15%	-14%	-20%	-13%	-15%	-14%	-18%

Table 7.14b. Public level social care costs and total costs in international dollars among participants with dementia estimated using different working age male and female carers, by site

Types of cost	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL costs	Carers characteristics method	1561±2111	1996±3145	3963±4617	2730±4549	1213±2802	2078±3615	2001±3707	5575±4951	3241±4701	1175±3099	1236±2044	2186±3524
	Base-case	2203±2889	2574±3926	5616±5957	3718±6161	1723±3984	2457±4249	2508±4677	8062±6535	4048±5595	1413±3687	1455±2389	2945±4597
	Carers characteristics method	822±1612	912±2419	2112±3809	985±2734	1386±2638	2388±4870	478±1253	2264±4014	1610±4468	512±1272	372±667	1175±2809
IADL costs	Base-case	1167±2150	1178±3187	2917±4968	1352±3692	1927±3789	2823±5392	600±1593	3160±5774	1713±4285	588±1417	430±754	1549±3568
	Carers characteristics method	552±1572	648±2144	2200±4492	662±1706	2599±5124	1710±4946	1026±3706	790±2752	208±660	727±2207	179±1010	1031±3160
Supervision costs	Base-case	795±2166	840±2813	3136±6278	958±2588	3582±6860	2072±5810	1276±4686	1096±3389	208±646	857±2623	210±1040	1389±4147
Informal care costs	Carers characteristics method	2936±3904	3555±6082	8275±10287	4377±7909	5197±7948	6176±9216	3505±7218	8629±8208	5059±8323	2415±5801	1788±3148	4392±7119
	Base-case	4164±5303	4591±7692	11669±13725	6028±10932	7232±10771	7351±10714	4383±9145	12317±10036	5968±8931	2858±6880	2095±3574	5883±9173
	Carers characteristics method	3171±4193	4174±6771	10465±12487	4718±8433	5763±8529	6245±9194	3539±7280	11563±9760	5059±8323	2415±5801	1788±3148	5016±7999
Total costs of social care	Base-case	4400±5594	5210±8350	13859±15661	6368±11376	7797±11289	7420±10688	4418±9186	15251±11368	5968±8931	2858±6880	2095±3574	6507±10016
Total cost	Carers characteristics method	3286±4190	4342±6780	10632±12476	4865±8435	6384±9111	6558±9231	4046±7698	12206±9986	5086±8333	2472±5819	1855±3189	5260±8147
	Base-case	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154
	Difference	-27%	-19%	-24%	-25%	-24%	-15%	-18%	-23%	-15%	-15%	-14%	-22%

Table 7.15. Changing of the total costs when adjusted by gender only, age only, and both, by site

Sample	Adjusted factors	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Whole sample	Gender	-10%	-10%	-12%	-15%	-15%	-8%	-7%	-6%	-3%	-12%	-11%	-10%
	Age	-14%	-7%	-8%	-10%	-4%	-7%	-8%	-15%	-10%	-4%	-4%	-9%
	Gender and Age	-22%	-16%	-20%	-23%	-18%	-15%	-14%	-20%	-13%	-15%	-14%	-18%
Dementia patients	Gender	-12%	-12%	-15%	-18%	-21%	-11%	-9%	-8%	-4%	-14%	-10%	-13%
	Age	-17%	-9%	-10%	-6%	-4%	-4%	-10%	-17%	-11%	-1%	-5%	-10%
	Gender and Age	-27%	-19%	-24%	-25%	-24%	-15%	-18%	-23%	-15%	-15%	-14%	-22%

7.7. All informal care method

Informal care from relatives or friends other than the main carer is not included in the base-case analysis. Only the total time spent for providing help and information about stopping work or cutting back from work was collected for other informal care. The time spent for providing this other care could not be separated into ADL, IADL and supervision. Therefore, the cost of ‘other informal care’ was treated as a separate category in the analyses and it was aggregated with the original total cost in the base-case to generate the total cost estimated from ‘All informal care method’. Inclusion of these costs formed the sensitivity analyses presented here.

The impact of these sensitivity analyses on costs are shown in Table 7.16a for the whole sample and Table 7.16b for the participants who had dementia. For the whole sample, costs were increased by around 10% when this method was used and the change ranged from 1% in urban China to 17% in urban Mexico. Among participants with dementia the impact remained greatest in urban Mexico and least in urban China.

Summary of section

In this section, sensitivity analyses were conducted to assess the impact of making different assumptions about unit costs of medical care and social care.

The ‘percentage method’ and the ‘GDP-ratio method’ changed the unit cost of publicly owned health services. The GDP-ratio method produced a very similar estimate of cost compared with the base case. The percentage method has less impact on total cost among participants with dementia.

The ‘10/66 salary method’, ‘replacement cost approach’, ‘leisure time method’ and ‘carers characteristics method’ gave different estimates of the cost of informal caregiver time. All these method influence the costs for the dementia sample more than for the whole sample, because informal care is the most import component of costs among those with dementia. Decreases in costs are shown for these methods, except when leisure time was valued as 150% of working time. The ‘carers

characteristics method' had the least impact on cost. The 'all informal care method' included the informal care provided by those other than the main caregivers and resulted in increases in cost of around 10% for the whole sample and 11% for the dementia sample.

Table 7.16a. Public level social care costs and total costs in international dollars among all participants estimated by including ‘other informal care’, by site

Types of informal care	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Costs of other informal care	Other informal care method	88±606	172±1090	183±1320	103±862	173±1017	291±1535	128±840	31±391	23±251	12±171	85±447	122±891
Informal care costs	Other informal care method	640±2668	980±3836	1766±6480	922±5262	1093±4710	1515±5495	934±4551	1631±5101	483±2778	336±2510	650±2309	983±4244
	Base-case	552±2338	808±3320	1583±6010	819±4669	920±4243	1224±4797	806±4145	1600±5040	460±2714	324±2453	565±2006	861±3869
Total costs of social care	Other informal care method	675±2800	1099±4170	2067±7406	967±5441	1196±5045	1531±5521	937±4561	2094±6230	486±2784	336±2510	650±2309	1086±4616
	Base-case	587±2471	927±3663	1884±6955	864±4842	1022±4563	1240±4818	809±4156	2062±6168	463±2717	324±2453	565±2006	964±4251
Total costs	Other informal care method	809±2959	1268±4205	2421±7548	1091±5494	1607±5285	2009±5708	1252±4757	2320±6404	511±2803	371±2523	727±2562	1305±4766
	Base-case	721±2649	1096±3702	2238±7111	988±4895	1434±4824	1718±4997	1124±4365	2289±6342	488±2736	359±2465	642±2291	1183±4408
	Difference	12%	16%	8%	10%	12%	17%	11%	1%	5%	3%	13%	10%

Table 7.16b. Public level social care costs and total costs in international dollars among participants with dementia estimated by including ‘other informal care’, by site

Types of informal care	Method	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Costs of other informal care	Other informal care method	610±1493	812±2284	1180±3190	1015±2937	1389±2817	1513±3010	524±1583	175±739	280±861	109±495	394±1018	763±2127
Informal care costs	Other informal care method	4774±6059	5403±8573	12849±14320	7043±13176	8621±11783	8865±11787	4908±9940	12492±10048	6248±9051	2966±7093	2489±4277	6646±9915
	Base-case	4164±5303	4591±7692	11669±13725	6028±10932	7232±10771	7351±10714	4383±9145	12317±10036	5968±8931	2858±6880	2095±3574	5883±9173
Total costs of social care	Other informal care method	5009±6332	6021±9197	15039±16206	7383±13686	9186±12291	8933±11754	4942±9975	15426±11350	6248±9051	2966±7093	2489±4277	7270±10717
	Base-case	4400±5594	5210±8350	13859±15661	6368±11376	7797±11289	7420±10688	4418±9186	15251±11368	5968±8931	2858±6880	2095±3574	6507±10016
Total costs	Other informal care method	5124±6333	6190±9196	15206±16180	7531±13697	9808±12718	9247±11819	5450±10288	16069±11592	6275±9071	3023±7116	2556±4340	7513±10846
	Base-case	4514±5593	5378±8354	14026±15641	6516±11376	8419±11769	7733±10736	4925±9539	15894±11615	5995±8951	2915±6902	2162±3640	6750±10154
	Difference	14%	15%	8%	16%	16%	20%	11%	1%	5%	4%	18%	11%

Section 8. Discussion

Around the world, the proportion of people aged 65 years and over has been increasing in recent years (Trabucchi, 1999). Dementia is one of the most important diseases among older people. Dementia has no cure and, therefore, the focus is on appropriate care and support for people with the condition. Providing care for a person with dementia is difficult and complex and the care burden is shared by nursing homes, hospitals, health professionals and family caregivers. However, the relative burden among these is different for developing and developed countries. It is clear that dementia has resulted in a substantial economic burden on society (Cotter, 2007). Undertaking a cost-of-illness study can identify areas in which costs may be saved if there is an intervention to reduce the prevalence of the disease, or to reduce severity or slow down progression and these studies can highlight the absence or insufficiency of research investment on dementia by governments (Lowin et al., 2001).

Currently, most evidence about the cost of dementia has come from high income countries, and information from low and middle income countries (LAMICs) has just started to accumulate. This thesis described the cost of care received by people with dementia in seven LAMICs in Asia and Latin America, estimated the cost that was attributable to dementia itself, and identified predictors of the cost. Results from the thesis can contribute to the current knowledge of dementia costs in LAMICs, and help people in those settings to consider how to allocate limited resources. The thesis also discussed methodological issues encountered when making cost estimations which may be a useful reference for future studies.

8.1. Summaries of the cost estimation in this study

In the study, cost was divided into the cost of medical care and the cost of social care. Social care consisted of informal care and paid home care. Cost was reported in international dollars (I\$) for the year 2008 using a private and public perspective.

Information on health service utilisation was collected in the 10/66 survey. Out-of-pocket expenses incurred when using services and real income lost by caregivers were used as unit costs at the private level. At the public level, the use of

UK unit costs and out-of-pocket expenses were combined to estimate the direct medical cost, and the human capital approach based on average wages was used to value the indirect cost incurred by carers.

Information on informal care provided for ADL, IADL, and supervision and paid home care was collected in the survey. The human capital approach was used to value informal care, again based on average wages. Minimum wages were used as the unit cost of paid home care. Two potential alternative methods for estimating the cost of medical care, and five alternative methods for informal care were addressed in sensitivity analyses.

Characteristics of participants with dementia and their carers

Most of the people who had dementia were female, were in the older age groups, and had lower educational levels than those without dementia. They were less likely to be employed and also less likely to have income, a pension or private health insurance. They had higher levels of disability and dependency, and therefore, needed more social care. All of these factors highlight the importance and urgent need for the provision of help for these people.

Most of the carers of the participants with dementia were female, except in rural China. Carers were usually of working age, but most did not have a job. Most of the carers were children, children in law or other relatives, rather than spouses. This indicates that the care burden is substantial because of the impact on work. It implies that older partners/spouses may have difficulties in dealing with the problems, or they may also need to be recipients of care.

Total cost of dementia

In this study, both costs for the general population (looking at the sample as a whole) and the specific costs of dementia were calculated. The results show the per capita total cost of care among the older general population is I\$660 at the private level, and I\$1183 at the public level. The costs increase to I\$1887 at the private level and I\$6750 at the public level for people with dementia. The increase at the private level is mainly due to the higher costs of informal care and paid home care. At the public level, although there is an increase in the cost of paid care, the increase in total costs

is more related to informal care. Dementia does not lead an increase in medical care costs. It is chronic physical diseases which increase medical care costs and this also influences the cost of social care.

The result that participants with dementia have higher costs than those without dementia is consistent with findings from other studies, even those not based on population samples. For example, a Sweden study (Nordberg et al., 2007) investigated institutionalised patients and found those with dementia had 30% higher costs than those without dementia, mainly because of functional dependency. A study of nursing home care (O'Brien and Caro, 2001) also indicated that dementia patients had higher costs due to extra hours of care.

However, the direct comparison of our results with findings from other studies is quite difficult. This is mainly because of variations in the methodologies used across these studies. The figures are usually presented for different years or in different currencies, but this can be resolved by converting to international dollar based on PPPs, and to same year according to CPIs. However, the range of resources measured in studies, methods of valuing the cost, and sources of data (from community or clinic samples) are often different, which means we need to be cautious about comparisons.

Nevertheless, some comparisons can be made with the findings from the study by Wimo and colleagues which made worldwide estimations of the costs of dementia. This study included both direct costs and informal care costs, and provided estimates for most countries in the world. In the latest worldwide report (Wimo et al., 2010), figures were reported at the country level for 2009, but no data were available for Cuba and the Dominican Republic. However, in their earlier report, information was available for these two countries. The costs from the two reports can be converted to 2008 prices based on the CPIs listed in Table 3.6a. The comparison is shown in Table 8.1. In order to facilitate this comparison, those cost not included as informal care are combined together as the direct cost.

At an individual level, it is shown that the current study makes lower estimates for direct cost in all countries, with the biggest difference in India (96%), followed by

Mexico (91%). Except for the Dominican Republic and Venezuela, the current study makes higher estimates of the costs of informal care, with the biggest difference in Peru (79%), followed by China (60%). The reason for the lower estimation of the cost of medical care in this thesis is because the data were from a community sample, while Wimo et al's study also considered people with dementia who were not living at home. Usually those patients have higher direct costs because of specialist treatments or institutionalisation. The higher estimate of the costs of informal care in most countries may be the result of differences in what time to include. In the estimates of Wimo et al, only ADL and IADL were included in informal care costs, while in this study supervision time is also considered. If looking at Wimo et al's earlier estimation for the year 2005 (Wimo et al., 2007), which included supervision, the informal care time doubled. If that were again the case, the costs here would be lower than those of Wimo et al.

The reason for the lower estimates of the cost of informal care in the Dominican Republic and Venezuela may be because of the CPI increased sharply in the most recent years in the two countries. In 2005, Wimo et al reported less difference in the cost of informal care across the countries, while bigger differences can be deduced from the 2009 report. For example, the average cost of informal care in Venezuela in 2005 was I\$9700. After adjustment based on the CPI, the figure increased to I\$17,198 for the year 2008. While in other countries with slower inflation, the figures would not highly increase. Therefore, the feasibility of applying PPPs to a country with higher inflation need to be addressed in the future. There is other evidence supporting this hypothesis. The costs of informal care in 2009 were only I\$17,411 in the UK (CPIs from Table 3.6a) and I\$13,179 in Sweden. Both of these costs are lower than the estimation for Venezuela (I\$22,075), and this results in similar estimations of total costs in the three countries (I\$27,402, I\$28,208 and I\$32,079 for Sweden, Venezuela and the UK separately). The results are problematic as Venezuela can not be considered similar to Sweden or the UK.

Comparisons of the costs at the population level are more complicated, as these are also influenced by the prevalence of dementia. However, it is clear from Table 8.1, that fewer people with dementia were estimated by Wimo et al in the Dominican Republic, Cuba and India compared with the findings of the 10/66 study. Therefore,

Table 8.1. Comparison of costs derived from Wimo et al and the current study

Country	Source	Number of people with dementia	Direct cost		Informal care		Total cost	
			Country level (millions IS)	Per capita (IS)	Country level (millions IS)	Per capita (IS)	Country level (millions IS)	Per capita (IS)
Cuba	Wimo-2005 ¹	86,543	132	1525	225	2600	357	4125
	Wimo-2008 ²	-	151	1744	257	2972	408	4716
	10/66 ³	147,840	52	350	616	4164	667	4514
Dominican Republic	Wimo-2005 ¹	26,686	76	2848	360	13490	436	16,338
	Wimo-2008 ²	-	96	3597	455	17037	551	20,634
	10/66 ³	71,280	56	787	327	4591	383	5378
China	Wimo-2009 ³	6,692,787	23,638	3532	40,568	6061	64,206	9593
	Wimo-2008 ²	-	23,796	3555	40,839	6102	64,635	9657
	10/66 ³	6,888,440	14,857	2157	67,353	9778	82,210	11,934
India	Wimo-2009 ³	3,165,827	6095	1925	7605	2402	13,670	4318
	Wimo-2008 ²	-	5511	1741	6876	2172	12,360	3904
	10/66 ³	5,229,315	329	63	12,590	2408	12,919	2471
Mexico	Wimo-2009 ³	486,521	2580	5303	2478	5093	5058	10396
	Wimo-2008 ²	-	2451	5037	2354	4838	4804	9875
	10/66 ³	581,580	267	459	3441	5917	3708	6376
Peru	Wimo-2009 ³	108,962	322	2955	654	6002	968	8884
	Wimo-2008 ²	-	313	2872	636	5833	941	8634
	10/66 ³	143,964	281	1952	1504	10,446	1785	12,397
Venezuela	Wimo-2009 ³	99,616	612	6144	2199	22075	2810	28,208
	Wimo-2008 ²	-	476	4777	1710	17165	2185	21,935
	10/66 ³	103,230	123	1187	747	7232	869	8419

1 Number of people with dementia and costs at country level are from Wimo, A., B. Winblad, et al. (2007). "An estimate of the total worldwide societal costs of dementia in 2005." *Alzheimers Dement* 3(2): 81-91.

2 Costs are converted based on CPIs in Table 3.6a.

3 Number of people with dementia and costs at country level are from Wimo, A., B. Winblad, et al. (2010). "The worldwide societal costs of dementia: Estimates for 2009." *Alzheimers Dement* 6(2): 98-103.

even if the two figures for the total cost were similar (such as with India), it can not be concluded that the costs estimated by the different studies are directly comparable.

Among the 10/66 project countries, only in China has there been a cost-of-illness conducted (in Shanghai, a metropolitan city), in 2006 among AD patients recruited from clinics (Wang et al., 2008). Only costs related specifically to AD were calculated. Informal care (termed as an indirect cost in the original paper) was valued according to the replacement cost method. The results showed the direct cost to be US\$1058 and the indirect cost was US\$1326. For comparison with the findings from this thesis, these figures were first converted back to local currency units based on the exchange rate provided in the study (1 USD = 7.97 RMB), and then converted to the I\$ based on PPPs (Table 3.5b) and CPIs (Table 3.6a). After conversion, the two figures were I\$2700 and I\$3385 for the year 2008 respectively. In this study, the cost for medical care was estimated to be I\$643 in urban China, which is much lower than Wang's report. This is because samples were from clinics, so greater medical costs occurred than for people living in the community. The cost of informal care in urban China in this study is I\$3848, which is very similar to Wang et al's estimation. This is despite Wang et al not including supervision.

A study was conducted in Argentina (Allegri et al., 2007), which can be used for comparison with the project Latin American countries, as the Argentina study also used 10/66 questionnaires. The study recruited 80 people with dementia from the community, 20 from institutions, and 25 people without dementia. In this study, direct costs refer to the costs of medical care and indirect cost is the cost of informal care. Direct costs were estimated by subtracting the cost of healthy controls from the cost of patients. Indirect costs were valued based on the replacement method. For comparison with this study, the costs of patients from the same setting (the community) were focussed on. The annual direct costs were US\$797 and the cost for informal care (termed as indirect cost in the paper) was US\$3189 in the year 2001. For comparison, these figures were converted to local currency units based on the exchange rate provided in the study (1 Argentine peso = 1 US dollar in 2001), and are then converted to the I\$ based on PPP (1 in 2001, from WHO Global Health Expenditure Database <http://apps.who.int/nha/database/DataExplorerRegime.aspx>) and CPIs (98.9 in 2001 and 211.9 in 2008, from LABORSTA <http://laborsta.ilo.org/>).

After conversion, the two figures are I\$1708 and I\$6833 respectively. In this study, the attributable costs of medical care are very low in Venezuela (I\$296) and Mexico (I\$16), and negative in other Latin American countries (Cuba, the Dominican Republic and Peru). Even if looking at the absolute cost of medical care, the costs estimated from this study (ranging from I\$114 in Cuba to I\$622 in Venezuela) are lower than Argentina. The result is difficult to interpret. Possible reasons for the large difference may be there was a selection bias in the Argentinean study as the sample size was relatively small, or they may have been selected from cases who visited hospitals/clinics. In this study, the average costs of informal care among participants with dementia in Latin American countries were I\$2666 and ranged from I\$1030 in rural Mexico to I\$4791 in urban Peru. If the Argentinean study included supervision time within informal care costs, then the difference between Argentina and other Latin American countries would be larger. The large difference can be explained by a heavier care burden among carers in Argentina. The daily amount of help for ADL and IADL was eight hours in Argentina, but only about two to five hours in the project Latin American countries (Table A1.2 in Appendix).

Although comparability is limited, there is evidence of greater dementia costs in high income countries than in LAMICs. Jonsson and Berr have reviewed evidence from eight countries and found the total cost per AD patient was from 6000 PPP-adjusted Euros in France to about 19,000 PPP-adjusted Euros in Finland in 2004 (Jonsson and Berr, 2005). A subsequent review (Jonsson and Wimo, 2009) of 15 European studies estimated the median total costs of AD to be 28,000 Euros in 2005 and the cost that was specifically attributable to AD was about 21,000 Euros. Although the figures were presented in Euros, it is still clear that the total cost is higher in these countries than the estimations from this study.

Cost of medical care

Findings from this study indicated that dementia does contribute to an increase in the costs of medical care at the public level, but has a mild impact at the private level. However, current evidence from high income countries indicated dementia is associated with higher costs of medical care. A Danish study (Andersen et al., 2003) followed up 114 dementia patients and 351 people without dementia persons and found that health care costs (including medical care, prescriptions and home care)

increased for dementia patients, particularly when the disease progressed. Decline of functional abilities also had an important impact on health care costs. Bynum's study (Bynum et al., 2004) on a nationally representative 5% random sample of Medicare recipients in the US showed that higher Medicare expenditures were related to dementia particularly through increased hospitalisation. Hill and colleagues (Hill et al., 2005) also found hospital admissions were important drivers of the cost of health care among dementia patients. Results showed that VD patients have the most expensive annual costs due to higher admission rates. In another paper, they also reported that functional impairment was highly associated with cost (Hill et al., 2006). A study from Taiwan (Kuo et al., 2010) compared the costs of patients living at home and those in institutions and found that the direct costs of institutional care (including medical care and other non-medical costs) were higher than those of home care.

It appears that hospital admissions, prescriptions and professional home care contribute to increases in the cost of medical care among people with dementia in high income countries. This emphasises the 'treatment gap' of dementia in LAMICs. As indicated in the World Alzheimer Report 2011 (Prince et al., 2011b), most people with dementia are not diagnosed and have no access to treatment. The gap is much greater in LAMICs than high income countries. Our study is based on community living patients from LAMICs and most of them were never diagnosed with dementia. This seems a valid reason for the lack of a noticeable impact on the costs of medical care.

Cost of social care

Social care, either provided by professionals or unpaid family members, is clearly important for people with dementia. Findings from this study highlight the high costs of social care. Evidence from high income countries also confirms the importance of such care. The ICTUS study in 12 European countries (Gustavsson et al., 2010; Reynish et al., 2007) collected cost information from 1385 AD patients attending specialist memory clinics. The results showed that only 16% of cost resulted from direct medical care, and the rest was distributed across informal care (54%) and community care (30%).

Although institutionalisation or living in nursing homes is one of the important types of care received by people with dementia, informal care is also a key component of social care (Kirchner et al., 2000). An Italian study carried out in 1995 (Cavallo and Fattore, 1997) showed that unpaid family care was more important than paid-for non-medical services for dementia patients. However, this information was collected by mailing questionnaires to caregivers who sought help and the response rate was very low (28.2%). Caregivers with higher burdens of care might be more likely to consult professionals and respond to the survey, which might have led to higher estimates of informal care costs.

In 2001, Rice and colleagues (Rice et al., 2001) reviewed cost evidence from the US and their results showed that the cost of informal care was about 0.5 to 1.5 times that of formal care. This result would indicate that formal and informal care make similar contributions to social care costs in high income countries. However, an American project (Stommel et al., 1994) found that in 1989 ‘unpaid labour’ accounted for 71% of family care costs among people with dementia. This suggests that economic status may influence the proportion of cost accounted for by formal and informal care. This finding has been reinforced by the current study. Urban Peru and urban China have higher costs of paid home care among all the sites, while the less developed areas have less or even no paid home care. The cost of paid home care does not account for a large proportion of the cost of social care. This is to some extent because of the valuation process for these components of the study. Paid home care is valued according to the minimum wage, while the cost of informal care is calculated according to the average wage. Nevertheless, if comparing the relative weekly hours of paid home care and informal care (see Table A1.2. and Table A1.3.), it is clear that participants received much more informal care than paid home care except in urban China. Care costs for participants in this site were nearly equally shared by the two types of social care.

This may be an increasing trend in the near future, when carers may have more money to spend matters other than basic living needs. When the cost of hiring a paid carer is lower than the earnings they make, they may not need to stop or to cut back from work to provide care. Moreover, evidence has showed that informal care does not save money at a societal level. A Taiwanese study (Chiu et al., 1999) compared

the cost of family-based care and nursing home care for dementia patients. Care costs of family members were valued according to similar caregiving tasks provided by hospital health aides. The results showed that the costs of family-based care were much higher than the costs of nursing home care.

Differences in the cost of dementia among 10/66 project sites in relation to local health care and economic systems

The patterns of care costs in the 10/66 sites are not same. Interpretation of the findings is easier if local policies and the characteristics of the economic and health care systems are considered. Some key differences in the cost of dementia among study sites are presented in Table 8.2, in terms of use of medical care, provision of informal care, value of informal care and the use of paid home care.

Peru has a relatively low use of medical care in both urban and rural sites, while Cuba, the Dominican Republic and urban China have relatively high use of medical care. That may be because of differences in ability to access services (see Table 2.7). Cuba, the Dominican Republic and urban China have easier access to primary care centres and these are usually located close to home. In Peru, primary care centres are located at about 5 kilometres away, so it might be difficult for older residents, especially dependent dementia patients, to travel to these centres. However, in India, although it is not easy to access the primary health care service, the use of medical care is not particularly low. The organisation of the health care system in India may explain this finding, as in India all residents can receive basic free medicine (see Table 2.5).

In India, both urban and rural areas have a low provision of informal care. Perhaps surprisingly, rural areas in each country have lower provision of informal care compared with urban are. This may be the result of lower educational attainment for people living in rural areas. Dementia may be considered as part of the normal aging process, because of a lack of knowledge about the condition, and so patients with dementia may not be considered as more dependent. Table 2.2 shows that India has the shortest expected duration of school education. Similarly, in China, Mexico and Peru, rural populations have a lower educational level than urban populations.

Table 8.2. Key differences in the cost of dementia among 10/66 study sites

Sites	Use of medical care	Provision of informal care (public level)	Value of informal care (public level)	Use of paid home care (public level)
China urban	High use at private level and moderate use at public level	High	High	High
China rural	Moderate use at private level and moderate use at public level	Moderate	Moderate	No
Cuba urban	High use at private level and moderate use at public level	Moderate	Moderate	Moderate
Dominican Republic urban	High use at private level and moderate use at public level	Moderate	Moderate	Moderate
India urban	Moderate use at private level and moderate use at public level	Low	Low	No
India rural	Moderate use at private level and high use at public level	Low	Low	No
Mexico urban	Moderate use at private level and high use at public level	Moderate	Moderate	Low
Mexico rural	Moderate use at private level and high use at public level	Low	Moderate	Low
Peru urban	Low use at private level and low use at public level	Moderate	High	High
Peru rural	Low use at private level and low use at public level	Low	Moderate	Moderate
Venezuela urban	Moderate use at private level and moderate use at public level	Moderate	Moderate	Moderate

Urban China and urban Peru have a higher value of informal care and a higher use of paid home care. The value of informal care is calculated based on the use of informal care and the average wage. Earnings data and the decision to hire somebody else to provide home care are related to economic wealth. China and Peru have quite large urban and rural differences in terms of economic development (see Table 2.4). This may explain the urban and rural difference in the value of informal care and the use of paid home care.

Table 2.5 shows that the urban populations generally have better health protection and pension coverage compared with the rural populations. This can be confirmed by the findings from Table 8.2. If the rural areas are combined together, and compared with the urban areas – with the exception of India – then the urban areas seem to have higher costs of dementia because of the higher use of medical care, more provision of informal care and more use of paid home care. However, the urban and rural comparison is quite limited by the fact that other key differences (e.g. in terms of the economic system, pension systems and structure of health care systems) exist. Future analyses should consider these urban-rural differences more fully.

Subtype and cost of dementia

The subtype of dementia was not entered into the linear regression models. This is because some sites (particularly India and rural Mexico) have high proportions of non-recording of certain subtypes. However, descriptive analyses reveal that pure VD has the highest cost of medical care among the different subtypes. Total costs among pure VD and mixed AD/DLB are higher than for other types of dementia

These results contribute to the knowledge that VD results in higher medical costs. Fillit and Hill compared the cost of VD patients, AD patients and controls without dementia based on community care homes and found the costs for VD were higher than for AD, which was mainly due to higher inpatients cost among VD patients (Fillit and Hill, 2002). A population-based study in Spain (Sicras et al., 2005) also showed that patients with VD had higher medical costs and total costs than patients with AD. Similar results were found in a study by Wimo and Winblad, in which costs from a societal level were compared (Wimo and Winblad, 2003).

By briefly reviewing these previous findings, it seems that VD increases the cost of medical care, mainly because of the higher admission rates to hospitals. Evidence from Argentina (Rojas et al., 2011) supports this hypothesis. That study showed there was no significant difference in the annual direct costs among AD, VD and FTD, but post hoc analyses indicated that VD had higher hospitalisation costs than AD, but had lower medication costs than FTD.

A study has also revealed that DLB patients may also have higher costs, but not for medical care. Results from a US study (Zhu et al., 2008c) showed unadjusted indirect costs were higher among DLB patients and unadjusted direct non-medical care were significantly lower. However, after adjusting for age, gender, cognitive and functional status, differences were not statistically significant. It is important to conduct further cost comparisons so as to allocate resources appropriately to the patients who need them most.

Predictors of cost

Severity is a strong predictor of the cost of dementia, and it particularly influences social care rather than medical care. For example, a Canadian study (Herrmann et al., 2010) followed up 903 mild-to-moderate AD patients in the community for three years. The results showed that total cost had a significant relationship with the severity of dementia. The largest component of the total cost among the most severe patients was informal care. Hux and colleagues investigated 750 probable or possible AD patients in the community and people in long term care institutions in Canada and found that the cost of patients for severe dementia was four times that for mild dementia (Hux et al., 1998). The cost of unpaid care was the largest component for patients with mild dementia, while the cost of institutionalisation was the largest cost for severe patients.

In this study, the possible association between more specific symptoms and costs were investigated. The results show that memory loss was the only one to not significantly predict cost, while other cognitive impairments and BPSD have a clear association with costs of informal care and social care. However, they did not influence the cost of medical care.

This finding is in agreement with other studies. Information from a nationally representative survey of people age 70 years and over in the US (Langa et al., 2001) showed, after controlling for socio-demographic factors and comorbidities, that informal care time increased with the severity of cognitive impairment. A study on Vascular Cognitive Impairment (VCI) in older adults (Rockwood et al., 2002) clearly demonstrated the positive association between cognitive impairment and higher societal costs. Another US study (Okura and Langa, 2011) suggested that patients with three or more neuropsychiatric symptoms had significantly increased hours of active help and supervision. Herrmann and colleagues investigated 500 caregivers of community living dementia patients and found there was a significant association between costs and BPSD (Herrmann et al., 2006). Elsewhere, it has been found that 30% of the total cost of AD was related to the management of BPSD (Beeri et al., 2002b).

Cognitive impairment and BPSD may directly leads to more need for help with ADLs. A study carried out in Spain, Sweden, the UK, and the US (Gustavsson et al., 2011) confirmed the hypothesis that the ability to perform ADL was the most powerful predictor of costs for community residents in all countries.

The results showed that diabetes, stroke, and other physical impairments predicted higher costs of informal care, social care and total costs at the public level, and stroke also predicted higher medical costs. Many studies report similar findings. The Taiwanese study (Kuo et al., 2010), which compared the costs of patients living at home and those in institutions, also indicated that indirect costs, including unpaid care, were greater among community dwelling patients and had a significantly positive association with the physical dependence of the patients. An earlier study in Sweden (Svensson et al., 1996) showed that functional disability was highly associated with higher staff density and higher labour costs, which lead to higher costs overall. A US study (Murman et al., 2003) showed clear evidence that AD patients with Lewy Bodies or parkinsonism had higher costs than patients with AD only. In brief, physical diseases/impairments influence both medical care and social care costs (particularly with regard to informal care).

Gender, age, and marital status usually were included as independent variables in the

regression models. Few studies have detected significant impacts on costs of these factors. For example, Zhu et al carried out a study on longitudinal changes of informal care costs for people with AD in the community (Zhu et al., 2006a). No difference was detected among patients with different demographic factors. However, some studies do have significant findings. For example, Lopez-Pousa et al found gender and marital status of patients to be associated with total costs (Lopez-Pousa et al., 2004). In this study, older participants with dementia, those with a higher educational level, those not living alone and those with younger carers had higher costs of informal care and social care and total cost. Male participants had lower costs of paid home care and social care and lower total cost. Participants with male carers had higher costs of medical care. Higher economic status predicts higher cost of paid home care and out-of-pocket expenses. The findings here emphasise the importance of identifying socio-demographic predictors of cost, so that help can be provided to those needing it the most.

The attributable cost of dementia and other diseases

As described above, physical comorbidity is one of the predictors of costs, both of medical care and social care. Other psychiatric comorbidities also influence the cost. A US-based study of a Veterans Affairs medical centre investigated 864 dementia patients from a cohort of 960 patients indentified in 1997 (Kunik et al., 2003). The study compared costs between patients with psychiatric comorbidities and those without. Results showed that comorbidities were highly related to higher costs for health service use.

As described in Section 1, the ‘net cost’, or the attributable cost can be calculated by ‘subtracting method’ or ‘regression method’. This study used the latter because matching with a control with similar socio-demographic characteristics and physical or mental status is challenging. Potential predictors, including other physical and mental diseases, were entered into regression models. The results showed that the attributable cost of dementia at the public level was I\$5164 in the sample as a whole, ranging from I\$1764 in India to I\$10,332 in Peru. The attributable costs increase with the progress of dementia, but only for social care and total cost, not for medical care. A decrease of I\$1587 (24%) can be treated as the increased cost caused by other conditions (Table A4.1 in Appendix). The rates vary from 15% in Cuba to 58%

in Venezuela. In all countries, the increase in cost is due to the impact on social care (particularly informal care), rather than medical care.

The regression model also shows the attributable costs of other mental and physical diseases. The results show that dementia has higher attributable costs than those of other chronic diseases in these countries except India, but again only for social care and total cost, not for medical care. This finding is consistent with a UK study (Livingston et al., 1997). The study compared the cost of formal community services among people with dementia, depression, anxiety disorders and physical disabilities and found that dementia was the most expensive disorder because of the largest use of community care. Although the UK study did not address informal care, the care need increased clearly among dementia patients compared with persons with other diseases or disorders.

These findings do not support the view that dementia adds more to the cost of medical care compared with other chronic diseases. By contrast, a study on Medicare Program expenditures in the United States found dementia or frailty added more costs of hospitalisation than other organ system failure, such as diabetes and chronic obstructive pulmonary disease (Campbell et al., 2004). This can be explained by the differences in care arrangement between high income countries and LAMICs. The care need in the above study was increased, but shared with hospitalisation.

In this study, stroke was highly associated with the cost of medical care in most countries, and related to informal care in all countries except Venezuela. In India, stroke had the highest attributable cost, again mainly with regard to the cost of informal care, while dementia was the second highest cost disease. This is probably the result of high rates of unidentified dementia in India (Prince et al., 2011b). Carers may pay more attention to stroke as it is much easier to identify, while dementia may be misunderstood as normal aging.

Depression is associated with higher costs of informal care. This finding is in agreement with a Germany study (Luppa et al., 2008). This showed that higher cost was associated with more depressive symptom and more chronic diseases. However,

no information was included on the cost of informal care in that study. In China, the increase of informal care costs due to depression is higher than that of dementia and stroke. Further research is warranted as China has the lowest prevalence of depression (Table 2.10) among study countries. However, the reliability of this finding needs to be considered as cases of stroke in India, and cases of depression in China are very few. The current findings might be because of sampling errors.

Interestingly, hypertension, the most prevalent chronic disease detected in this survey, has a negative association with the cost of informal care and paid care in China, and does not increase cost in other countries except Peru. In Peru, the cost of medical care increases in the presence of hypertension. This overall finding suggests that patients with hypertension may have lower disability and therefore do not need further care. Another reason may be that there is less awareness and control of the disease (Prince et al., 2012b). Patients do not always know they have hypertension and so carers may not provide extra help for them.

Diabetes increased the cost of medical care and informal care in the sample as a whole, but had different impacts across the countries. In Cuba, ischemic heart disease decreased the cost of informal care, paid care and total cost. COPD increased the cost of informal care in China, but decreased the cost of informal care in Dominican Republic. This may be because of cultural differences between the two countries. However, more research should be implemented to give a better explaining of these phenomena.

The attributable cost of dementia is finally presented at a country level and calculated as the percentage of GDP in that country to make it comparable with the World Alzheimer Report. The report shows that the worldwide cost is equivalent to about 1% of global GDP, varying from 0.24% in low income countries, 0.35% in low-middle income countries, 0.5% in high-middle income countries, and 1.24% in high income countries. This study showed the attributable costs of dementia are equivalent to between 0.1% and 1.2% of GDP in the project countries. According to the World Bank classification (World Bank, <http://data.worldbank.org/about/country-classifications>), only India in this study is classified as a low-middle income country, with other countries classed as

high-middle income countries in 2011. Therefore, the combined rate for high-middle income countries in this study (except India) is 0.6%, and for low-middle income countries (only India) is 0.3%. For comparison with Wimo's result, the crude costs of dementia were calculated in Table A4.2 in Appendix. The figures are 0.9% for high-middle income countries, and 0.4% for low-middle income countries. The current estimation of GDP equivalence is similar with Wimo's report. A Korean study also gave different figures, reporting a GDP equivalence of 0.5% to 1% in 2004 (Kim et al., 2009). However, it is not appropriate to compare these directly, as different methodologies and different estimates of the prevalence of dementia were applied.

Results from sensitivity analyses

Use of the 'percentage method' was closely linked to out-of-pocket expenses. The influence on costs of dementia was not extensive because participants with dementia use relatively little medical care. The 'GDP-ratio method' led to a similar estimation of cost of medical care and total cost as those produced in the base case analysis.

The '10/66 salary method' and 'replacement cost approach' serve to decrease costs, because these two methods reduce the value of informal care, which is the most important component of total cost. The 'leisure time method' also largely increases or decreases the cost of informal care depending on whether a figure of 50% of earnings or 150% is used. However, these figures are arbitrary because there is no standard value for leisure time. For example, in an Israeli study (Beeri et al., 2002a), leisure time was valued according to minimum wage rates. If this study used the same method, the results would be quite different. The 'carers characteristics method' has the least influences on the cost of informal care and total cost compared to the other three methods. However, this method has the advantage that it is based on information (characteristics of carers) collected from the survey. All these four methods give different estimates of the total cost of care for dementia patients, and this implies that informal care cost is the most important component of total costs.

Use of 'all informal care method' resulted in increases in total cost of about 10%. This shows us the information about informal care should be collected based on all the care received by the older participants, rather than care provided by main

caregivers.

8.2. The 10/66 algorithm and the CDR

The diagnosis of dementia in this thesis was made according to the 10/66 algorithm, while the severity of dementia was accessed with the Clinical Dementia Rating (CDR). A previous report (Prince et al., 2008b) showed a discrepancy between the 10/66 algorithm and CDR rating. The 10/66 algorithm confirmed 100% of CDR-rated severe cases, 100% of moderate cases, 98.1% of mild cases and 77.4% of questionable cases. In other words, the 10/66 algorithm also makes diagnoses for those people with questionable dementia identified by the CDR. Therefore, in the results section, when analyzing service use and costs related to severity, those with questionable dementia have been grouped with those who have mild dementia. For comparison, the costs attributable to dementia, by level of severity (with questionable and mild dementia separated), are shown in Table A.5 at the appendix.

Although a disagreement between the 10/66 algorithm and the CDR exists, the 10/66 algorithm is preferable to the DSM-IV system in terms of the diagnosis of dementia as it can detect the early stage of dementia (Llibre Rodriguez et al., 2008), which are more likely to be found in community settings. A key weakness of dementia diagnosis using the DSM-IV system is that it is difficult to operationalise the DSM-IV criteria in a standardised way, which may lead to unsatisfactory reliability. Therefore, compared with DSM-IV, the 10/66 algorithm might be more useful for developed countries in an epidemiological survey because of its easy operation and good reliability.

8.3. The quality of the database

The quality of the database can be discussed from the following aspects, including the validity of the instruments, uniformity, data constraints, accuracy and completeness.

The diagnoses of dementia and depression were obtained from detailed clinical

interview, and, in the case of 10/66 dementia, cognitive testing and informant interview. There is now extensive evidence attesting to the criterion and predictive validity of the 10/66 Dementia diagnosis (Jotheeswaran et al., 2010; Prince et al., 2003; Prince et al., 2012a; Prince et al., 2008b), and some support for the validity of the measurement approach used to identify depression (Prince et al., 2004a). Other assessments of physical health (e.g. stroke, and physical impairments) were based mainly on self-report, and may have been subject to under-ascertainment. The version of the Client Service Receipt Inventory (CSRI) used in this thesis was specifically adapted for use in resource poor low and middle income countries (Chisholm et al., 2000b). Other scale-based assessments; of disability (WHODAS 2.0), cognition (CSI-D), and behavioural and psychological symptoms (NPI-Q) in the older person, and informant/ carer mental health (SRQ-20) and strain (ZBI); have all been used and validated in a wide range of countries and cultures, with in several instances, further attention being given to their cross-cultural measurement properties in the 10/66 surveys (Prince, 2004; Sosa et al., 2009; Sousa et al., 2010a).

As described in section 2, all 10/66 centres were extensively trained in the main diagnostic assessments. A standardised manual with detailed information in terms of operational procedures was designed, covering every aspect of the training and field procedures. To maximise standardisation, special training videos were prepared for the Geriatric Mental State clinical interview and the NEUROEX physical and neurological examination. Study PIs were all originally trained by the 10/66 PI, with refresher 'train the trainer' training at project inception, ensuring that research workers in all sites were trained in the same way, and to a similar standard.

During the field study, quality control was maintained by local study coordinators:

1. supervising all initial interviews, and spot-checking interviewer performance later
2. reviewing data entry sheets for completeness and any unusual or questionable data patterns before they were entered into computers
3. holding regular group meetings with interviewers to discuss any difficulties encountered during interviews, and coding problems.

A set of EpiData database files was developed and all centres used the same files to enter the data. Each country had a specific data entry clerk and 100% double entry

was requested, ensuring accuracy during the data entry process. During the design of the EpiData database files, check files were also used to ensure the data constraints (data fall into the right categories) and range constraints (data fall into certain range). The London coordinating centre reviewed early data returns from all sites, and regularly thereafter to check for data quality and completeness.

The London coordinating centre carried out the final processing and cleaning of data from all sites, generating all of the main derived variables (scale scores and diagnostic algorithms for dementia and other mental and physical health conditions), using SPSS syntax command files. Questionable data, and matching errors were checked with local centres and errors corrected where necessary.

All of these steps should have optimised the accuracy, completeness and consistency of data across the 10/66 research centres. The overall response rate was high to very high in all centres, and there was also, in general, a very low proportion of missing values in the dataset.

Therefore, considering the satisfied validity, uniformity, data constraints, accuracy and completeness, the 10/66 database used in this thesis is of a high quality and is suitable to be used for further analysis.

8.4. Implications of the study results

By reviewing the results from this study, the following implication can be made:

- People with dementia have specific characteristics that imply social disadvantage (being female, older age, lower education, less likely to have income, pension or private health insurance), and they have high levels of disability and dependency. These highlight the importance and urgent need of providing help for these people.
- Informal care is the most important driver of total cost in LAMICs. Providing care for a person with dementia leads to substantial caregiver burden. Most carers are of working age but do not have a job. Some people with dementia also have BPSD, which may increase the caregiver burden. Therefore, help also

need to be offered to carers.

- Evidence shows that costs may not be greater in a nursing home if we also consider unpaid work (Chiu and Shyu, 2001; Chiu et al., 1999; Kuo et al., 2010). Therefore, non-professional care may be provided at home to release the burden of family caregivers. That may also decrease the total cost of dementia by providing help with IADL or supervision for more than one patient at the same time.
- Chronic diseases contribute to the total cost of dementia. Some diseases increase medical care cost and some of them mainly increase informal care. Early detection and treatment for other chronic disease may decrease the cost of care for these patients.
- Compared with stroke, diabetes, ischemic heart disease and COPD, dementia results in higher social care costs. The patterns of care received may be different between high income countries (more professional care) and LAMICs (more informal care), but the care needs and care burden are similar between the two settings. However, limited funds are available for dementia research both in high income countries (Wimo and Prince, 2010) and LAMICs (Prince et al., 2007). More research fund should be allocated to dementia in the future.
- Although patients with severe dementia have higher average total costs, at a country level the overall cost of mild dementia dominant. Evidence-based intervention should be provided for those with mild dementia, delaying the progression of the condition, so as to decrease the cost of dementia at a country level.
- Results from this study are difficult to compare with findings from other studies. This is mainly due to methodological issues (Bloom et al., 2001) which occur in the various steps of the calculations (identification, measurement, valuation). Future discussion should be made to establish standard methods to guide the conduct of cost-of-illness studies.

8.5. Limitations

As mentioned above, the reasons that make comparisons difficult are due to differences in design and methods. Although costs have been estimated for each

participant in this study, some limitations need to be pointed out.

Identification of cost

(i) This study is based on a community sample and specific questions were not asked about diagnosis or treatment specifically related to dementia. This may lead to an underestimation of the cost of medical care.

(ii) As this was a community survey, individuals in residential care were not included. This means the costs for the whole country will be underestimated if based on the costs per person reported here.

(iii) A review (Sorensen et al., 2006) reported that the outcomes of family caregivers of people with dementia included psychosocial and physiological problems, health behaviour and other general health problems. All these could be identified as requiring resources utilisation. However, these costs were not included.

(iv) Although most people aged 65 years and over do not work, there are still some people of this age who have paid work. Our findings show that fewer participants with dementia have jobs than the general population. Some people with dementia stop work because of the disease and this is thus a cost of lost production. This was not though included in the estimates.

(v) Dementia patients have a higher mortality rate than the general population (Ferri et al., 2012). The life years lost should also be considered in the costs of dementia. However, this study is based on a prevalence approach, and only estimates of the cost in one year are made. If the study was based on an incidence approach, these costs should be included.

(vi) When calculating the cost at the country level, research costs were not included.

Measurement of cost

(vii) In this study, information about service uses was reported by the participants. This method may be problematic. People with dementia may lack the ability to reliably report service utilisation (Fox, 1997). In order to deal with the problem, this

information was also asked of informants and it was the responsibility of the interviewer to decide which information was more valid. However, the informant also may not accurately report the situation of the older participants. Diagnoses of diabetes, stroke, COPD, or ischemic heart disease are also based on self-report so may not be accurate.

(viii) Care provided by a main caregiver was recorded as the basis of informal care costs. However, the older person may receive help from other unpaid family members. This will lead to a lower estimation for the cost of informal care. This has been shown in sensitivity analyses where an increase of around 10% increase will occur if all informal care is included.

(ix) The recall periods for the information about medical care, informal care and paid home care are different. Health service use during the past three months was asked and annual costs were calculated by multiplying by four. This assumes the costs in the three months are representative of the annual costs, which may not be the case. Informal care costs were based on care provided in the last 24 hours and this also may not be representative. Similarly, paid home care was based on provision during the past week.

(x) Only the *frequency* of time spent providing help for ADL, transportation and paid home care were asked in the survey. Assumptions had to be made to convert these categorical variables to continuous variable.

(xi) Missing values were treated as zero and some outliers were trimmed to avoid using data that appeared to be mistakenly recorded. However, those with missing data may have used the service or received care. Furthermore, individuals may have received some extremely expensive treatments and so the trimming method may result in underestimated costs.

Valuation of cost

(xii) The amount of the payments for paid care and the reimbursement rates for medicine were not collected in the survey. Patients may under- or over-estimate the out-of-pocket expenses as they may not recall the reimbursement rate.

(xiii) UK unit costs were used as the basis of the estimates. Although adjustments were made, the structure of services in other countries may be different.

(xiv) The decision was made to use the same value for paid home care workers providing care during the day and night. It may though be the case that rates differ according to the time of day.

8.6. Next steps

Cost of illness studies and evaluation of interventions

A systematic review was published recently (Oremus and Aguilar, 2011) which addressed cost-of-illness studies in the US and Canada. The authors suggested future research should move from cost of dementia studies to evaluations of dementia programmes. Cost-of-illness studies do provide information on cost patterns in dementia and therefore can be used for generating ideas for future research. However, as dementia has no cure, it may be more important to consider how to allocate current resources to meet the needs of managing dementia.

The above view about cost-of-illness studies may be relevant for developed countries they have been conducted over many. However, going back 30 years, when little was known about the cost of dementia, cost-of-illness studies did provide useful information to encourage people to more attention to dementia. For example, in 1981, a study in the Netherlands (Ringoir and van Duuren, 1981) estimated that the total cost of dementia was about 5% of the total costs spent on health care and 0.4% of national income and this emphasised the need for dementia research. Very few studies have been carried out in LAMICs and so a similar need for such studies may apply.

A further reason for carrying out a cost-of-illness study is that this can identify the costs that may be avoided by implementing efficient prevention programmes (Smith et al., 1995). Nepal et al reviewed evidences from current economic studies on dementia and their implications in Australia (Nepal et al., 2008) and suggested that dementia may be delayed or prevented by interventions and the subsequent costs

could therefore be reduced. Cognitive stimulation treatment (CST) (Orrell et al., 2005; Spector et al., 2008) and/or reality orientation for patients, particularly with mild or moderate cognitive impairment, has relatively strong evidence of efficacy (Prince et al., 2011b). ‘Helping carers to help’ (HC2C) also shows evidence of decreasing caregiver strain (Gavrilova et al., 2009; Guerra et al., 2011). Both CST and HC2C could potentially decrease the cost of dementia.

Lifetime costs of dementia

Current cost-of-illness studies usually estimate cost over a defined period. This thesis has reported costs of dementia for 2008. However, these cross-sectional data cannot reflect the dynamic changes during the progression of the disorder over time. Lifetime costs can also be modelled and this information is useful for comparing the monetary effects of different treatment programmes in the future. Lifetime costs could be estimated based on a cross-sectional study by dividing the sample into age groups or severity groups (the two will be highly correlated) and by examining costs for each to estimate the change in costs that is likely to happen over time.

Standard guideline for a cost-of-dementia study

As mentioned earlier, comparisons of results from cost-of-illness studies are difficult because of different designs and methods. A guideline about how to implement a cost-of-illness study in the dementia area would be useful for researchers and facilitate such comparisons. Some suggestions are as follows:

- Make clear the cost categories
- Indicate the sample source and sampling methods
- Measure cost using comparable questionnaires
- Provide detailed information of the valuation of the costs
- Apply appropriate statistical methods to deal with data that have excess zeros and do not follow normal distributions
- Convert local currencies to international dollars and make clear the year of the estimates
- Report comprehensive results

Glossary of terms

Terms	Definitions
10/66	Refers to the recognition that 66% of people with dementia live in developing countries while less than one-tenth of population based research has been carried out in those settings.
Activities of daily life (ADL)	Routine activities that people tend to do everyday. Includes help with dressing, eating, grooming, toileting, and bathing.
Assets	Items of economic value owned by an individual or a family. Include televisions, fridges, freezers, mains water, mains electricity, telephones, plumbed toilets and plumbed bathrooms.
Attributable cost	The cost which is specifically due to a certain disease or condition.
Behavioural and psychological symptoms of dementia (BPSD)	A series of symptoms of dementia. Behavioural problems refer to agitation, screaming, restlessness, wandering, sexual disinhibition, hoarding, or cursing. Psychological symptoms include anxiety, depression, hallucinations, delusions and apathy.
Bootstrapping	A statistical method to deal with highly skewed data.
Bottom-up method	An approach for costing at the individual level with data aggregated to generate the total cost for a condition.
Conditions of Work and Employment Branch (TRAVAIL)	TRAVAIL is a department of the International Labour Organisation (ILO) and provides information on wages, working time, work organisation and maternity protection. One of TRAVAIL's products is a Global Wage Database which provides a comprehensive overview of wage trends in ILO member countries and this information was used in this thesis. (International Labour Organisation, http://www.ilo.org/travail/info/db/lang--en/index.htm)
Consumer price index (CPI)	Measures changes in the prices of goods and services that households purchase across years. Such changes affect the real purchasing power of individual's incomes and consequently their welfare.
Cost at private level	Family and patient costs, including out-of-pocket expenses and time spent using services and travelling to use them.

Cost at public level	For medical care, this refers to the cost of government funded services. For indirect costs, it implies that values are based on average income rather than individual income lost.
Cost-of-illness study	An attempt to measure all the costs associated with a particular disease or condition. This usually includes direct and indirect costs.
Dependence	Reliance on or needing someone or something for aid or support. In this thesis, it means the need for care.
Direct cost	Materials, labour and expenses related to the provision of a service.
Direct medical cost	Direct cost of receiving medical care (e.g. diagnostic assessments, examination and treatment).
Direct non-medical cost	Personal direct costs (e.g. transport and time costs).
Friction cost approach	A method to value lost production. It is equal to the value of lost working days confined to the period during which labour is replaced.
GDP per capita	Gross domestic product divided by population estimates.
Global Health Expenditure Database	A database released by World Health Organisation (WHO), which contains internationally comparable numbers on national health expenditures. In this thesis, information of health expenditures and PPPs were used. (World Health Organisation, http://apps.who.int/nha/database/DataExplorerRegime.aspx)
Gross Domestic Product (GDP)	‘GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.’ (World Bank, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD)
Human capital approach (HCA)	The human capital approach is a method to value lost production, which is assumed to be equal to the lost income as a consequence of disease.
Incidence approach	New cases are identified and followed up over a period of time (usually lifetime) to show the cost over the disease course.
Indirect cost	Resources lost, including loss of productivity, or other impacts including costs due to being unable to engage in leisure.

Informal care	Care provided by unpaid family members or relatives.
Instrumental activities of daily life (IADL)	A series of activities often performed by a person who is living independently in a community setting, but not necessary for fundamental functioning. It includes help with communication and transportation in this study.
Labour Statistics Database (LABORSTA)	LABORSTA is a database published by the International Labour Organisation (ILO), providing internationally comparable data on employment, unemployment, wages, hours of work, CPIs, occupational injuries, industrial disputes, household income and expenditure and international labour migration. Wages and CPIs were used in this thesis.(International Labour Organisation, http://laborsta.ilo.org/)
Opportunity cost	‘The cost of any activity measured in terms of the value of the next best alternative forgone (that is not chosen).’ (Wikipedia, http://en.wikipedia.org/wiki/Opportunity_cost)
Low and middle income countries (LAMICs)	Used by the World Bank to classify countries based on population income. (World Bank, http://data.worldbank.org/about/country-classifications)
Medical care	Care provided by healthcare professionals.
NHS Reference Costs	Costs published regularly by the Department of Health in England which and provide detailed information on an extended range of surgical procedures and medical treatments. (Department of Health, http://www.dh.gov.uk/health/tag/reference-costs/)
Out of pocket expenditure	‘Direct outlays of cash which may or may not be later reimbursed.’ (Wikipedia, http://en.wikipedia.org/wiki/Out-of-pocket_expenses)
Paid home care	Care provided by paid home carers (non-professional help, such as cleaning the house, helping with cooking or other activities of daily life). It does not include professional health workers’ home visits.
Perspective of costs	The vantage point of a cost-of-illness study. Cost can be estimated from different perspectives and these generate different results.

Prevalence approach	This approach uses cross-sectional data and the cost in one specific year is calculated for people with a specific condition.
Purchasing power parities (PPPs)	PPPs are exchange rates which aim to make adjustments to equalise the purchasing power of different currencies and also to enable costs to be compared for different years.
Quality-adjusted life year (QALY)	QALY is a measure of disease burden and it presents a year of life adjusted for its quality or its value. It considers both the quality and the quantity of life lived. (Adapted from Wikipedia, http://en.wikipedia.org/wiki/Quality-adjusted_life_year)
Replacement cost method	The replacement cost method is one of the methods to value lost production. It values informal care based on what one would have to pay to replace the carers if they were not available.
Sensitivity analyses	This is an analysis carried out to determine the impact of making different assumptions about key variables (e.g. a unit cost).
Social care	In this thesis, social care only includes informal care and paid home care. It does not include professional home care, respite care or long term institutional care.
Top-down method	A costing approach using data collected at a macro or national level (e.g. from national registers) with costs distributed across different conditions.
Unit cost	The cost per unit of a particular service.
Unit Costs of Health and Social Care	A series of publications funded by the UK Department of Health, updated every year, to provide transparent and comparable information about the costs of health and social care for use in health economic studies. (Personal Social Services Research Unit, http://www.pssru.ac.uk/project-pages/unit-costs/2011/index.php)
WHO-CHOICE project	A World Health Organisation (WHO) sponsored project to provide policy makers with information when deciding on which interventions and programmes to provide using limited resources in order to maximise health. Country-level costs and effects of different health interventions are estimated and provided in the WHO-CHOICE report. (World Health Organization, http://www.who.int/choice/en/)

World Economic Outlook Database	A database released by the International Monetary Fund, which contains selected macroeconomic data series from the statistical appendix of the World Economic Outlook report. In this thesis, PPPs, CPIs, and GDP per capita from this database were used. (International Monetary Fund, http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx)

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Appendix

Table A1.1. Amount of receiving health service uses in the last 3 months, by site and dementia status

Services type by dementia status	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
Primary health centre												
Dementia	0.8±2.0	0.2±0.9	0.1±0.5	0.9±2.8	0.3±1.0	0.5±1.2	0.9±1.7	1.1±2.5	0.1±0.4	0.1±0.6	0.4±0.7	0.5±1.5
Non-dementia	1.0±2.1	0.3±1.1	0.3±1.2	0.3±1.1	0.4±1.1	0.9±1.4	0.9±1.5	0.7±1.9	0.1±0.5	0.05±0.4	0.2±0.6	0.5±1.4
Hospital doctor												
Dementia	0.5±1.4	0.5±1.4	0.8±1.5	0.4±0.9	0.6±1.8	0.6±1.4	0.3±1.1	0.7±1.6	0.1±0.5	0.1±0.4	0.4±1.1	0.5±1.4
Non-dementia	0.5±1.4	0.6±1.5	1.0±2.0	0.5±1.5	0.5±1.4	0.6±1.4	0.2±0.8	0.6±1.4	0.03±0.3	0.2±0.8	0.4±1.1	0.5±1.4
Other government health worker												
Dementia	0.3±1.5	0.1±0.7	0	0	0.2±1.1	0.02±0.1	0.1±0.8	0.1±1.3	0	0.04±0.3	0.5±1.7	0.2±1.1
Non-dementia	0.4±2.0	0.1±0.8	0.1±0.8	0.03±0.5	0.1±0.8	0.2±1.1	0.2±1.2	0.001±0.03	0.001±0.03	0.01±0.1	0.2±0.7	0.2±1.1
Private doctor												
Dementia	0	0.4±1.0	0.2±0.9	0.1±0.4	0.5±1.1	0.6±1.2	0.3±0.9	0	0	0.4±1.1	0.8±1.4	0.3±0.9
Non-dementia	0.01±0.2	0.4±0.9	0.3±0.9	0.02±0.2	0.6±1.2	0.3±0.9	0.4±1.0	0.01±0.2	0.01±0.2	0.4±0.9	0.6±1.1	0.3±0.8
Dentist												
Dementia	0.02±0.2	0.03±0.3	0.02±0.1	0.1±0.4	0.1±0.5	0.1±0.6	0	0	0	0	0	0.03±0.3
Non-dementia	0.1±0.5	0.1±0.6	0.2±0.8	0.04±0.4	0.2±0.7	0.2±0.8	0.1±0.4	0.03±0.3	0	0.002±0.05	0.04±0.2	0.1±0.5
Traditional healer												
Dementia	0.01±0.1	0.004±0.1	0	0	0	0.1±0.4	0.1±0.3	0	0	0	0.1±0.4	0.02±0.2
Non-dementia	0.01±0.2	0.002±0.05	0.01±0.2	0.03±0.3	0.01±0.2	0.04±0.4	0.1±0.6	0.01±0.3	0	0.002±0.05	0.1±0.4	0.02±0.3
Admitted to hospital												
Dementia	0.2±1.7	0.2±1.1	0.1±1.1	0	0.3±2.6	0.01±0.1	0.2±1.3	4.1±17.9	0	0.5±3.5	0.1±0.3	0.4±4.8
Non-dementia	0.2±1.7	0.2±1.9	0.2±1.7	0.1±1.1	0.2±1.6	0.1±1.6	0.1±0.7	0.5±4.3	0.1±0.9	0.1±0.8	0.04±0.4	0.2±1.9

Table A1.2. Hours of receiving informal care per day, by site and dementia status

Services type by dementia status	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
ADL												
Dressing												
Dementia	0.7±0.9	0.4±0.7	0.5±0.6	0.4±0.7	0.2±0.5	0.3±0.6	0.2±0.5	1.0±1.0	0.6±0.9	0.2±0.6	0.3±0.4	0.5±0.8
Non-dementia	0.02±0.2	0.04±0.3	0.03±0.2	0.02±0.1	0.01±0.2	0.03±0.2	0.02±0.2	0.1±0.4	0.01±0.1	0.01±0.1	0.04±0.2	0.03±0.2
Eating												
Dementia	0.6±0.9	0.4±0.7	0.5±0.6	0.3±0.5	0.2±0.7	0.3±0.7	0.3±0.7	1.2±1.0	0.7±1.0	0.3±0.8	0.3±0.5	0.5±0.8
Non-dementia	0.01±0.1	0.04±0.2	0.03±0.2	0.02±0.1	0.02±0.2	0.03±0.2	0.02±0.2	0.1±0.3	0.01±0.1	0.01±0.1	0.1±0.2	0.03±0.2
Grooming												
Dementia	0.6±0.9	0.4±0.7	0.5±0.7	0.4±0.8	0.2±0.6	0.3±0.6	0.2±0.5	1.1±1.0	0.5±0.8	0.2±0.6	0.2±0.4	0.4±0.8
Non-dementia	0.02±0.1	0.04±0.3	0.03±0.2	0.02±0.1	0.01±0.1	0.02±0.2	0.02±0.2	0.1±0.4	0.01±0.1	0.01±0.1	0.03±0.2	0.02±0.2
Toileting												
Dementia	0.6±1.0	0.4±0.7	0.6±0.7	0.3±0.6	0.3±0.7	0.2±0.6	0.3±0.8	1.3±1.2	0.6±0.9	0.3±0.7	0.2±0.4	0.5±0.8
Non-dementia	0.02±0.2	0.03±0.2	0.03±0.2	0.02±0.1	0.01±0.1	0.02±0.2	0.02±0.2	0.1±0.4	0.01±0.1	0.01±0.2	0.04±0.2	0.03±0.2
Bathing												
Dementia	0.6±0.9	0.5±0.7	0.6±0.7	0.4±0.8	0.2±0.5	0.3±0.6	0.3±0.7	1.0±1.1	0.5±0.8	0.2±0.6	0.3±0.5	0.5±0.8
Non-dementia	0.02±0.2	0.04±0.2	0.04±0.2	0.02±0.2	0.01±0.1	0.04±0.2	0.02±0.2	0.1±0.4	0.02±0.2	0.01±0.1	0.1±0.2	0.03±0.2
Total ADL												
Dementia	3.1±4.1	2.1±3.2	2.8±2.9	1.8±3.0	1.1±2.6	1.4±2.5	1.5±2.7	5.5±4.5	2.8±3.9	1.2±3.1	1.2±2.0	2.3±3.5
Non-dementia	0.1±0.6	0.2±1.0	0.1±0.8	0.1±0.6	0.1±0.5	0.1±0.8	0.1±0.7	0.4±1.6	0.1±0.5	0.05±0.5	0.2±0.9	0.1±0.8
IADL												
Using transport												
Dementia	0.1±0.4	0.1±0.4	0.5±0.6	0.1±0.4	0.3±0.8	0.6±1.0	0.2±0.6	0.2±0.5	0.1±0.3	0.2±0.6	0.04±0.2	0.2±0.6
Non-dementia	0.01±0.1	0.02±0.2	0.03±0.2	0.02±0.1	0.05±0.3	0.1±0.3	0.04±0.3	0.01±0.2	0.003±0.1	0.01±0.2	0.01±0.1	0.02±0.2
Communication												

Dementia	1.6±3.2	1.0±3.4	1.1±2.8	0.5±1.8	1.1±3.0	1.1±2.6	0.2±0.8	2.3±4.7	1.1±2.9	0.3±0.7	0.3±0.6	1.1±3.0
Non-dementia	0.04±0.8	0.02±0.2	0.03±0.3	0.1±0.7	0.1±0.6	0.1±0.6	0.03±0.4	0.1±0.7	0.02±0.3	0.002±0.05	0.1±0.3	0.04±0.5
Total IADL												
Dementia	1.7±3.2	1.1±3.4	1.5±3.1	0.7±1.8	1.4±3.2	1.7±3.2	0.4±1.1	2.5±4.7	1.2±2.9	0.5±1.2	0.4±0.6	1.3±3.1
Non-dementia	0.05±0.8	0.03±0.3	0.1±0.4	0.1±0.7	0.1±0.7	0.1±0.7	0.1±0.5	0.1±0.7	0.03±0.3	0.02±0.2	0.1±0.3	0.1±0.6
Supervision												
Dementia	1.2±3.5	0.8±2.8	1.7±3.9	0.5±1.3	2.6±5.1	1.5±4.5	1.1±4.5	0.8±2.5	0.1±0.4	0.7±2.2	0.2±0.9	1.1±3.5
Non-dementia	0.02±0.6	0.01±0.2	0.1±0.5	0.1±1.2	0.1±1.0	0.1±1.1	0.1±1.3	0.04±0.8	0.01±0.1	0.1±1.1	0.02±0.3	0.1±0.8
Total informal care												
Dementia	5.9±7.5	3.7±6.2	5.8±6.8	3.0±5.4	4.7±7.0	4.3±6.2	2.6±5.3	8.5±6.9	4.1±6.1	2.4±5.8	1.8±3.0	4.5±6.6
Non-dementia	0.2±1.3	0.2±1.2	0.3±1.5	0.2±1.8	0.3±1.7	0.3±1.8	0.3±1.8	0.5±2.2	0.1±0.8	0.1±1.2	0.3±1.4	0.2±1.5

Table A1.3 Hours of receiving paid home care per week, by site and dementia status

Services type by dementia status	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	India (rural)	Total
During the day												
Dementia	3.7±12.9	4.8±15.3	11.4±22.0	1.6±9.3	3.3±11.6	0.7±5.9	0.6±6.0	24.5±27.4	0	0	0	4.7±15.0
Non-dementia	0.1±2.3	0.4±4.6	0.6±5.7	0.1±2.5	0.3±3.7	0.1±2.6	0	2.2±10.8	0.1±1.8	0	0	0.4±4.4
During the night												
Dementia	1.0±7.6	4.2±14.7	8.6±20.3	1.6±9.3	1.2±8.0	0.6±5.8	0	24.7±28.0	0	0	0	3.5±13.5
Non-dementia	0.1±2.2	0.3±4.2	0.3±4.2	0.1±2.5	0.2±3.5	0.1±1.9	0	2.3±11.1	0	0	0	0.3±4.1
Total paid home care												
Dementia	4.7±17.5	8.9±29.5	20.0±40.6	3.1±18.7	4.4±16.9	1.3±11.6	0.6±6.0	49.1±54.9	0	0	0	8.2±27.4
Non-dementia	0.2±4.2	0.7±8.4	1.0±9.1	0.2±4.9	0.5±6.6	0.2±4.1	0	4.5±21.9	0.1±1.8	0	0	0.7±8.2

Table A2.1. Variables in Services

Services	Cost for services	Cost for transportation	Time spent in services	Time spent for transportation	Visit times in past 3 months	Number of accompanied carers
Primary health centre	PPCCOST	PPCTRCST	PPCMINS	PPCTRMIN	PPCVIS	PPCCARE
Hospital doctor	PHPCOST	PHPTRCST	PHPMINS	PHPTRMIN	PHPVIS	PHPCARE
Other government health worker	POTCOST	POTTRCST	POTMINS	POTTRMIN	POTVIS	POTCARE
Private doctor	PPDCOST	PPDTRCST	PPDMINS	PPDTRMIN	PPDVIS	PPDCARE
Dentist	PDENCOST	PDENTRCT	PDENMINS	PDENTRMIN	PDENVIS	PDENCARE
Traditional healer	PTHCOST	PTHTRCST	PTHMINS	PTHTRMIN	PTHVIS	PTHCARE

Table A2.2. Variables in hospital admission and medication

Services	Used or not	Cost	Bed days
Hospital admission	PHOSAD	PHOSCOST	PHOSDAY
Medicine	PMEDS	PMEDCOST	

Table A2.3. Variables in social care

Activities	Time spent for the activity in one day (hours)	Time spent for the activity in a year (hours)
Dressing	ICADRE	ICADREY
Eating	ICAEAT	ICAEATY
Grooming	ICAGRO	ICAGROY
Toilet	ICATOI	ICATOIY
Bath	ICABAT	ICABATY
Transportation	ICIATRA	ICIATRAY
Communication	ICIACOM	ICIACOMY
Supervision	ICSUOVI	ICSUOVIY
Day paid home carer	DYPAID	DYPAIDY
Night paid home carer	NTPAID	NTPAIDY

Table A3.1. Linear regression model of cost of dementia and other chronic diseases in Cuba

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Male	21	-33 to 103	-62	-247 to 144	-65	-237 to 122	3	-29 to 39	-41	-233 to 172
Age	-2.5	-8.3 to 1.3	27*	11 to 41	24*	9.6 to 38	2.4	-0.6 to 5.7	24*	7.7 to 40
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	-101*	-244 to -3.8	-439	-1340 to 366	-315	-1090 to 404	-124	-335 to 43	-540	-1440 to 291
Completed primary	-103	-252 to 6.5	-380	-1289 to 447	-249	-1035 to 503	-131	-339 to 31	-483	-1384 to 364
Completed secondary or higher	-69	-215 to 29	-323	-1201 to 474	-215	-998 to 490	-108	-314 to 50	-392	-1296 to 402
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	49*	10 to 94	224	-130 to 549	268	-61 to 567	-44	-115 to 17	272	-78 to 599
Divorced/widowed	11	-20 to 45	142	-173 to 435	169	-121 to 423	-27	-109 to 36	152	-167 to 444
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	-72*	-152 to -6.6	342*	42 to 621	361*	114 to 611	-19	-118 to 52	271	-11 to 553
Living with children	-38	-95 to 12	45	-268 to 323	94	-154 to 341	-49	-155 to 27	6.9	-288 to 295

Living with other relatives	-105*	-260 to -2.2	104	-220 to 442	137	-135 to 423	-33	-141 to 50	-1.8	-354 to 366
Living with children under 16	60	-25 to 203	218*	23 to 406	209*	25 to 395	8.3	-23 to 39	278*	58 to 527
Participants with any income	8.5	-33 to 45	-224	-525 to 69	-206	-491 to 65	-18	-74 to 28	-216	-532 to 77
Number of assets in the family	21	-5.8 to 65	21	-62 to 114	-4.5	-84 to 80	26*	10 to 43	43	-49 to 141
Participant has private insurance	-188	-469 to 0	58	-181 to 283	34	-205 to 255	24	-31 to 87	-131	-495 to 184
Male carers	-22	-73 to 18	-91	-245 to 82	-81	-220 to 86	-10	-41 to 24	-113	-277 to 63
Age of carers	1.4	-0.3 to 3.8	6.1*	0.09 to 13	5.4	-0.4 to 12	0.8	-0.3 to 2	7.5*	1.1 to 14
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	20	-34 to 69	182	-158 to 498	196	-128 to 496	-14	-61 to 26	202	-164 to 528
Completed secondary	92	-19 to 261	-17	-338 to 298	-1.4	-303 to 306	-16	-65 to 27	75	-292 to 431
Completed tertiary	69	-15 to 177	189	-174 to 539	189	-152 to 522	-0.6	-58 to 55	258	-124 to 612
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-32	-114 to 32	-27	-403 to 352	15	-367 to 384	-43	-192 to 41	-59	-441 to 327
Divorced/widowed	-56	-146 to 16	29	-400 to 426	83	-340 to 461	-54	-213 to 38	-27	-461 to 386
Carers with paid work	-14	-62 to 26	-13	-222 to 163	-66	-263 to 105	53*	18 to 91	-27	-234 to 160
Carers' relationship to participants										

Spouse	Reference		Reference		Reference		Reference		Reference	
Children	-16	-102 to 47	235	-31 to 519	238	-12 to 508	-3.4	-56 to 52	219	-63 to 506
Children in law or other relatives	-7.9	-63 to 37	101	-169 to 393	113	-141 to 390	-12	-54 to 29	94	-181 to 391
Non-relative	-20	-83 to 33	122	-239 to 540	122	-201 to 509	-0.2	-83 to 73	102	-262 to 518
Dementia	-5.5	-40 to 33	3856*	3237 to 4500	3658*	3065 to 4243	198*	99 to 311	3851*	3242 to 4496
Depression	91*	22 to 178	448	-96 to 1004	406	-107 to 925	43	-38 to 141	540	-32 to 1121
Hypertension	32	-24 to 120	-177*	-369 to -9.3	-179*	-356 to -22	2	-28 to 29	-145	-362 to 56
Diabetes	-1.9	-63 to 44	1.2	-207 to 223	7.1	-192 to 204	-5.9	-38 to 30	-0.7	-217 to 218
Ischemic heart disease	11	-40 to 58	-265*	-460 to -72	-231*	-421 to -53	-33*	-64 to -1.6	-253*	-455 to -67
Stroke	4.5	-55 to 55	973*	478 to 1465	853*	412 to 1299	120*	24 to 239	977*	481 to 1481
COPD	-49	-134 to 18	-144	-528 to 300	-176	-528 to 206	32	-41 to 119	-193	-594 to 233
Number of physical impairment	16*	3.8 to 27	139*	51 to 215	124*	40 to 192	15*	1.1 to 31	156*	68 to 232
Constant	155	-83 to 417	-2157*	-3901 to -460	-2024*	-3635 to -461	-133	-430 to 149	-2002*	-3771 to -344
R ²	0.09		0.41		0.40		0.23		0.42	
Adjusted R ²	0.08		0.40		0.39		0.22		0.41	

* Significant at 95% level

** Sample in Cuba only came from urban area.

Table A3.2. Linear regression model of cost of dementia for each level of severity in Cuba **

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Male	19	-34 to 100	73	-85 to 249	58	-92 to 223	15	-16 to 49	92	-82 to 278
Age	-2.9	-9.4 to 1.1	10	-2.7 to 22	9.7	-1.8 to 21	0.6	-2.2 to 3.4	7.4	-5.8 to 21
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	-100*	-246 to -1.9	-377	-888 to 78	-264	-692 to 146	-113	-298 to 36	-477*	-991 to -11
Completed primary	-97	-246 to 11	-260	-795 to 186	-141	-594 to 249	-119	-300 to 23	-357	-902 to 112
Completed secondary or higher	-60	-207 to 40	-337	-832 to 109	-231	-653 to 152	-106	-284 to 35	-397	-919 to 64
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	51*	11 to 98	177	-115 to 439	225	-48 to 465	-48	-115 to 11	228	-67 to 491
Divorced/widowed	10	-22 to 43	145	-114 to 385	173	-55 to 388	-28	-99 to 32	155	-105 to 405
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	-72*	-156 to -5.4	382*	144 to 625	401*	209 to 617	-19	-110 to 45	310*	54 to 559
Living with children	-37	-91 to 13	37	-206 to 283	87	-129 to 290	-50	-148 to 23	-0.3	-252 to 244
Living with other relatives	-104*	-256 to -1.9	51	-226 to 349	90	-166 to 361	-39	-140 to 38	-53	-391 to 273

Living with children under 16	58	-25 to 200	161	-4.7 to 318	152*	2.6 to 300	8.7	-22 to 39	219*	22 to 438
Participants with any income	4.6	-36 to 42	31	-234 to 271	35	-213 to 271	-3.9	-55 to 42	35	-236 to 288
Number of assets in the family	20	-6 to 61	5.9	-56 to 76	-19	-78 to 43	25*	9.9 to 41	26	-45 to 107
Participant has private insurance	-184	-476 to 0.8	32	-222 to 260	14	-264 to 261	18	-34 to 74	-152	-567 to 164
Male carers	-21	-70 to 19	-29	-155 to 110	-24	-152 to 113	-5.2	-33 to 26	-49	-189 to 95
Age of carers	1.3	-0.3 to 3.7	4.1	-1.3 to 9.6	3.4	-1.6 to 8.8	0.7	-0.4 to 1.8	5.4	-0.6 to 11
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	23	-32 to 73	137	-166 to 391	153	-125 to 396	-16	-61 to 23	160	-157 to 429
Completed secondary	94	-18 to 263	-28	-301 to 234	-10	-271 to 242	-18	-63 to 23	66	-257 to 388
Completed tertiary	72	-14 to 185	145	-150 to 444	147	-133 to 432	-2.2	-53 to 48	217	-99 to 535
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-34	-117 to 30	-12	-322 to 309	24	-311 to 340	-36	-168 to 45	-45	-370 to 285
Divorced/widowed	-61	-161 to 16	75	-265 to 420	119	-244 to 466	-45	-184 to 45	13	-358 to 380
Carers with paid work	-15	-64 to 26	23	-147 to 182	-29	-190 to 117	52*	17 to 88	7.7	-166 to 166
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	
Children	-14	-96 to 48	132	-55 to 382	137	-43 to 365	-5.6	-58 to 50	117	-93 to 376
Children in law or other relatives	-5.6	-59 to 38	125	-111 to 381	130	-88 to 387	-5.4	-46 to 38	119	-132 to 376

Non-relative	-13	-70 to 36	108	-206 to 495	107	-180 to 464	0.8	-73 to 73	95	-222 to 478
Depression	78*	4.4 to 169	544*	125 to 1032	498*	115 to 938	46	-28 to 137	622*	190 to 1121
Hypertension	33	-24 to 124	-34	-172 to 120	-41	-179 to 103	7.8	-21 to 34	-0.7	-165 to 171
Diabetes	-2.4	-64 to 44	19	-139 to 183	23	-124 to 174	-3.9	-35 to 30	16	-150 to 188
Ischemic heart disease	14	-34 to 57	-127	-297 to 27	-99	-255 to 49	-28	-55 to 1.1	-113	-286 to 47
Stroke	0.3	-64 to 54	683*	254 to 1100	580*	178 to 965	103*	10 to 217	683*	257 to 1101
COPD	-49	-133 to 18	-15	-323 to 315	-52	-317 to 231	37	-31 to 119	-64	-380 to 285
Number of physical impairment	15	-0.9 to 27	125*	53 to 192	110*	39 to 172	15*	1.2 to 31	140*	64 to 208
Severity of dementia										
No dementia	Reference		Reference		Reference		Reference		Reference	
Questionable	73	-3.3 to 209	52	-39 to 150	60	-27 to 153	-8.4	-25 to 5.7	125	-3.8 to 288
Mild	39	-25 to 123	2007*	1396 to 2683	1915*	1338 to 2564	92*	8.5 to 190	2046*	1430 to 2714
Moderate	38	-62 to 172	7396*	6183 to 8691	6714*	5562 to 7958	682*	350 to 1057	7434*	6214 to 8768
Severe	18	-63 to 125	9390*	7895 to 11031	9118*	7709 to 10649	272*	19 to 607	9409*	7906 to 11039
Constant	166	-74 to 435	-1349	-2796 to 57	-1308*	-2602 to -47	-41	-342 to 245	-1183	-2700 to 239
R ²	0.11		0.49		0.48		0.27		0.50	
Adjusted R ²	0.09		0.48		0.47		0.25		0.49	

* Significant at 95% level

** Sample in Cuba only came from urban area.

Table A3.3 Linear regression model of cost of dementia and other chronic diseases in the Dominican Republic **

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Male	59*	1.3 to 119	-5.9	-382 to 378	25	-322 to 396	-31	-121 to 54	53	-314 to 448
Age	-2.6	-6.1 to 0.6	63*	34 to 93	53*	26 to 81	10*	2.9 to 18	61*	31 to 90
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	8.9	-50 to 65	325	-104 to 753	294	-80 to 681	31	-100 to 141	334	-108 to 767
Completed primary	56	-21 to 138	246	-309 to 780	240	-236 to 704	6.2	-142 to 166	303	-243 to 829
Completed secondary or higher	19	-63 to 109	176	-345 to 648	205	-264 to 653	-29	-175 to 104	195	-320 to 679
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-26	-109 to 48	-365	-1384 to 363	-432	-1303 to 213	67	-140 to 244	-391	-1405 to 336
Divorced/widowed	34	-59 to 119	192	-623 to 877	112	-629 to 749	81	-75 to 208	227	-588 to 918
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with pouse	11	-110 to 124	440*	74 to 844	316*	0.9 to 654	124	-4.9 to 266	451*	55 to 883
Living with children	-34	-151 to 67	800*	369 to 1237	658*	272 to 1036	143*	2.8 to 295	767*	319 to 1262
Living with other relatives	-21	-179 to 112	909*	203 to 1697	636*	51 to 1270	273*	45 to 539	888*	118 to 1679

Living with children under 16	-3.4	-55 to 49	-16	-401 to 434	59	-294 to 471	-75	-178 to 32	-19	-430 to 450
Participants with any income	12	-49 to 65	-12	-331 to 346	-125	-417 to 199	113*	31 to 196	-0.5	-333 to 359
Number of assets in the family	-23*	-46 to -0.2	-1.7	-122 to 112	-46	-162 to 59	44*	14 to 81	-25	-146 to 93
Participant has private insurance	59	-19 to 159	-85	-409 to 249	-20	-323 to 280	-66	-146 to 27	-27	-369 to 335
Male carers	46	-32 to 135	-6.7	-271 to 250	-2.9	-237 to 240	-3.8	-101 to 102	39	-246 to 329
Age of carers	-1.4	-3.6 to 0.7	-11	-24 to 1.4	-11*	-23 to -0.6	0.4	-3.4 to 3.8	-13	-25 to 0.2
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	-38	-100 to 18	493*	54 to 997	463*	58 to 900	30	-92 to 167	456*	5.4 to 954
Completed secondary	-14	-90 to 59	418	-38 to 883	425*	25 to 853	-6.6	-130 to 136	404	-52 to 890
Completed tertiary	-38	-108 to 25	897*	222 to 1698	984*	332 to 1741	-87	-236 to 55	859*	154 to 1670
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	132	-77 to 241	228	-556 to 821	206	-504 to 743	22	-144 to 178	360	-583 to 952
Divorced/widowed	164	0 to 297	537	-83 to 1261	475	-81 to 1086	62	-117 to 250	700	0 to 1391
Carers with paid work	-23	-88 to 38	-136	-511 to 246	-291	-604 to 28	155*	33 to 285	-159	-538 to 231
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	

Children	-23	-115 to 64	-1448*	-2198 to -658	-1410*	-2117 to -674	-39	-211 to 146	-1472*	-2206 to -671
Children in law or other relatives	-60	-138 to 18	-833*	-1559 to -106	-882*	-1565 to -207	49	-153 to 263	-893*	-1627 to -143
Non-relative	-49	-181 to 59	-766*	-1523 to -28	-897*	-1547 to -242	132	-80 to 354	-815*	-1546 to -68
Dementia	-44	-100 to 18	3847*	2813 to 4994	3433*	2468 to 4506	415*	150 to 676	3804*	2773 to 4956
Depression	21	-71 to 114	177	-436 to 822	138	-399 to 705	39	-136 to 234	197	-401 to 868
Hypertension	-35	-105 to 24	-5.3	-362 to 366	-32	-363 to 286	27	-67 to 116	-40	-392 to 326
Diabetes	58	-15 to 139	-38	-400 to 329	-65	-370 to 248	27	-109 to 171	20	-340 to 398
Ischemic heart disease	-19	-112 to 74	397	-753 to 1831	520	-633 to 1984	-123*	-240 to -25	378	-760 to 1849
Stroke	94*	2.6 to 199	1311*	519 to 2204	1080*	341 to 1897	231	-17 to 514	1405*	610 to 2314
COPD	43	-100 to 244	-561*	-1082 to -59	-449*	-930 to -3	-112	-267 to 87	-518	-1047 to 32
Number of physical impairment	46*	29 to 66	151*	21 to 291	117*	4.5 to 239	34	-12 to 79	196*	61 to 337
Constant	233	-53 to 702	-4742*	-6816 to -2387	-3433*	-5292 to -1386	-1309*	-2081 to -591	-4509*	-6609 to -2028
R ²	0.05		0.23		0.22		0.08		0.22	
Adjusted R ²	0.03		0.21		0.21		0.06		0.21	

* Significant at 95% level

** Sample in Dominican Republic only came from urban area.

Table A3.4. Linear regression model of cost of dementia in each level of severity in the Dominican Republic **

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Male	63*	4.2 to 122	-92	-419 to 267	-48	-362 to 275	-45	-131 to 42	-30	-358 to 337
Age	-2.4	-5.6 to 0.6	52*	28 to 75	44*	21 to 66	7.9*	1.4 to 15	49*	26 to 73
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	8.7	-49 to 64	230	-115 to 585	208	-115 to 519	22	-98 to 133	239	-128 to 592
Completed primary	52	-24 to 134	389	-86 to 862	363	-41 to 774	25	-123 to 169	441	-55 to 904
Completed secondary or higher	17	-67 to 111	36	-438 to 503	78	-365 to 482	-43	-192 to 95	53	-424 to 519
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-27	-111 to 47	-284	-902 to 269	-366	-886 to 109	82	-84 to 245	-311	-913 to 242
Divorced/widowed	36	-58 to 121	127	-421 to 650	50	-471 to 527	77	-43 to 198	163	-404 to 699
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	11	-110 to 124	470*	130 to 808	344*	36 to 626	126	-6.1 to 253	481*	119 to 843
Living with children	-31	-148 to 69	718*	303 to 1101	590*	232 to 947	128	-9.1 to 269	687*	260 to 1097
Living with other relatives	-19	-171 to 114	610*	24 to 1251	375	-152 to 903	235*	24 to 475	590*	0.8 to 1232

Living with children under 16	-2.4	-55 to 51	-150	-480 to 200	-62	-360 to 264	-88	-193 to 14	-152	-491 to 198
Participants with any income	9.4	-51 to 63	-99	-394 to 192	-209	-478 to 57	110*	24 to 191	-90	-399 to 212
Number of assets in the family	-22	-46 to 0.8	-21	-133 to 81	-64	-171 to 32	43*	13 to 76	-44	-159 to 63
Participant has private insurance	58	-19 to 156	-136	-425 to 162	-68	-351 to 227	-69	-147 to 17	-78	-389 to 257
Male carers	49	-31 to 139	-229	-477 to 24	-201	-414 to 26	-28	-122 to 70	-180	-437 to 87
Age of carers	-1.4	-3.6 to 0.7	-6.6	-18 to 4.5	-7.4	-17 to 2.6	0.8	-3 to 4.2	-8	-20 to 3.4
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	-35	-96 to 20	218	-140 to 599	221	-105 to 574	-3	-120 to 119	183	-173 to 572
Completed secondary	-8	-85 to 68	-63	-396 to 290	2.3	-304 to 335	-65	-188 to 73	-71	-420 to 300
Completed tertiary	-33	-103 to 29	581	-15 to 1274	708*	138 to 1353	-127	-269 to 14	548	-65 to 1247
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	136	-76 to 253	-46	-515 to 476	-38	-465 to 423	-8.7	-159 to 149	90	-420 to 602
Divorced/widowed	169	0 to 315	54	-466 to 647	47	-438 to 571	7.1	-154 to 193	223	-304 to 817
Carers with paid work	-22	-88 to 38	-85	-405 to 230	-244	-507 to 26	159*	33 to 276	-107	-429 to 213
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	
Children	-28	-121 to 60	-703*	-1276 to -92	-746*	-1291 to -185	42	-130 to 219	-731*	-1341 to -111
Children in law or other relatives	-62	-141 to 17	-439	-1085 to 177	-533	-1086 to 40	93	-102 to 298	-501	-1161 to 112

Non-relative	-51	-186 to 57	-503	-1113 to 97	-665*	-1194 to -146	162	-46 to 367	-554	-1220 to 69
Depression	30	-65 to 127	293	-238 to 870	256	-223 to 752	37	-122 to 216	323	-195 to 912
Hypertension	-38	-108 to 23	121	-202 to 444	74	-231 to 355	47	-44 to 135	83	-246 to 395
Diabetes	58	-15 to 138	92	-195 to 417	48	-221 to 332	44	-87 to 183	150	-161 to 476
Ischemic heart disease	-21	-116 to 72	579	-382 to 1745	674	-316 to 1897	-96	-217 to 9.6	558	-396 to 1714
Stroke	100*	14 to 203	1117*	392 to 1822	926*	335 to 1578	191	-58 to 458	1217*	521 to 1935
COPD	40	-104 to 240	-91	-598 to 369	-34	-496 to 357	-57	-203 to 150	-51	-582 to 453
Number of physical impairment	47*	29 to 69	-8.1	-120 to 113	-24	-123 to 79	16	-23 to 56	39	-73 to 160
Severity of dementia										
No dementia	Reference		Reference		Reference		Reference		Reference	
Questionable	-5	-56 to 48	97	-92 to 272	84	-76 to 248	13	-57 to 76	92	-95 to 284
Mild	-69*	-141 to -3.2	1738*	1035 to 2498	1436*	854 to 2087	302*	42 to 567	1669*	988 to 2442
Moderate	-141*	-248 to -39	9924*	6597 to 13472	8750*	5509 to 12407	1174*	289 to 2151	9783*	6489 to 13382
Severe	-48	-198 to 125	16711*	11438 to 22258	14777*	9963 to 19423	1934*	365 to 3917	16663*	11376 to 22201
Constant	204	-81 to 669	-3189*	-4969 to -1363	-2102*	-3609 to -455	-1087*	-1810 to -440	-2985*	-4673 to -1079
R ²	0.05		0.45		0.44		0.13		0.44	
Adjusted R ²	0.03		0.44		0.42		0.11		0.43	

* Significant at 95% level

** Sample in Dominican Republic only came from urban area.

Table A3.5. Linear regression model of cost of dementia and other chronic diseases in Peru

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Rural area	-177*	-318 to -70	-164	-789 to 449	-162	-736 to 425	-1.8	-138 to 133	-341	-967 to 306
Male	29	-105 to 166	-495	-1065 to 114	-295	-831 to 243	-200*	-352 to -47	-466	-1066 to 144
Age	-11*	-20 to -3.8	69*	24 to 112	53*	15 to 92	15*	4.4 to 27	58*	12 to 102
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	53	-108 to 195	1718*	484 to 3050	1549*	389 to 2765	169	-150 to 478	1771*	509 to 3106
Completed primary	-20	-167 to 88	1033	-24 to 2097	906	-73 to 1827	127	-178 to 377	1012	-59 to 2095
Completed secondary or higher	62	-120 to 237	1088	-139 to 2356	924	-194 to 2082	164	-192 to 478	1150	-95 to 2431
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	48	-83 to 186	-185	-1209 to 898	-370	-1309 to 584	185	-76 to 454	-137	-1158 to 944
Divorced/widowed	-28	-140 to 77	-275	-1385 to 888	-260	-1235 to 749	-15	-281 to 258	-302	-1460 to 844
Living arrangement of participants										

	Reference		Referen ce		Reference		Reference		Reference	
Living alone										
Living with spouse	-26	-133 to 80	1373*	521 to 2351	1018*	302 to 1845	354*	144 to 598	1347*	502 to 2356
Living with children	144*	11 to 300	1905*	1078 to 2785	1475*	729 to 2272	430*	230 to 658	2049*	1227 to 2944
Living with other relatives	51	-64 to 174	1949*	938 to 2948	1516*	586 to 2434	433*	183 to 692	2001*	993 to 3012
Living with children under 16	-120	-296 to 8.2	-506	-1101 to 35	-323	-864 to 200	-183*	-336 to -50	-626*	-1225 to -58
Participants with any income	85	-23 to 214	577	-85 to 1286	447	-116 to 1038	130	-57 to 312	662	-0.9 to 1360
Number of assets in the family	-4.1	-47 to 36	43	-303 to 382	9.2	-329 to 327	34	-25 to 89	39	-310 to 378
Participant has private insurance	110*	26 to 198	-170	-959 to 596	-244	-946 to 419	75	-116 to 257	-60	-848 to 700
Male carers	34	-82 to 179	-105	-575 to 437	-17	-433 to 473	-88	-214 to 39	-71	-568 to 498
Age of carers	-2.7	-13 to 4.3	-30*	-50 to -10	-21*	-38 to -3.4	-9*	-16 to -2.4	-32*	-53 to -11
Education level of carers										
Less than primary	Reference		Referen ce		Reference		Reference		Reference	
Completed primary	176*	26 to 395	-1165	-2534 to 101	-984	-2382 to 297	-181	-429 to 41	-989	-2385 to 283
Completed secondary	-5.3	-171 to 126	-1231	-2569 to 150	-999	-2402 to 333	-232	-517 to 8.3	-1236	-2570 to 144
Completed tertiary	62	-165 to 280	-1057	-2500 to 342	-1000	-2505 to 367	-57	-400 to 235	-994	-2481 to 391

Marital status of carers										
Single	Reference			Referen ce	Reference		Reference		Reference	
Married	14	-117 to 149	-441	-1156 to 213	-305	-913 to 239	-136	-305 to 48	-427	-1149 to 260
Divorced/widowed	6.7	-154 to 185	61	-1136 to 1259	400	-736 to 1515	-339*	-566 to -101	68	-1161 to 1291
Carers with paid work	0.2	-140 to 130	924*	191 to 1692	477	-156 to 1135	447*	262 to 649	924*	173 to 1728
Carers' relationship to participants										
Spouse	Reference			Referen ce	Reference		Reference		Reference	
Children	-94	-386 to 115	-1544*	-2299 to -753	-1164*	-1799 to -489	-379*	-593 to -181	-1638*	-2469 to -773
Children in law or other relatives	52	-260 to 326	-682	-1526 to 181	-645	-1381 to 63	-37	-286 to 220	-631	-1512 to 267
Non-relative	-135	-455 to 90	463	-550 to 1566	-420	-1255 to 426	884*	549 to 1263	328	-707 to 1425
Dementia	-42	-130 to 43	10375*	8248 to 12767	8870*	6862 to 11040	1505*	960 to 2094	10332*	8196 to 12695
Depression	92	-126 to 293	1214	-424 to 3215	1301	-298 to 3228	-87	-396 to 280	1306	-361 to 3378
Hypertension	122*	10 to 266	-115	-584 to 320	-119	-533 to 290	4	-120 to 119	7	-492 to 481
Diabetes	73	-85 to 239	536	-435 to 1562	411	-482 to 1370	126	-118 to 414	610	-386 to 1649
Ischemic heart disease	-47	-218 to 107	-89	-1018 to 774	124	-711 to 986	-214	-430 to 4.2	-136	-1084 to 768
Stroke	81	-163 to 290	3461*	1890 to 5214	3217*	1783 to 4723	244	-114 to 681	3542*	1942 to 5289
COPD	266	-49 to 625	-720	-1629 to 240	-662	-1498 to 259	-58	-277 to 202	-454	-1393 to 533
Number of physical impairment	59*	2.1 to 153	292*	42 to 535	285*	62 to 510	7.7	-47 to 71	351*	84 to 619
Constant	816	-116 to 2070	-3649	-8251 to 769	-2757	-6866 to 1281	-892	-1896 to 134	-2834	-7377 to 1712

R ²	0.03	0.32	0.29	0.21	0.31
Adjusted R ²	0.01	0.31	0.28	0.20	0.29

* Significant at 95% level

Table A3.6. Linear regression model of cost of dementia in each level of severity in Peru

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Rural area	-166*	-316 to -58	-25	-623 to 598	-35	-593 to 544	9.9	-125 to 140	-191	-805 to 448
Male	32	-96 to 170	-476	-1005 to 93	-277	-724 to 213	-198*	-343 to -46	-444	-982 to 109
Age	-12*	-20 to -5.2	73*	33 to 112	57*	22 to 92	16*	4.7 to 27	61*	19 to 102
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	56	-102 to 201	987	-252 to 2208	928	-155 to 2094	59	-240 to 352	1043	-170 to 2303
Completed primary	-17	-164 to 99	377	-570 to 1407	350	-554 to 1251	27	-274 to 275	360	-619 to 1397
Completed secondary or higher	70	-111 to 247	493	-611 to 1706	424	-544 to 1462	69	-272 to 383	563	-613 to 1762
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	47	-86 to 185	-264	-1285 to 790	-430	-1334 to 529	166	-95 to 427	-217	-1216 to 829
Divorced/widowed	-28	-140 to 79	-364	-1537 to 654	-320	-1396 to 634	-44	-327 to 208	-391	-1564 to 667
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	

Living with spouse	-22	-132 to 82	961*	192 to 1837	671*	0.2 to 1423	290*	84 to 522	939*	154 to 1829
Living with children	147*	16 to 303	1587*	811 to 2403	1206*	500 to 1968	382*	191 to 590	1735*	947 to 2573
Living with other relatives	48	-66 to 168	1656*	746 to 2538	1267*	433 to 2068	389*	137 to 662	1704*	791 to 2596
Living with children under 16	-125	-299 to 2.3	-422	-995 to 105	-258	-786 to 243	-164*	-309 to -28	-547*	-1123 to -19
Participants with any income	81	-28 to 212	408	-207 to 1020	307	-237 to 821	101	-63 to 265	489	-132 to 1108
Number of assets in the family	-3.4	-46 to 37	-54	-365 to 238	-73	-380 to 208	19	-32 to 66	-57	-382 to 240
Participant has private insurance	112*	28 to 205	-217	-941 to 449	-294	-951 to 329	77	-88 to 242	-105	-843 to 581
Male carers	36	-86 to 181	-313	-768 to 144	-198	-603 to 211	-115	-241 to 14	-277	-745 to 225
Age of carers	-2.5	-13 to 4.6	-24*	-42 to -5.3	-16	-32 to 0.6	-8.4*	-15 to -2.2	-27*	-46 to -6.4
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	175*	20 to 397	-880	-2285 to 385	-741	-2149 to 492	-139	-395 to 69	-705	-2123 to 566
Completed secondary	-6.5	-169 to 126	-970	-2363 to 470	-778	-2222 to 645	-192	-492 to 47	-976	-2402 to 430
Completed tertiary	62	-163 to 279	-762	-2253 to 620	-745	-2259 to 615	-17	-362 to 273	-700	-2164 to 710
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	14	-116 to 149	-637*	-1307 to -33	-470	-1076 to 52	-167	-322 to 1.1	-623*	-1285 to -3.1
Divorced/widowed	2.6	-161 to 183	33	-1184 to 1165	384	-753 to 1472	-351*	-568 to -117	36	-1162 to 1174

Carers with paid work	-7.4	-140 to 121	985*	339 to 1696	524	-24 to 1153	461*	278 to 665	977*	294 to 1728
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	
Children	-95	-384 to 112	-1490*	-2175 to -724	-1115*	-1742 to -452	-375*	-575 to -180	-1585*	-2327 to -805
Children in law or other relatives	55	-258 to 333	-710	-1503 to 47	-674*	-1345 to -29	-35	-279 to 214	-654	-1505 to 185
Non-relative	-133	-455 to 91	120	-815 to 1121	-717	-1505 to 102	837*	520 to 1187	-13	-946 to 1015
Depression	53	-146 to 247	1499	-88 to 3422	1551*	49 to 3416	-52	-360 to 300	1552	-59 to 3544
Hypertension	121*	9.6 to 265	-211	-678 to 244	-202	-618 to 219	-9.3	-128 to 103	-91	-569 to 391
Diabetes	73	-86 to 237	188	-781 to 1120	109	-751 to 986	78	-176 to 374	261	-705 to 1252
Ischemic heart disease	-54	-219 to 101	-136	-1107 to 803	89	-822 to 1014	-225*	-426 to -22	-190	-1198 to 779
Stroke	79	-167 to 285	2798*	1388 to 4324	2652*	1400 to 4016	146	-203 to 582	2877*	1448 to 4445
COPD	253	-58 to 605	-481	-1202 to 341	-459	-1147 to 332	-22	-238 to 246	-228	-970 to 593
Number of physical impairment	53	-5.9 to 154	177	-62 to 424	183	-43 to 420	-6.2	-59 to 52	230	-26 to 486
Severity of dementia	-166*	-316 to -58	-25	-623 to 598						
No dementia	32	-96 to 170	-476	-1005 to 93	Reference		Reference		Reference	
Questionable	-12*	-20 to -5.2	73*	33 to 112	573*	201 to 1016	22	-93 to 130	703*	250 to 1194
Mild					5182*	3378 to 7089	987*	441 to 1624	6285*	4277 to 8466
Moderate	Reference		Reference		15418*	11056 to 19890	2829*	1515 to 4344	18203*	13325 to 23153
Severe	56	-102 to 201	987	-252 to 2208	21153*	11861 to 29556	2602	-125 to 5478	23648*	14071 to 31542

Constant	-17	-164 to 99	377	-570 to 1407	-1792	-5263 to 2151	-649	-1630 to 281	-1598	-5474 to 2705
R ²	0.03		0.39		0.37		0.24		0.38	
Adjusted R ²	0.01		0.38		0.35		0.22		0.37	

* Significant at 95% level

Table A3.7. Linear regression model of cost of dementia and other chronic diseases in Venezuela**

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Male	-52	-267 to 140	-29	-529 to 520	-67	-529 to 427	38	-52 to 151	-81	-634 to 520
Age	-3.1	-16 to 9	60*	22 to 97	55*	23 to 87	5	-5 to 18	57*	18 to 96
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	135	-107 to 514	-159	-1029 to 690	-210	-1104 to 623	51	-49 to 163	-24	-934 to 933
Completed primary	120	-69 to 348	-264	-1123 to 554	-342	-1134 to 426	77	-57 to 222	-144	-1018 to 666
Completed secondary or higher	254	-23 to 564	84	-801 to 936	-99	-931 to 688	183	-42 to 477	337	-640 to 1224
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-1.6	-318 to 275	156	-632 to 946	122	-654 to 874	34	-37 to 122	154	-718 to 1013
Divorced/widowed	-47	-354 to 220	167	-645 to 838	92	-710 to 760	76*	19 to 144	120	-672 to 875
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	3.7	-272 to 289	1001*	331 to 1786	893*	306 to 1606	108	-28 to 328	1005*	223 to 1904

Living with children	149	-86 to 432	591*	52 to 1210	516*	11 to 1089	75*	2.8 to 171	740*	136 to 1449
Living with other relatives	15	-308 to 354	684	-207 to 1596	668	-163 to 1527	16	-79 to 102	698	-212 to 1712
Living with children under 16	-112	-361 to 94	42	-354 to 401	-3.3	-375 to 340	45	-23 to 136	-69	-527 to 364
Participants with any income	-3.7	-189 to 162	189	-250 to 608	226	-148 to 612	-37	-166 to 62	185	-297 to 624
Number of assets in the family	29	-18 to 87	-94	-338 to 119	-110	-350 to 105	15	-5.8 to 44	-65	-307 to 162
Participant has private insurance	153*	3.5 to 348	-210	-526 to 88	-232	-531 to 48	23	-39 to 85	-56	-407 to 278
Male carers	-54	-236 to 105	165	-249 to 596	94	-253 to 475	72	-34 to 207	111	-338 to 578
Age of carers	5.3	-4.8 to 17	-8.9	-27 to 10	-7.7	-23 to 9.8	-1.3	-7.3 to 3.8	-3.7	-23 to 19
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	-279	-936 to 179	-357	-1334 to 526	-140	-891 to 557	-217	-624 to 23	-636	-1779 to 499
Completed secondary	-287	-926 to 170	-317	-1408 to 671	-86	-939 to 701	-231	-693 to 55	-604	-1837 to 555
Completed tertiary	-308	-966 to 178	-643	-1718 to 291	-396	-1235 to 348	-248	-710 to 39	-952	-2168 to 146
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-174	-374 to 6.8	264	-287 to 854	223	-268 to 779	41	-63 to 179	90	-505 to 695
Divorced/widowed	9.3	-318 to 448	169	-346 to 663	96	-347 to 538	73	-55 to 235	178	-420 to 814

Carers with paid work	-34	-189 to 174	-223	-616 to 140	-311	-678 to 7	87*	9.8 to 184	-258	-676 to 154
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	
Children	43	-311 to 406	167	-556 to 1033	140	-556 to 960	26	-99 to 187	209	-646 to 1151
Children in law or other relatives	120	-337 to 653	503	-357 to 1418	493	-329 to 1392	10	-122 to 168	623	-359 to 1644
Non-relative	-67	-440 to 277	417	-384 to 1418	302	-421 to 1207	115	-86 to 415	350	-592 to 1440
Dementia	296	-212 to 1171	3201*	1584 to 5139	2986*	1468 to 4861	215	-30 to 542	3497*	1705 to 5584
Depression	466	-152 to 1490	1737*	274 to 3591	1674*	292 to 3410	63	-142 to 312	2203*	544 to 4285
Hypertension	15	-250 to 203	38	-284 to 332	103	-166 to 363	-65	-177 to 26	53	-326 to 410
Diabetes	72	-116 to 258	657*	122 to 1231	619*	115 to 1188	38	-47 to 131	729*	225 to 1325
Ischemic heart disease	61	-167 to 290	-276	-1039 to 543	-246	-972 to 556	-29	-134 to 75	-215	-988 to 585
Stroke	256	-131 to 679	776	-390 to 1884	816	-269 to 1899	-41	-146 to 57	1032	-234 to 2240
COPD	-48	-298 to 245	-111	-808 to 653	-212	-862 to 476	100	-69 to 317	-159	-893 to 665
Number of physical impairment	32	-30 to 84	125*	7.5 to 241	107	-4.2 to 208	18	-5.2 to 49	156*	18 to 288
Constant	326	-783 to 1520	-4073*	-7344 to -937	-3496*	-6325 to -690	-577	-1400 to 80	-3747*	-7123 to -526
R ²	0.04		0.14		0.15		0.03		0.14	
Adjusted R ²	0.01		0.12		0.13		0.01		0.12	

* Significant at 95% level

** Sample in Venezuela only came from urban area.

Table A3.8. Linear regression model of cost of dementia in each level of severity in Venezuela **

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Male	-25	-234 to 154	39	-444 to 537	0.6	-441 to 433	38	-53 to 155	14	-517 to 527
Age	-6.4	-21 to 6.4	52*	12 to 93	46*	12 to 81	5.8	-4.7 to 19	45*	2.9 to 88
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	187	-98 to 599	-26	-852 to 766	-74	-903 to 740	48	-57 to 161	162	-721 to 1069
Completed primary	198	-50 to 519	3.6	-789 to 731	-75	-834 to 620	79	-57 to 225	202	-682 to 971
Completed secondary or higher	314	-17 to 716	239	-663 to 1071	59	-713 to 794	180	-44 to 478	554	-390 to 1465
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-13	-335 to 266	96	-630 to 858	67	-656 to 813	29	-39 to 113	83	-689 to 958
Divorced/widowed	-51	-353 to 217	169	-594 to 875	96	-670 to 767	73*	16 to 143	118	-627 to 846
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	-45	-341 to 262	848*	211 to 1618	742*	167 to 1370	106	-31 to 323	803*	120 to 1609
Living with children	117	-88 to 348	577*	94 to 1146	501*	45 to 1024	76*	1.5 to 171	694*	172 to 1284
Living with other relatives	-25	-322 to 248	629	-187 to 1519	614	-164 to 1457	15	-81 to 103	604	-279 to 1542

Living with children under 16	-103	-328 to 100	76	-320 to 423	30	-342 to 355	46	-25 to 138	-27	-441 to 372
Participants with any income	17	-138 to 169	297	-109 to 698	334*	0.3 to 690	-37	-166 to 62	314	-108 to 723
Number of assets in the family	23	-19 to 69	-142	-383 to 58	-156	-400 to 45	13	-5 to 39	-119	-360 to 99
Participant has private insurance	147*	0.8 to 322	-254	-573 to 42	-277	-568 to 2.6	23	-40 to 89	-107	-439 to 201
Male carers	-52	-223 to 106	147	-249 to 553	78	-264 to 411	68	-37 to 207	94	-331 to 522
Age of carers	5.9	-3.7 to 18	-6.7	-24 to 13	-5.5	-22 to 12	-1.3	-7.3 to 3.8	-0.8	-20 to 22
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	-330	-967 to 136	-517	-1475 to 295	-302	-984 to 335	-216	-619 to 34	-847	-1912 to 203
Completed secondary	-289	-911 to 175	-281	-1373 to 662	-53	-851 to 660	-228	-689 to 55	-570	-1747 to 486
Completed tertiary	-291	-902 to 189	-557	-1660 to 367	-311	-1116 to 406	-246	-704 to 38	-848	-2068 to 200
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-179*	-372 to -0.2	225	-297 to 761	181	-302 to 692	44	-55 to 183	46	-518 to 615
Divorced/widowed	-3.7	-317 to 349	71	-451 to 601	1.3	-429 to 461	69	-57 to 234	67	-485 to 660
Carers with paid work	-28	-191 to 171	-217	-597 to 138	-301	-662 to 6.7	84*	7.4 to 182	-245	-665 to 144
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	
Children	29	-330 to 394	77	-624 to 931	51	-588 to 831	27	-102 to 187	107	-682 to 1034
Children in law or other relatives	120	-375 to 649	427	-316 to 1284	419	-295 to 1223	8.3	-120 to 153	547	-329 to 1516
Non-relative	-71	-443 to 274	370	-427 to 1350	258	-426 to 1084	113	-90 to 411	299	-640 to 1315

Depression	458	-169 to 1358	1639*	243 to 3362	1571*	284 to 3192	67	-133 to 303	2096*	543 to 3875
Hypertension	13	-210 to 194	44	-248 to 325	109	-133 to 356	-65	-178 to 27	57	-277 to 389
Diabetes	30	-179 to 238	582*	71 to 1144	541*	42 to 1054	41	-39 to 128	612*	95 to 1220
Ischemic heart disease	94	-134 to 327	-285	-1012 to 534	-252	-951 to 533	-33	-146 to 67	-190	-933 to 601
Stroke	217	-222 to 668	621	-471 to 1654	658	-404 to 1690	-37	-134 to 47	838	-388 to 2043
COPD	-14	-248 to 266	0.4	-695 to 782	-102	-725 to 552	102	-66 to 313	-14	-758 to 769
Number of physical impairment	30	-28 to 82	117	-5.8 to 238	100	-7.7 to 205	17	-7.2 to 50	147*	16 to 277
Severity of dementia										
No dementia	Reference		Reference		Reference		Reference		Reference	
Questionable	112	-40 to 288	234	-58 to 529	220	-47 to 486	14	-58 to 91	346*	3.3 to 682
Mild	-70	-343 to 206	1754*	293 to 3256	1644*	272 to 3073	110	-122 to 431	1685*	153 to 3262
Moderate	2073	-385 to 6802	10194*	4099 to 16375	10003*	4110 to 15863	191	-157 to 768	12268*	5214 to 19031
Severe ***	-	-	-	-	-	-	-	-	-	-
Constant	475	-621 to 1690	-3510*	-6993 to -305	-2893	-5844 to 11	-617	-1531 to 106	-3035	-6608 to 442
R ²	0.05		0.19		0.20		0.03		0.21	
Adjusted R ²	0.02		0.17		0.18		0.01		0.19	

* Significant at 95% level

** Sample in Venezuela only came from urban area.

*** Results were omitted because the case of severe dementia was very small.

Table A3.9. Linear regression model of cost of dementia and other chronic diseases in Mexico

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Rural area	-69	-196 to 50	-252	-759 to 288	-255	-765 to 283	2.7	-14 to 26	-321	-872 to 212
Male	13	-95 to 131	-155	-537 to 271	-151	-530 to 268	-4.3	-25 to 13	-143	-546 to 297
Age	0.7	-6.2 to 8	65*	26 to 107	65*	26 to 107	0.2	-1.4 to 2	66*	26 to 107
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	12	-101 to 125	307	-177 to 733	302	-186 to 729	5.2	-3.5 to 17	318	-176 to 789
Completed primary	-33	-170 to 104	497	-229 to 1271	457	-252 to 1220	40	-2.2 to 95	464	-264 to 1266
Completed secondary or higher	108	-67 to 287	182	-496 to 912	192	-484 to 928	-9.5	-31 to 7.5	290	-451 to 1048
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	77	-59 to 194	-697	-1850 to 366	-708	-1863 to 361	11	-3.6 to 30	-620	-1808 to 443
Divorced/widowed	91	-38 to 219	-658	-1816 to 361	-681	-1859 to 338	23*	0.4 to 51	-567	-1748 to 502
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	-200	-467 to 25	524	-77 to 1105	533	-67 to 1101	-9.1	-70 to 40	324	-315 to 935

Living with children	-223	-515 to 20	419	-159 to 995	427	-158 to 999	-7.8	-72 to 43	196	-446 to 875
Living with other relatives	-90	-381 to 169	889*	10 to 1774	895*	4.8 to 1781	-6.7	-68 to 45	798	-145 to 1744
Living with children under 16	-3.1	-110 to 91	213	-295 to 692	219	-285 to 697	-6.4	-27 to 9.9	209	-331 to 695
Participants with any income	7.6	-109 to 112	-348	-800 to 96	-351	-801 to 95	3.7	-11 to 19	-340	-792 to 145
Number of assets in the family	24	-4 to 54	144*	21 to 279	140*	18 to 275	3.7	-0.9 to 9.5	167*	34 to 315
Participant has private insurance	223*	138 to 316	-198	-590 to 221	-197	-596 to 228	-1.7	-21 to 16	25	-401 to 470
Male carers	-65	-166 to 44	-194	-557 to 156	-185	-552 to 157	-8.7	-32 to 14	-259	-649 to 97
Age of carers	-0.8	-5 to 3.3	-10	-28 to 7.5	-10	-28 to 7.4	0.2	-0.4 to 1	-11	-30 to 7.5
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	16	-96 to 148	-676	-1387 to 33	-664	-1374 to 42	-11	-31 to 4.1	-660	-1390 to 46
Completed secondary	151*	18 to 296	-731	-1483 to 14	-728	-1493 to 6	-2.9	-30 to 22	-579	-1378 to 199
Completed tertiary	58	-67 to 193	-867*	-1726 to -80	-867*	-1723 to -97	-0.3	-32 to 37	-809*	-1680 to -37
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	79	-19 to 185	256	-173 to 697	240	-191 to 677	16	0 to 36	335	-118 to 791
Divorced/widowed	12	-171 to 257	69	-577 to 727	33	-605 to 677	35	-5.3 to 99	81	-603 to 789

Carers with paid work	80	-26 to 198	-305	-711 to 71	-328	-735 to 53	23*	1.2 to 48	-225	-645 to 186
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	
Children	5.5	-259 to 222	-513	-1443 to 363	-519	-1443 to 354	6.3	-6.8 to 22	-507	-1448 to 395
Children in law or other relatives	-17	-285 to 206	-862	-1870 to 138	-864	-1873 to 139	1.7	-12 to 14	-880	-1875 to 150
Non-relative	-2.6	-351 to 352	-822	-1838 to 250	-837	-1849 to 188	15	-42 to 84	-825	-1934 to 322
Dementia	16	-139 to 211	4765*	3304 to 6244	4720*	3272 to 6219	45	-20 to 127	4781*	3300 to 6299
Depression	-34	-241 to 224	495	-599 to 1738	439	-687 to 1683	56	-19 to 196	461	-678 to 1753
Hypertension	65	-21 to 147	-230	-615 to 141	-219	-609 to 157	-10	-29 to 3.4	-165	-588 to 242
Diabetes	102	-16 to 219	679*	175 to 1216	682*	176 to 1214	-2.2	-20 to 14	781*	267 to 1322
Ischemic heart disease	-116	-277 to 27	9.8	-1232 to 1661	-150	-1307 to 1399	159	-8.5 to 432	-106	-1372 to 1541
Stroke	237*	20 to 495	1819*	785 to 2922	1832*	793 to 2925	-13	-37 to 3.1	2056*	952 to 3219
COPD	-94	-211 to 30	93	-788 to 1148	106	-767 to 1167	-13*	-30 to -0.4	-1.6	-922 to 1136
Number of physical impairment	37*	3.6 to 74	201*	31 to 392	202*	32 to 392	-0.6	-8.1 to 7.9	238*	63 to 434
Constant	84	-545 to 694	-3039	-6377 to 378	-2980	-6293 to 405	-58	-219 to 54	-2955	-6412 to 504
R ²	0.04		0.17		0.17		0.04		0.16	
Adjusted R ²	0.03		0.15		0.15		0.02		0.15	

* Significant at 95% level

Table A3.10. Linear regression model of cost of dementia in each level of severity in Mexico

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Rural area	-61	-185 to 60	-285	-775 to 270	-285	-777 to 268	-0.2	-20 to 14	-346	-876 to 217
Male	16	-89 to 133	-210	-582 to 185	-208	-573 to 187	-2.6	-22 to 14	-195	-592 to 224
Age	-0.1	-7.8 to 9	77*	38 to 117	77*	37 to 117	0.3	-0.9 to 2.2	77*	37 to 117
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	16	-101 to 131	120	-361 to 567	117	-362 to 564	3.3	-5.6 to 12	136	-348 to 603
Completed primary	-25	-161 to 117	304	-394 to 1057	270	-429 to 1032	34	-3.8 to 78	279	-438 to 1044
Completed secondary or higher	111	-60 to 288	-35	-665 to 593	-22	-660 to 604	-13	-34 to 2.7	76	-620 to 716
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	80	-55 to 200	-634	-1726 to 389	-645	-1735 to 379	11	-5.4 to 38	-554	-1673 to 477
Divorced/widowed	95	-33 to 220	-643	-1733 to 362	-662	-1754 to 339	19	0 to 46	-547	-1665 to 481
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	-195	-458 to 31	547	-22 to 1085	560	-22 to 1114	-12	-65 to 36	352	-235 to 936
Living with children	-219	-514 to 23	391	-177 to 882	404	-153 to 896	-13	-66 to 36	172	-441 to 768
Living with other relatives	-86	-373 to 173	825	-56 to 1703	835	-55 to 1713	-9.4	-62 to 43	740	-192 to 1690

Living with children under 16	-7.3	-115 to 87	116	-339 to 579	123	-328 to 590	-7.3	-31 to 7	109	-385 to 594
Participants with any income	7.4	-111 to 113	-360	-780 to 90	-365	-784 to 83	4.6	-5.9 to 19	-353	-796 to 120
Number of assets in the family	25	-2.3 to 54	111	-4.6 to 243	109	-8 to 242	1.8	-1.9 to 5.3	136*	8.1 to 281
Participant has private insurance	224*	136 to 318	-223	-640 to 185	-223	-646 to 185	0	-18 to 18	0.9	-434 to 433
Male carers	-67	-168 to 40	-309	-638 to 54	-297	-614 to 61	-11	-35 to 4.1	-376*	-714 to -17
Age of carers	-0.7	-4.9 to 3.4	-12	-31 to 5.4	-13	-31 to 5.7	0.1	-0.5 to 0.7	-13	-32 to 5.8
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	20	-90 to 148	-629	-1307 to 80	-622	-1294 to 81	-7.3	-31 to 9.9	-610	-1306 to 104
Completed secondary	159*	26 to 299	-676	-1384 to 42	-677	-1371 to 37	0.9	-29 to 25	-517	-1263 to 249
Completed tertiary	64	-61 to 196	-845*	-1621 to -19	-845*	-1613 to -37	0.4	-39 to 33	-781	-1572 to 28
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	79	-20 to 184	144	-234 to 540	133	-244 to 535	11	-1 to 27	223	-190 to 633
Divorced/widowed	11	-174 to 255	82	-548 to 691	45	-573 to 657	37	-4.3 to 102	93	-565 to 761
Carers with paid work	83	-22 to 201	-325	-707 to 40	-347	-726 to 25	22*	0.6 to 45	-242	-640 to 140
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	
Children	8.2	-259 to 224	-468	-1374 to 405	-470	-1375 to 410	1.4	-12 to 13	-460	-1424 to 470
Children in law or other relatives	-12	-285 to 212	-858	-1818 to 132	-853	-1816 to 150	-5.5	-19 to 6.8	-870	-1859 to 130
Non-relative	13	-351 to 375	-711	-1712 to 314	-722	-1707 to 261	11	-47 to 73	-698	-1783 to 404

Depression	-52	-261 to 211	486	-521 to 1620	426	-619 to 1596	60	-10 to 179	435	-609 to 1628
Hypertension	66	-22 to 147	-135	-502 to 229	-131	-500 to 234	-4.4	-18 to 6.4	-69	-442 to 312
Diabetes	100	-18 to 219	595*	94 to 1152	599*	102 to 1152	-3.8	-23 to 14	695*	181 to 1248
Ischemic heart disease	-119	-283 to 22	234	-962 to 1901	69	-1079 to 1632	164	-1.8 to 435	115	-1111 to 1769
Stroke	229*	15 to 476	1553*	553 to 2628	1568*	559 to 2636	-14	-45 to 5	1782*	721 to 2961
COPD	-93	-209 to 33	215	-666 to 1278	226	-654 to 1290	-11	-32 to 0.9	122	-773 to 1230
Number of physical impairment	33*	1.5 to 69	244*	80 to 432	243*	80 to 426	0.9	-4.7 to 9.1	277*	114 to 467
Severity of dementia										
No dementia	Reference		Reference		Reference		Reference		Reference	
Questionable	66	-22 to 153	94	-232 to 422	106	-227 to 426	-11	-31 to 2.5	160	-187 to 504
Mild	125	-86 to 400	4002*	2568 to 5569	4013*	2581 to 5586	-12	-38 to 6.1	4127*	2608 to 5749
Moderate	-26	-272 to 295	10949*	5691 to 17276	10659*	5491 to 16945	290	-29 to 915	10923*	5791 to 17244
Severe	367	-65 to 745	28239	0 to 40044	26775	0 to 40067	1464	-48 to 2985	28606	0 to 40737
Constant	75	-633 to 735	-3272*	-6451 to -180	-3234*	-6442 to -133	-39	-196 to 91	-3197	-6567 to 71
R ²	0.05		0.22		0.21		0.10		0.21	
Adjusted R ²	0.03		0.20		0.20		0.09		0.19	

* Significant at 95% level

Table A3.11. Linear regression model of cost of dementia and other chronic diseases in China

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Rural area	8.5	-69 to 92	-592	-1440 to 76	-399	-1136 to 166	-193	-387 to 0.4	-584	-1430 to 86
Male	9.5	-74 to 82	-889*	-1351 to -468	-663*	-1029 to -305	-226*	-359 to -79	-880*	-1332 to -443
Age	3.7	-0.9 to 9.2	91*	48 to 135	61*	24 to 96	30*	18 to 42	95*	53 to 139
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	8.2	-61 to 93	128	-430 to 675	129	-372 to 627	-0.9	-161 to 163	136	-421 to 702
Completed primary	11	-51 to 86	318	-139 to 760	208	-194 to 583	110	-26 to 242	330	-128 to 777
Completed secondary or higher	35	-61 to 163	760*	44 to 1422	460	-115 to 1040	299*	54 to 512	794*	74 to 1506
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-25	-140 to 80	-858	-1781 to 53	-709	-1557 to 50	-148	-370 to 89	-883	-1872 to 17
Divorced/widowed	-7.1	-114 to 104	-1110*	-2054 to -153	-943*	-1799 to -131	-166	-395 to 75	-1117*	-2133 to -133
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	-76	-317 to 81	1144*	200 to 2040	849*	65 to 1569	296*	25 to 516	1069*	154 to 1963
Living with children	-91	-335 to 82	677	-192 to 1499	515	-198 to 1221	162	-87 to 356	587	-322 to 1379

Living with other relatives	-133	-376 to 36	986*	7 to 1991	731	-60 to 1573	255	-29 to 483	853	-155 to 1861
Living with children under 16	-17	-71 to 30	-138	-571 to 285	-58	-444 to 298	-80	-188 to 28	-154	-600 to 265
Participants with any income	36	-2 to 79	-201	-602 to 174	-216	-555 to 114	15	-80 to 108	-165	-560 to 216
Number of assets in the family	11	-9.4 to 33	-11	-163 to 141	-43	-177 to 83	32	-7.1 to 73	0.5	-160 to 151
Participant has private insurance	5.6	-49 to 58	440	-130 to 1178	408	-146 to 1069	32	-93 to 179	445	-148 to 1186
Male carers	-57	-143 to 19	-692*	-1147 to -254	-676*	-1089 to -311	-16	-154 to 122	-749*	-1211 to -304
Age of carers	0.6	-2.4 to 4.1	-39*	-68 to -11	-25*	-48 to -1.1	-15*	-23 to -6.4	-39*	-67 to -10
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	56	-24 to 134	183	-366 to 721	252	-228 to 716	-70	-201 to 68	239	-328 to 795
Completed secondary	86	-6.5 to 176	-98	-631 to 449	67	-425 to 530	-164	-335 to 11	-12	-560 to 548
Completed tertiary	99	-90 to 303	174	-820 to 1007	350	-502 to 1109	-176	-475 to 142	272	-739 to 1141
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-21	-126 to 91	2032*	760 to 3252	1552*	494 to 2565	481*	109 to 855	2011*	748 to 3259
Divorced/widowed	-76	-223 to 72	2119*	2.4 to 4317	1868*	106 to 3755	251	-292 to 749	2043	-52 to 4194
Carers with paid work	-14	-86 to 72	70	-530 to 747	-43	-544 to 503	113	-64 to 290	56	-532 to 730
Carers' relationship to participants										

Spouse	Reference		Reference		Reference		Reference		Reference	
Children	-65	-150 to 15	-332	-1174 to 391	-155	-904 to 511	-178	-411 to 47	-397	-1238 to 343
Children in law or other relatives	-110*	-240 to -14	-590	-1568 to 395	-471	-1294 to 306	-119	-402 to 216	-700	-1665 to 255
Non-relative	-143	-290 to 4.4	1220	-277 to 2902	541	-738 to 1841	678*	273 to 1145	1077	-423 to 2736
Dementia	148	-71 to 463	8540*	6729 to 10243	7344*	5706 to 8821	1195*	748 to 1683	8687*	6857 to 10443
Depression	36	-412 to 674	7624*	1153 to 14926	8162*	1333 to 15648	-539	-1255 to 336	7660*	1315 to 14891
Hypertension	-10	-58 to 35	-396*	-743 to -42	-269	-551 to 25	-127*	-230 to -18	-406*	-769 to -38
Diabetes	160*	44 to 289	616	-156 to 1430	416	-218 to 1100	200	-26 to 444	776*	4 to 1595
Ischemic heart disease	75	-115 to 310	-207	-1228 to 930	-66	-948 to 927	-141	-394 to 119	-132	-1177 to 1093
Stroke	259*	26 to 528	3813*	2336 to 5398	3070*	1884 to 4392	743*	321 to 1241	4072*	2566 to 5620
COPD	-164*	-323 to -20	2125*	492 to 3927	2015*	514 to 3730	110	-394 to 664	1961*	352 to 3765
Number of physical impairment	79*	42 to 125	409*	173 to 654	310*	112 to 518	99*	36 to 169	488*	249 to 731
Constant	-195	-717 to 280	-3525	-7131 to 0.9	-1999	-4907 to 781	-1526*	-2650 to -440	-3720*	-7375 to -76
R ²	0.09		0.41		0.40		0.23		0.42	
Adjusted R ²	0.08		0.40		0.39		0.22		0.41	

* Significant at 95% level

Table A3.12. Linear regression model of cost of dementia in each level of severity in China

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Rural area	-3.8	-80 to 76	-580	-1340 to 45	-371	-1044 to 184	-209*	-390 to -20	-584	-1387 to 33
Male	12	-68 to 83	-777*	-1168 to -384	-570*	-893 to -241	-207*	-342 to -65	-765*	-1167 to -353
Age	3.4	-0.9 to 8.6	97*	58 to 136	66*	34 to 99	31*	18 to 42	100*	60 to 140
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	25	-44 to 110	290	-258 to 805	270	-229 to 740	20	-135 to 174	315	-232 to 843
Completed primary	18	-48 to 96	351	-141 to 775	241	-160 to 614	110	-28 to 235	370	-120 to 802
Completed secondary or higher	42	-55 to 173	766*	33 to 1436	468	-121 to 1002	298*	58 to 511	808*	118 to 1480
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-30	-144 to 75	-940*	-1803 to -67	-784*	-1551 to -64	-156	-372 to 76	-970*	-1870 to -81
Divorced/widowed	-3.6	-106 to 99	-921*	-1763 to -38	-786*	-1545 to -37	-136	-347 to 96	-925*	-1802 to -36
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	-63	-283 to 90	1334*	323 to 2140	1013*	195 to 1730	321*	67 to 525	1270*	308 to 2071
Living with children	-82	-305 to 84	770	-175 to 1583	599	-142 to 1307	172	-73 to 372	688	-223 to 1439
Living with other relatives	-123	-344 to 37	1100*	128 to 1987	837*	37 to 1642	264	-12 to 477	977*	1.2 to 1867

Living with children under 16	-19	-72 to 30	-124	-494 to 229	-48	-374 to 257	-76	-185 to 30	-142	-515 to 202
Participants with any income	32	-5 to 75	-234	-601 to 95	-244	-558 to 41	10	-85 to 100	-201	-576 to 147
Number of assets in the family	15	-5.3 to 36	31	-110 to 172	-6.9	-126 to 112	38	-0.4 to 77	46	-97 to 187
Participant has private insurance	14	-40 to 69	460	-61 to 1098	427	-32 to 982	32	-92 to 176	474	-68 to 1123
Male carers	-49	-127 to 25	-527*	-981 to -88	-539*	-936 to -152	11	-127 to 152	-576*	-1022 to -143
Age of carers	1.1	-2 to 4.7	-25	-50 to 1.9	-12	-33 to 11	-12*	-20 to -3.7	-24	-48 to 3.6
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	60	-24 to 137	260	-233 to 746	322	-104 to 741	-62	-196 to 70	320	-191 to 845
Completed secondary	86	-11 to 178	-89	-570 to 484	76	-358 to 553	-166	-335 to 14	-3.7	-503 to 580
Completed tertiary	96	-82 to 289	107	-789 to 975	300	-465 to 1026	-193	-479 to 144	203	-745 to 1081
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-56	-166 to 61	1417*	489 to 2372	1023*	262 to 1784	394*	43 to 743	1361*	437 to 2366
Divorced/widowed	-85	-219 to 70	1391	-477 to 3471	1250	-325 to 2951	141	-341 to 641	1306	-572 to 3362
Carers with paid work	-10	-86 to 74	84	-490 to 714	-31	-526 to 499	114	-59 to 287	74	-494 to 722
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	
Children	-60	-145 to 22	-62	-866 to 667	76	-582 to 703	-138	-365 to 82	-122	-895 to 623
Children in law or other relatives	-105*	-235 to -5.7	-334	-1221 to 615	-262	-971 to 491	-72	-350 to 256	-439	-1322 to 494
Non-relative	-133	-271 to 7.2	1484*	81 to 2964	774	-351 to 2002	710*	319 to 1169	1351	-52 to 2837

Depression	-48	-660 to 625	6846*	845 to 13525	7519*	1229 to 14385	-673	-1638 to 307	6798*	962 to 13395
Hypertension	-4.7	-54 to 41	-324	-631 to 7.6	-208	-474 to 83	-117*	-217 to -11	-329	-670 to 21
Diabetes	158*	40 to 289	591	-137 to 1368	395	-237 to 1045	196	-24 to 427	749*	4.5 to 1535
Ischemic heart disease	70	-109 to 287	-181	-1125 to 831	-51	-847 to 873	-129	-378 to 115	-110	-1055 to 931
Stroke	214	-27 to 458	2903*	1434 to 4289	2316*	1115 to 3449	588*	163 to 1049	3117*	1676 to 4507
COPD	-192*	-380 to -41	1364	-151 to 3232	1390	-152 to 3199	-26	-461 to 545	1172	-368 to 3015
Number of physical impairment	78*	40 to 122	360*	148 to 578	266*	82 to 451	94*	29 to 166	438*	219 to 657
Severity of dementia										
No dementia	Reference		Reference		Reference		Reference		Reference	
Questionable	-17	-78 to 37	165	-161 to 541	201	-58 to 513	-35	-136 to 82	149	-183 to 531
Mild	-14	-167 to 193	6303*	4487 to 8257	5234*	3644 to 6931	1068*	531 to 1632	6288*	4471 to 8219
Moderate	662	-56 to 1685	16169*	12925 to 19228	13943*	10740 to 16913	2226*	1239 to 3332	16830*	13682 to 20027
Severe	-150	-690 to 177	22591	0 to 34095	18948	0 to 28450	3643	0 to 5860	22441	0 to 33599
Constant	-210	-743 to 259	-5129*	-8612 to -1766	-3418*	-6132 to -733	-1711*	-2807 to -643	-5339*	-8785 to -1860
R ²	0.11		0.49		0.48		0.27		0.50	
Adjusted R ²	0.09		0.48		0.47		0.25		0.49	

* Significant at 95% level

Table A3.13. Linear regression model of cost of dementia and other chronic diseases in India**

Variables	Cost of medical care		Cost of social care		Cost of informal care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Rural area	34*	1 to 95	345*	105 to 577	345*	105 to 577	379*	134 to 619
Male	18	-12 to 73	-145	-392 to 100	-145	-392 to 100	-126	-376 to 124
Age	3.6	-1.6 to 13	14	-2.1 to 31	14	-2.1 to 31	18	-1.5 to 38
Education level of participants								
No education	Reference		Reference		Reference		Reference	
Less than primary	-76*	-216 to -5.7	-148	-372 to 102	-148	-372 to 102	-224	-501 to 58
Completed primary	-73	-223 to 1.8	-4.1	-342 to 348	-4.1	-342 to 348	-77	-449 to 320
Completed secondary or higher	-61	-206 to 8.5	234	-238 to 736	234	-238 to 736	173	-318 to 671
Marital status of participants								
Single	Reference		Reference		Reference		Reference	
Married	-15	-129 to 35	-443	-1338 to 250	-443	-1338 to 250	-458	-1346 to 255
Divorced/widowed	-12	-108 to 38	-413	-1340 to 346	-413	-1340 to 346	-426	-1348 to 336
Living arrangement of participants								
Living alone	Reference		Reference		Reference		Reference	
Living with spouse	71	-13 to 232	541*	115 to 1010	541*	115 to 1010	612*	154 to 1099
Living with children	11	-23 to 55	337	-0.3 to 698	337	-0.3 to 698	348*	9.3 to 701

Living with other relatives	21	-31 to 80	607*	112 to 1197	607*	112 to 1197	628*	120 to 1215
Living with children under 16	6.3	-17 to 38	-76	-376 to 210	-76	-376 to 210	-69	-371 to 218
Participants with any income	-3.5	-39 to 38	-720*	-1019 to -395	-720*	-1019 to -395	-723*	-1037 to -404
Number of assets in the family	-5.7	-21 to 2.8	38	-26 to 103	38	-26 to 103	32	-34 to 98
Participant has private insurance	150*	21 to 350	2054	-450 to 6803	2054	-450 to 6803	2204	-273 to 6955
Male carers	-21	-80 to 11	-67	-371 to 267	-67	-371 to 267	-88	-400 to 264
Age of carers	0.4	-1.9 to 3.1	-2.1	-12 to 8.4	-2.1	-12 to 8.4	-1.7	-12 to 9.4
Education level of carers								
Less than primary	Reference		Reference		Reference		Reference	
Completed primary	22	-11 to 70	-87	-337 to 166	-87	-337 to 166	-65	-321 to 186
Completed secondary	12	-15 to 52	-153	-463 to 184	-153	-463 to 184	-142	-447 to 219
Completed tertiary	-1.4	-110 to 64	-83	-584 to 459	-83	-584 to 459	-85	-613 to 477
Marital status of carers								
Single	Reference		Reference		Reference		Reference	
Married	16	-26 to 62	194	-112 to 512	194	-112 to 512	209	-95 to 538
Divorced/widowed	33	-71 to 175	25	-458 to 500	25	-458 to 500	59	-428 to 517
Carers with paid work	-5.5	-46 to 19	264*	55 to 497	264*	55 to 497	259*	45 to 500

Carers' relationship to participants								
Spouse	Reference		Reference		Reference		Reference	
Children	-31	-114 to 30	-82	-505 to 372	-82	-505 to 372	-113	-540 to 350
Children in law or other relatives	-39	-122 to 15	-46	-473 to 404	-46	-473 to 404	-85	-520 to 358
Non-relative	-51	-169 to 26	23	-513 to 673	23	-513 to 673	-28	-580 to 601
Dementia	-29	-139 to 40	1793*	1054 to 2548	1793*	1054 to 2548	1764*	1004 to 2517
Depression	-19	-129 to 44	608*	116 to 1176	608*	116 to 1176	588*	92 to 1163
Hypertension	-31	-127 to 23	-79	-287 to 120	-79	-287 to 120	-109	-333 to 112
Diabetes	212*	11 to 565	553*	88 to 1112	553*	88 to 1112	764*	185 to 1399
Ischemic heart disease	9	-69 to 64	-364	-702 to 34	-364	-702 to 34	-355	-716 to 46
Stroke	1066	-31 to 3589	2185*	544 to 4321	2185*	544 to 4321	3251*	634 to 6809
COPD	-3.3	-75 to 43	212	-179 to 625	212	-179 to 625	209	-198 to 632
Number of physical impairment	-13	-63 to 14	90	-3.8 to 184	90	-3.8 to 184	76	-32 to 188
Constant	-195	-775 to 154	-415	-1798 to 1124	-415	-1798 to 1124	-610	-2131 to 962
R ²	0.05		0.14		0.14		0.14	
Adjusted R ²	0.04		0.12		0.12		0.13	

* Significant at 95% level

** No paid home care was found in India.

Table A3.14. Linear regression model of cost of dementia in each level of severity in India**

Variables	Cost of medical care		Cost of social care		Cost of informal care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficient	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficient	Bootstrapped 95% confidence interval
Rural area	26	-1.6 to 73	227	-4.4 to 447	227	-4.4 to 447	253*	7 to 485
Male	17	-12 to 76	-238*	-481 to -13	-238*	-481 to -13	-221	-463 to 0.8
Age	3	-1.5 to 11	20*	3.8 to 36	20*	3.8 to 36	23*	4.8 to 41
Education level of participants								
No education	Reference		Reference		Reference		Reference	
Less than primary	-73*	-198 to -5	-99	-319 to 124	-99	-319 to 124	-172	-429 to 99
Completed primary	-72	-222 to 3	89	-244 to 433	89	-244 to 433	17	-354 to 377
Completed secondary or higher	-59	-195 to 10	264	-148 to 654	264	-148 to 654	205	-232 to 611
Marital status of participants								
Single	Reference		Reference		Reference		Reference	
Married	-30	-162 to 32	-477	-1369 to 215	-477	-1369 to 215	-506	-1395 to 203
Divorced/widowed	-28	-150 to 34	-535	-1474 to 242	-535	-1474 to 242	-563	-1494 to 228
Living arrangement of participants								
Living alone	Reference		Reference		Reference		Reference	
Living with spouse	74	-12 to 245	525*	102 to 982	525*	102 to 982	600*	139 to 1094
Living with children	17	-19 to 81	336*	21 to 689	336*	21 to 689	353*	30 to 718
Living with other relatives	23	-33 to 89	473*	1.4 to 1062	473*	1.4 to 1062	496*	6.2 to 1084

Living with children under 16	9.1	-14 to 47	-95	-402 to 174	-95	-402 to 174	-86	-403 to 195
Participants with any income	7.2	-30 to 68	-640*	-936 to -342	-640*	-936 to -342	-632*	-937 to -337
Number of assets in the family	-3.7	-16 to 3.3	16	-42 to 78	16	-42 to 78	12	-48 to 76
Participant has private insurance	152*	21 to 363	1522	-409 to 4690	1522	-409 to 4690	1674	-218 to 4892
Male carers	-20	-78 to 11	-106	-406 to 185	-106	-406 to 185	-127	-446 to 177
Age of carers	0.4	-1.8 to 3.1	-4.4	-13 to 5.1	-4.4	-13 to 5.1	-4	-13 to 5.6
Education level of carers								
Less than primary	Reference		Reference		Reference		Reference	
Completed primary	18	-14 to 64	-172	-395 to 45	-172	-395 to 45	-154	-382 to 76
Completed secondary	11	-17 to 50	-136	-424 to 198	-136	-424 to 198	-125	-415 to 212
Completed tertiary	6.7	-94 to 86	-316	-722 to 53	-316	-722 to 53	-309	-716 to 82
Marital status of carers								
Single	Reference		Reference		Reference		Reference	
Married	19	-22 to 75	281	-48 to 613	281	-48 to 613	300	-36 to 634
Divorced/widowed	38	-62 to 184	23	-413 to 467	23	-413 to 467	61	-398 to 505
Carers with paid work	-6.6	-51 to 20	230*	33 to 450	230*	33 to 450	223*	13 to 451
Carers' relationship to participants								
Spouse	Reference		Reference		Reference		Reference	
Children	-32	-120 to 31	10	-372 to 450	10	-372 to 450	-22	-419 to 425
Children in law or other relatives	-47	-142 to 14	-51	-380 to 309	-51	-380 to 309	-98	-457 to 257
Non-relative	-50	-168 to 27	44	-444 to 683	44	-444 to 683	-5.8	-514 to 641

Depression	-33	-174 to 44	666*	199 to 1180	666*	199 to 1180	632*	156 to 1179
Hypertension	-26	-111 to 24	8.9	-183 to 186	8.9	-183 to 186	-17	-217 to 175
Diabetes	208*	12 to 548	518*	81 to 1026	518*	81 to 1026	726*	165 to 1319
Ischemic heart disease	10	-72 to 68	-421*	-675 to -187	-421*	-675 to -187	-411*	-698 to -150
Stroke	1040	-31 to 3477	1645*	284 to 3154	1645*	284 to 3154	2685*	398 to 5621
COPD	5.6	-57 to 46	156	-205 to 555	156	-205 to 555	162	-197 to 554
Number of physical impairment	-18	-74 to 13	78	-8.3 to 173	78	-8.3 to 173	60	-52 to 173
Severity of dementia								
No dementia	Reference		Reference		Reference		Reference	
Questionable	10	-14 to 40	114	-83 to 295	114	-83 to 295	125	-73 to 301
Mild	277	-17 to 852	1872*	945 to 2918	1872*	945 to 2918	2150*	1066 to 3234
Moderate	-100	-596 to 93	8671*	4874 to 12455	8671*	4874 to 12455	8571*	4900 to 12337
Severe	308	-103 to 1038	12785	0 to 16729	12785	0 to 16729	13093	0 to 16696
Constant	-167	-678 to 144	-489	-1905 to 1010	-489	-1905 to 1010	-656	-2171 to 947
R ²	0.06		0.26		0.26		0.26	
Adjusted R ²	0.04		0.25		0.25		0.25	

* Significant at 95% level

** No paid home care was found in India.

Table A3.15. Linear regression model of cost of dementia and other chronic diseases in Whole Sample

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Rural area	-77*	-111 to -43	-9.2	-178 to 168	-63	-257 to 148	94*	41 to 149	26	-198 to 271
Male	5.8	-34 to 45	-198*	-361 to -42	1032*	698 to 1397	228*	144 to 311	1354*	975 to 1754
Age	-3*	-5.4 to -0.7	58*	46 to 71	717*	316 to 1168	103*	33 to 189	760*	322 to 1225
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	10	-33 to 51	55	-144 to 254	284*	52 to 511	52*	2.9 to 105	561*	297 to 810
Completed primary	-19	-60 to 21	110	-108 to 328	814*	506 to 1154	-20	-67 to 21	1065*	749 to 1433
Completed secondary or higher	36	-17 to 96	308*	27 to 554	405*	119 to 698	21	-20 to 60	586*	275 to 907
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	30	-27 to 82	42	-323 to 382	1255*	996 to 1534	481*	391 to 579	1809*	1494 to 2149
Divorced/widowed	-5.9	-63 to 45	-3.3	-353 to 316	708*	417 to 1023	77*	22 to 132	647*	335 to 980
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	-87*	-163 to -22	932*	701 to 1169	256*	36 to 491	89*	47 to 130	306*	70 to 560
Living with children	-60	-139 to 7.3	736*	523 to 942	222	-0.08 to 469	72*	24 to 115	273*	10 to 549

Living with other relatives	-119*	-203 to -45	986*	693 to 1251	-124	-274 to 12	-54*	-89 to -20	-163*	-331 to -2.3
Living with children under 16	-21	-67 to 26	-119	-286 to 36	48*	37 to 59	9.7*	6.6 to 13	55*	42 to 68
Participants with any income	19	-12 to 48	-94	-249 to 61	208*	28 to 393	34	-6.7 to 73	235*	27 to 441
Number of assets in the family	11*	0.01 to 23	65*	15 to 118	167	-26 to 369	39	-8.3 to 85	185	-38 to 401
Participant has private insurance	171*	121 to 227	228*	74 to 400	236	-0.9 to 476	98*	31 to 164	380*	105 to 642
Male carers	-42*	-77 to -3.8	-133*	-258 to -6.1	-133	-459 to 179	31	-41 to 101	-81	-441 to 265
Age of carers	0.2	-1.8 to 2.2	-8.6*	-15 to -2.7	-85	-415 to 205	9	-66 to 69	-66	-417 to 262
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	37	-7.2 to 84	-125	-312 to 75	656*	462 to 857	167*	107 to 221	750*	503 to 983
Completed secondary	40	-3.8 to 88	-161	-394 to 67	565*	391 to 748	149*	93 to 201	671*	450 to 886
Completed tertiary	37	-18 to 91	-138	-386 to 139	722*	465 to 940	180*	107 to 251	827*	535 to 1097
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-72*	-131 to -18	-92	-328 to 150	-6.7	-169 to 140	-56*	-90 to -24	-85	-262 to 78
Divorced/widowed	-69	-147 to 2.9	-294*	-579 to -12	-132	-281 to 24	32*	0.3 to 64	-90	-254 to 81
Carers with paid work	-13	-45 to 20	39	-107 to 193	23	-25 to 72	25*	16 to 35	53	-1.5 to 107
Carers' relationship to participants										

Spouse	Reference		Reference		Reference		Reference		Reference	
Children	-11	-86 to 63	-292*	-528 to -75	-48	-262 to 159	19	-18 to 58	113	-116 to 344
Children in law or other relatives	4.1	-80 to 86	-264*	-516 to -31	-140*	-260 to -25	-26	-61 to 12	-184*	-318 to -48
Non-relative	-64	-149 to 8.9	475*	131 to 812	-9.6*	-15 to -4.5	-3.5*	-5.2 to -2	-13*	-19 to -6.3
Dementia	72	-6 to 176	487*	115 to 909	-92	-272 to 97	-40	-81 to 1.3	-113	-318 to 98
Depression	23	-15 to 55	-189*	-324 to -45	-185	-399 to 36	-77*	-125 to -32	-231	-465 to 10
Hypertension	102*	53 to 156	303*	103 to 534	-156	-395 to 116	-59	-125 to 0.6	-201	-468 to 105
Diabetes	-18	-61 to 30	-211	-490 to 54	65	-149 to 285	-37	-98 to 23	22	-223 to 268
Ischemic heart disease	174*	79 to 289	2085*	1607 to 2536	145	-118 to 418	-66*	-132 to -4.3	83	-211 to 384
Stroke	26	-38 to 104	-34	-379 to 324	-19	-154 to 122	140*	99 to 183	118	-39 to 282
COPD	51*	37 to 68	219*	152 to 283	-323*	-563 to -116	-61*	-114 to -12	-412*	-678 to -177
Number of physical impairment	12	-51 to 88	5114*	4587 to 5641	-270*	-501 to -61	-5.8	-65 to 51	-288*	-560 to -31
Constant	374*	171 to 597	-4119*	-5155 to -3097	53	-219 to 333	354*	258 to 454	350*	14 to 695
R ²	0.02		0.20		0.21		0.10		0.21	
Adjusted R ²	0.02		0.20		0.20		0.09		0.21	

* Significant at 95% level

Table A3.16. Linear regression model of cost of dementia in each level of severity in Whole Sample

Variables	Cost of medical care		Cost of social care		Cost of informal care		Cost of paid home care		Total cost	
	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval	Observed coefficients	Bootstrapped 95% confidence interval
Rural area	-6	-61 to 43	112	-80 to 321	12	-167 to 205	100*	49 to 156	107	-89 to 322
Male	94	-2.9 to 190	1367*	1030 to 1726	1131*	828 to 1463	236*	152 to 320	1460*	1116 to 1835
Age	-52	-116 to 14	1061*	651 to 1504	937*	547 to 1384	124*	52 to 208	1009*	594 to 1464
Education level of participants										
No education	Reference		Reference		Reference		Reference		Reference	
Less than primary	221*	133 to 309	516*	268 to 750	447*	220 to 666	68*	18 to 120	737*	489 to 989
Completed primary	267*	187 to 352	1018*	714 to 1357	1017*	713 to 1353	0.8	-44 to 42	1285*	976 to 1639
Completed secondary or higher	163*	99 to 231	675*	394 to 977	630*	356 to 911	45*	2.5 to 85	838*	539 to 1149
Marital status of participants										
Single	Reference		Reference		Reference		Reference		Reference	
Married	68	-8.6 to 133	1785*	1491 to 2097	1301*	1061 to 1562	484*	399 to 581	1853*	1546 to 2161
Divorced/widowed	-127*	-193 to -64	960*	675 to 1275	871*	610 to 1166	89*	32 to 143	833*	538 to 1149
Living arrangement of participants										
Living alone	Reference		Reference		Reference		Reference		Reference	
Living with spouse	-35	-87 to 13	570*	357 to 788	461*	262 to 670	109*	65 to 150	535*	322 to 759
Living with children	-19	-83 to 58	429*	199 to 646	346*	132 to 547	83*	34 to 128	410*	175 to 645
Living with other relatives	17	-24 to 59	-142*	-289 to -4	-91	-226 to 34	-51*	-86 to -17	-125	-276 to 13

Living with children under 16	-3.4*	-6.1 to -1	51*	39 to 63	42*	32 to 53	8.6*	5.7 to 12	48*	36 to 60
Participants with any income	-4.8	-49 to 40	76	-108 to 260	58	-115 to 235	19	-21 to 55	72	-125 to 263
Number of assets in the family	-16	-58 to 24	165	-45 to 360	128	-60 to 313	37	-8.6 to 78	149	-69 to 352
Participant has private insurance	52*	3.9 to 108	235	-16 to 477	146	-77 to 370	89*	23 to 153	287*	31 to 539
Male carers	22	-35 to 73	-126	-455 to 178	-155	-451 to 124	29	-44 to 96	-105	-434 to 212
Age of carers	9.4	-49 to 60	-74	-412 to 223	-82	-398 to 198	8.7	-64 to 69	-64	-396 to 239
Education level of carers										
Less than primary	Reference		Reference		Reference		Reference		Reference	
Completed primary	-73*	-148 to -9.9	782*	562 to 987	620*	435 to 808	162*	106 to 216	709*	474 to 927
Completed secondary	-44	-120 to 18	671*	484 to 863	526*	354 to 695	145*	90 to 196	627*	420 to 824
Completed tertiary	-76*	-159 to -4.4	763*	510 to 1007	597*	369 to 817	166*	94 to 236	687*	427 to 943
Marital status of carers										
Single	Reference		Reference		Reference		Reference		Reference	
Married	-22	-69 to 24	-91	-249 to 58	-32	-178 to 108	-59*	-94 to -27	-113	-281 to 54
Divorced/widowed	11	-24 to 44	-50	-189 to 108	-88	-225 to 59	38*	6.1 to 70	-39	-182 to 116
Carers with paid work	5.2	-6.4 to 17	21	-29 to 69	-1.7	-49 to 45	23*	14 to 32	26	-24 to 75
Carers' relationship to participants										
Spouse	Reference		Reference		Reference		Reference		Reference	
Children	142*	92 to 203	-82	-290 to 135	-96	-285 to 104	14	-23 to 52	60	-141 to 281
Children in law or other relatives	-16	-51 to 21	-167*	-293 to -42	-141*	-254 to -33	-26	-60 to 11	-183*	-315 to -49

Non-relative	0.3	-1.7 to 2.5	-13*	-19 to -7.6	-9.8*	-15 to -4.8	-3.6*	-5.2 to -2	-13*	-19 to -7
Depression	19	-22 to 62	-195*	-392 to -3.5	-149	-336 to 30	-46*	-85 to -5.4	-176	-381 to 29
Hypertension	33	-14 to 83	-337*	-557 to -113	-252*	-454 to -45	-85*	-133 to -40	-304*	-529 to -75
Diabetes	16	-44 to 72	-304*	-555 to -24	-235	-470 to 28	-69*	-131 to -8.3	-288*	-549 to -5.1
Ischemic heart disease	-6.2	-68 to 48	4.5	-234 to 236	44	-165 to 250	-40	-99 to 18	-1.8	-246 to 234
Stroke	3.1	-80 to 86	18	-259 to 292	90	-162 to 347	-72*	-135 to -7.7	21	-264 to 301
COPD	-2.3	-34 to 31	118	-24 to 268	-22	-146 to 116	140*	99 to 182	116	-30 to 274
Number of physical impairment	-27	-104 to 45	-312*	-552 to -109	-258*	-476 to -70	-54*	-106 to -4.8	-339*	-586 to -110
Severity of dementia										
No dementia	Reference		Reference		Reference		Reference		Reference	
Questionable	-10	-97 to 71	-222*	-458 to -0.9	-222*	-445 to -10	-0.1	-59 to 56	-233	-479 to 14
Mild	-53	-139 to 20	389*	89 to 706	36	-207 to 301	353*	259 to 447	336*	11 to 666
Moderate	74	-11 to 188	594*	243 to 993	608*	260 to 1000	-13	-79 to 65	107	-89 to 322
Severe	30	-8.1 to 63	11	-107 to 136	13	-101 to 127	-2.1	-32 to 27	1460*	1116 to 1835
Constant	80*	31 to 136	305*	105 to 524	274*	95 to 473	31	-12 to 82	1009*	594 to 1464
R ²	0.03		0.31		0.30		0.12		0.30	
Adjusted R ²	0.03		0.31		0.30		0.12		0.30	

* Significant at 95% level

TableA4.1. Comparison between crude cost and attributable cost in 2008 international dollars

Type of cost	Cuba	Dominican Republic	Peru	Venezuela	Mexico	China	India	Whole sample
<i>Medical care</i>								
Crude cost	114	168	163	622	407	396	63	243
Attributable cost	-5.5	-44	-42	296	16	148	-29	12
Increased cost by other conditions	119.5	212	205	326	391	248	92	231
<i>Social care</i>								
Crude cost	4400	5210	12235	7797	5969	11538	2408	6507
Attributable cost	3856	3847	10375	3201	4765	8540	1793	5114
Increased cost by other conditions	544	1363	1860	4596	1204	2998	615	1393
<i>Informal care</i>								
Crude cost	4164	4591	10446	7232	5917	9778	2408	5883
Attributable cost	3658	3433	8870	2986	4720	7344	1793	4653
Increased cost by other conditions	506	1158	1576	4246	1197	2434	615	1230
<i>Paid home care</i>								
Crude cost	236	619	1789	565	52	1760	0	624
Attributable cost	198	415	1505	215	45	1195	-	493
Increased cost by other conditions	38	204	284	350	7	565	-	131
<i>Total cost</i>								
Crude cost	4514	5378	12397	8419	6376	11934	2471	6751
Attributable cost	3851	3804	10332	3497	4781	8687	1764	5164
Increased cost by other conditions	663	1574	2065	4922	1595	3247	707	1587
Change rate of total cost	15%	29%	17%	58%	25%	27%	29%	24%

Table A4.2. Total crude cost of dementia in 2008 international dollars at the country level

	Cuba	Dominican Republic	Peru	Venezuela	Mexico	China	India
Population in 2008 (millions)	11.2	9.9	27.9	27.9	107.7	1324.7	1149.3
% of population aged 65+	12%	6%	6%	5%	6%	8%	5%
GDP per capita in 2008 (I\$)	4125	8138	8522	12665	14494	6136	2925
Prevalence of dementia	11.0%	12.0%	8.6%	7.4%	9.0%	6.5%	9.1%
Annual cost of care (I\$ millions)							
Medical care	17	12	23	64	237	2728	17
Social care	650	371	1761	805	3471	79479	650
Informal care	616	327	1504	747	3441	67355	616
Paid home care	35	44	258	58	30	12124	35
Total cost (IS millions)	667	383	1785	869	3708	82207	667
Total cost as % of GDP	1.4%	0.5%	0.8%	0.2%	0.2%	1.0%	0.4%

Table A5. Mean cost attributable to different levels of dementia severity in 2008 international dollars

Type of cost	Cuba	Dominican Republic	Peru	Venezuela	Mexico	China	India	Whole sample
Medical care								
Questionable	73	-5.0	108	112	66	-17	10	48*
Mild	39	-69*	117	-70	125	-14	277	56
Moderate	38	-141*	-44	2073	-26	662	-100	241
Severe	18	-48	-107	- ¹	367	-150	308	-4.4
Social care								
Questionable	52	97	595*	234	94	165	114	248*
Mild	2007*	1738*	6169*	1754*	4002*	6303*	1872*	3445*
Moderate	7396*	9923*	18247*	10194*	10949*	16169*	8671*	11878*
Severe	9390*	16711*	23755*	- ¹	28239*	22591*	12785*	14054*
Informal care								
Questionable	60	84	573*	220	106	201	114	238*
Mild	1915*	1436*	5182*	1644*	4013*	5234*	1872*	3074*
Moderate	6714*	8750*	15418*	10003*	10659*	13943*	8671*	10589*
Severe	9118*	14777*	21153*	- ¹	26775*	18948*	12785*	12916*
Paid home care								
Questionable	-8.4	13	22	14	-11	-35	-	10
Mild	92*	302*	987*	110	-12	1068*	-	370*
Moderate	682*	1174*	2829*	191	290	2226*	-	1289*
Severe	272*	1934*	2602	- ¹	1464	3643*	-	1139*
Total cost								
Questionable	125	92	703*	346*	160	149	125	297*
Mild	2046*	1669*	6285*	1685*	4127*	6288*	2150*	3500*
Moderate	7434*	9782*	18203*	12268*	10923*	16830*	8571*	12119*
Severe	9409*	16662*	23648*	- ¹	28606*	22440*	13093*	14050*

* Statistically significant at 95% level of confidence

¹ Results are omitted because dementia cases are too few.