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Federaal Kenniscentrum voor de Gezondheidszorg
Centre Fédéral d'Expertise des Soins de Santé
Belgian Health Care Knowledge Center

RESIDENTIAL CARE FOR OLDER PERSONS IN BELGIUM: PROJECTIONS 2011 – 2025

APPENDIX

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APPENDIX

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This document is available on the website of the Belgian Health Care Knowledge Centre.

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SUPPLEMENT

TABLE OF CONTENT

APPENDICES TO CHAPTER 2

Appendix 2.1.: Long-term care projection models: literature search details

Selection criteria	Inclusion criteria
Population	Population 65+ in developed country or region
Intervention	NA
Outcome	Future costs OR Future use of Long-term care OR Future demand for Long-term care
Design	Quantitative projection, using any method
Language	English, Dutch, German, French

PubMed

Search terms and limits: 'forecasting[MeSH Terms] AND "long-term care"[MeSH Terms] AND "aged"[MeSH Terms]'

Searched on: 10.11.2010

Ref found: 235

Refs selected for FT-evaluation: 10

Web of Science

Search terms and limits:Topic=((forecasting OR future OR projection)) AND Topic=("long-term care") Refined by: Subject Areas=(HEALTH POLICY & SERVICES OR PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH OR SOCIAL SCIENCES, MATHEMATICAL METHODS OR DEMOGRAPHY OR ECONOMICS OR SOCIAL ISSUES OR PUBLIC ADMINISTRATION) Timespan=1990-2010. Databases=SCI-EXPANDED, SSCI.

Searched on:22.11.2010

Ref found:163 (including duplicates)

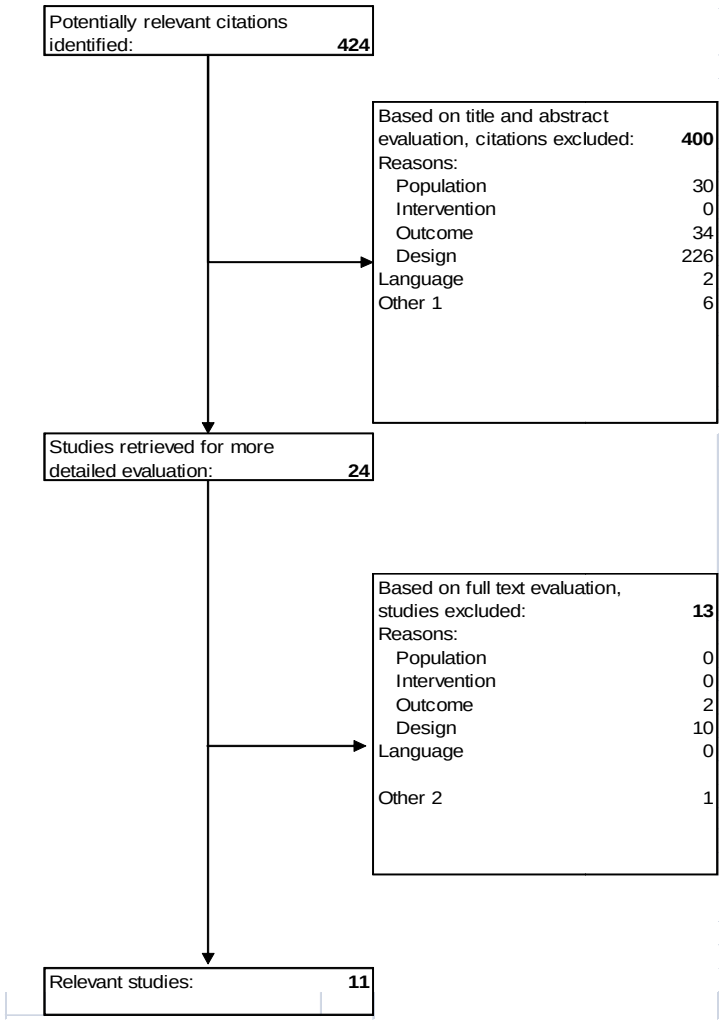
Refs selected for FT-evaluation: 14

Of the 24 references selected for full-text evaluation, 11 were finally selected. The other 13 turned out not to contain projections, or were superseded by later projections based on models that were further developed.

A further 40 references were received from colleagues, in particular from an internal note dated 2005 by Joanna Geerts at the University of Antwerp, containing a review of long-term care projections models. From these, 21 were selected, while 19 were not selected, mainly because those publications were superseded by later publications.

Figure A2.1 summarizes the results of the database literature search.

Figure A2.1: Flow chart of database literature search.



Appendix 2.2.: Model 'index cards'

Name	No name given. Prov. Name: "DIW-UniUlm"
References	Schulz et al. 2004
Population	Germany
Projected variable(s)	Persons receiving LTC, by institutional setting (home, institutional)
Projection horizon (intermediate years)	1999 - 2050 (2020)
Method of projection:	
- Micro or Macro (cell-based)	Macro
- Static or Dynamic	Static
- Other characteristics	
Sources of data	Administrative data from the German long-term care insurance
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Population forecasting model of the Deutsches Institut für Wirtschaftsforschung DIW
- Household situation, supply of informal care	Account taken of trends in labour force participation for males and females (pp. 62-63).
- Health	Through Disability rates
- Needs (ADL limitations)	Constant disability prevalence rates by age-groups (presumably also by gender);
- Other	
How is need/demand for LTC determined?	Constant prevalence rates by age
How are supply restrictions taken into account?	"the projection assumed that the supply of long-term care would be able to sufficiently expand in order to meet the projected increases in demand." (p. 71)
Are results disaggregated by region?	No

Name	Cass
References	Karlsson et al. 2006; Rickayzen and Walsh 2000
Population	UK
Projected variable(s)	Population receiving formal (LT) care, by care setting (home care, residential home care, nursing home care); Formal (LT) care costs by payer
Projection horizon (intermediate years)	2000 - 2050 (every year?)
Method of projection:	
- Micro or Macro (cell-based)	Macro
- Static or Dynamic	Dynamic (using transition rates)
- Other characteristics	Discrete time multiple state model' (Rikayzen, Walsh, 2000: 2)
Sources of data	Office of Population, Censuses and Surveys (OPCS) Survey of disability, 1985-1986; Health Survey of England (for number of residents in institutions and prevalence of disability)
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Government Actuary's Department (GAD) central population projection 1996-2036; IL92 mortality table;
- Household situation, supply of informal care	Household situation: no mention; informal care is residual category
- Health	See Needs
- Needs (ADL limitations)	Disability model, using 10 levels of disability: transition rates estimated from OPCS and aligned to observed prevalence rates;
- Other	
How is need/demand for LTC determined?	"We assume that the mapping between a certain level of disability and different care settings remains constant over the projection period" (Karlsson 2006: 193)
How are supply restrictions taken into account?	Not mentioned
Are results disaggregated by region?	No

Name	Personal Social Services Research Unit (PSSRU)
References	Wittenberg et al., 2006
Population:	England
Projected variable(s)	Numbers of disabled older people; Number of people in institutions, Level of demand for long-term care services; Costs of long-term care services
Projection horizon (intermediate years)	2002-2041 (2012, 2022, 2031)
Method of projection:	
- Micro or Macro (cell-based)	Macro (cell based) 1000 cells
- Static or Dynamic	Static
- Other characteristics	
Sources of data	2001/2 General Household Survey (GHS); Official national statistics; PSSRU surveys of residential care; 2001 Census data
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Government Actuary Department (GAD, 2005) projections by age band and gender
- Household situation, supply of informal care	"The projections of household composition/informal care […] are driven by the 2003-based GAD marital status and cohabitation projections (ONS, 2005). The model incorporates the GAD marital breakdown by age and gender to 2031 and then assumes that the proportion of the population, by age and gender, who are married/cohabiting remains constant from 2031 onward." (p. 5); 6 household types "The projections assume a steady state regarding the propensity, within household type/informal care groups, to receive care from a spouse, child, spouse and child, or others." (p. 6)
- Health	See Needs
- Needs (ADL limitations)	6 Disability groups; prevalence of disability by age and gender remain unchanged, as reported in the 2001/2 GHS
- Other	Housing tenure. Projected rates to 2022 from Hancock (2005), after 2022 assumed to remain constant by age, gender and marital status

How is need/demand for LTC determined?	Residential care: prevalence rates for each subgroup by age band, gender, household type, disability; housing tenure; non-residential care: fitted logistic analysis models.
How are supply restrictions taken into account?	"The supply of formal care will adjust to match demand and demand will be no more constrained by supply in the future than in the base year" (p. 12)
Are results disaggregated by region?	No

Name	ASIM Äldre Simulering (Elderly Simulation) III
References	Lagergren 2005
Population:	Sweden
Projected variable(s)	Total yearly costs for the long-term care services for the elderly (at fixed price levels)
Projection horizon (intermediate years)	2000-2030 (every 5 years)
Method of projection:	
- Micro or Macro (cell-based)	Macro cell based implemented in EXCEL
- Static or Dynamic	Static
- Other characteristics	
Sources of data	Official national statistics on the provision of long-term care; national surveys on living conditions (ULF); various local studies: ASIM-Stolma; SNAC-Kungsholmen; Field municipalities surveys
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Obtained from Statistics Sweden
- Household situation, supply of informal care	"The development of the proportion of married persons [...] has been extrapolated (linear regression) per 5-year age group and gender from the period 1985-2000" (pp. 327-328)
- Health	"The model assumptions concerning the development of ill-health or disability are based upon trends extrapolations using (adjusted) data from the ULF studies" (p. 328) Health index with four degrees
- Needs (ADL limitations)	See Health
- Other	
How is need/demand for LTC	Swedish population is subdivided by age, gender, civil status, degree of ill health. Prop. of persons per cell receiving

determined?	services (estimated using local studies) is assumed to remain unchanged at the 2000 level. "Using a fixed price level amounts essentially to measuring the volume of services." (p. 330)
How are supply restrictions taken into account?	Not mentioned
Are results disaggregated by region?	No

Name	Erasmus
References	Polder et al. 2002
Population:	Netherlands
Projected variable(s)	National health care costs for long-term care for the 65+
Projection horizon (intermediate years)	1994-2015
Method of projection:	
- Micro or Macro (cell-based)	Macro
- Static or Dynamic	Static (One projection is 'Dynamic' in the sense that age-specific trends are projected into the future)
- Other characteristics	
Sources of data	Administrative data on health care costs; sector specific registries and sample surveys
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Population projection from national statistical office
- Household situation, supply of informal care	No account taken
- Health	Only to the extent that past trends are projected into the future
- Needs (ADL limitations)	Only to the extent that past trends are projected into the future
- Other	
How is need/demand for LTC determined?	"Dutch population forecasts were combined with the observed levels and growth rates for per capita costs to make projections for total health care costs in 2015." (p. 58); growth rates were observed for the period 1988-1994
How are supply restrictions	Possible influence of policy changes (de-institutionalization) discussed

taken into account?	
Are results disaggregated by region?	No
Comment	Study is on all health care costs; here LTC costs are singled out

Name	No name given. Prov. name OECD
References	Jacobzone et al. 2000
Population:	Several OECD Countries, Australia, Canada, France, Germany, Japan, Netherlands, Sweden, United Kingdom, United States
Projected variable(s)	Number of institutionalized persons, number of disabled older persons, costs of publicly financed long-term care
Projection horizon (intermediate years)	1996-2020 (2000, 2010)
Method of projection:	
- Micro or Macro (cell-based)	Macro
- Static or Dynamic	Static (One projection is called 'Dynamic' in the sense that past trends are projected into the future)
- Other characteristics	
Sources of data	Various surveys and administrative data in the several countries
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	United Nations projections
- Household situation, supply of informal care	No account taken
- Health	Only to the extent that past trends are projected into the future
- Needs (ADL limitations)	Only to the extent that past trends are projected into the future
- Other	
How is need/demand for LTC determined?	Two projections are made, a dynamic one where past trends are projected into the future, and a static one with no change in institutionalisation rates or disability rates
How are supply restrictions taken into account?	Not

Are results disaggregated by region?	No
Comments	Details on how past trends are projected into the future not provided

Name	No name given, prov. Name Bamberg
References	Heigl and Rosenkranz ,1994
Population:	Germany
Projected variable(s)	"Pflegefällen", "number of persons requiring care"
Projection horizon (intermediate years)	1990-2050 (every 5 years)
Method of projection:	
- Micro or Macro (cell-based)	Macro
- Static or Dynamic	Static
- Other characteristics	
Sources of data	Official population data, Survey "Hilfe und Pflegebedarf"
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Own projections, using official mortality and fertility rates
- Household situation, supply of informal care	No
- Health	Through increased Life expectancy (scenarios)
- Needs (ADL limitations)	No
- Other	Immigration (through scenario's)
How is need/demand for LTC determined?	Presumably constant prevalence rates
How are supply restrictions taken into account?	Not mentioned
Are results disaggregated by region?	No

Name	Dynasim III
References	Johnson et al. 2007
Population:	USA
Projected variable(s)	Number of older adults receiving long-term care services (among many others); distinguished between unpaid help from children, from other sources, paid home care, nursing home care
Projection horizon (intermediate years)	2000-2040 (every year)
Method of projection:	
- Micro or Macro (cell-based)	Micro
- Static or Dynamic	Dynamic
- Other characteristics	
Sources of data	SIPP; additional data from HRS, National Longitudinal Mortality Study (NLMS)
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Dynamic projection, using spec. estimated mortality rates
- Household situation, supply of informal care	Dynamic simulation of household situation. Logit equations of receipt of any unpaid help, unpaid help from children. OLS of home help hours from adult children, other unpaid helpers. (using HRS) Price of children's time is imputed in simulations and used in logit models of paid home care and nursing home care
- Health	Through future mortality
- Needs (ADL limitations)	Imputed using ordered probit model, with three disability categories, using future mortality, age, gender, race, education, marital status and household income as predictors. Predictors are dynamically simulated
- Other	race, education, household income
How is need/demand for LTC determined?	Imputed using ordered logistic equation, using age, gender, race, disability, education, marital status, disability of spouse, price of children's time and household income as predictors. Predictors are dynamically simulated
How are supply restrictions taken into account?	Not mentioned

Are results disaggregated by region?	No

Name	Destinie
References	Duée and Rebillard, 2004, 2006; Le Bouler 2005
Population:	USA
Projected variable(s)	Number of dependent older persons ("Nombre de personnes âgées dépendantes") obv. AGGIR schaal (+/- ADL); for Le Bouler (2005) extended to project number of older persons in institutional care
Projection horizon (intermediate years)	2000-2040 (every year)
Method of projection:	
- Micro or Macro (cell-based)	Micro
- Static or Dynamic	Dynamic
- Other characteristics	
Sources of data	Enquête Patrimoine 1998; HID (Enquête Handicaps – Incapacités - Dépendance 1998 - 1999 - 2000/01)
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Dynamic projection, using 'état civil' mortality tables
- Household situation, supply of informal care	Dynamic simulation of marital status (presumably depending on age and gender; education?)
- Health	Through mortality rates by age, gender, education and dependency
- Needs (ADL limitations)	Dynamic simulation for incidence and remission using logistic model, using mortality rates, education, and number of children as predictors.
- Other	
How is need/demand for LTC determined?	For Le Bouler (2005), based on prevalence rates by degree of Dependency and "situation familiale" = marital status
How are supply restrictions taken into account?	Not mentioned

Are results disaggregated by region?	No

Name	Federal Planning Bureau
References	Vandevyvere and Willlemé (2004); Hoge Raad voor de Financiën (2007)
Population:	Belgium
Projected variable(s)	Number of older adults receiving long-term care services (among many others); distinguished between unpaid help from children, from other sources, paid home care, nursing home care
Projection horizon (intermediate years)	2012-2050 (2020, 2030, 2040, 2050)
Method of projection:	
- Micro or Macro (cell-based)	Macro
- Static or Dynamic	Static
- Other characteristics	
Sources of data	Administrative data
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Federal Planning Bureau projections (external to the LTC model)
- Household situation, supply of informal care	Equation predicting use of LTC care includes probability of loss of partner. This probability by age declines over time, in line with increased life expectancy
- Health	No
- Needs (ADL limitations)	Not explicitly taken account of
- Other	
How is need/demand for LTC determined?	Imputed using econometric equations (logistic) on aggregate data, using age, sex, loss of partner, price of institutional care relative to home care
How are supply restrictions taken into account?	Not mentioned

Are results disaggregated by region?	No

Name	VeVeRa-III
References	Eggink et al. 2009
Population:	Netherlands
Projected variable(s)	Potential demand ('potentiële vraag') for care (number of persons); use of care (number of persons); costs of care; care split up in 8 packets of increasing intensity, from help with household tasks to nursing home
Projection horizon (intermediate years)	2005-2030 (2006, 2007, 2008, 2009, 2010, 2015, 2020, 2025, 2030)
Method of projection:	
- Micro or Macro (cell-based)	Micro
- Static or Dynamic	Static
- Other characteristics	Great attention for calibrating ('ijking') to administrative figures on actual care use
Sources of data	Several surveys: AVO 2003 (household population), OII 2004 (institutional population), CIZ 2004 (approved demand)
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Central Bureau of Statistics population projections
- Household situation, supply of informal care	Central Bureau of Statistics population projections for having partner or not; informal care as such is not treated as a determinant of potential demand or use of care
- Health	A number of chronic conditions; external estimates of future trends of chronic conditions
- Needs (ADL limitations)	ADL scale; no trend imputed ('derived trend' from changes in other variables)
- Other	Education, income; degree of urbanization; out-of-pocket price of care; use of other medical care. Only for education is a trend imputed.
How is need/demand for LTC determined?	Constructed for base year in primary database from observed variables; for future years imputed using coefficients from multinomial logistic equations (two-step procedure)

How are supply restrictions taken into account?	Not. Assumption of 'unchanged policy'
Are results disaggregated by region?	No

Name	Wirtschafts Universität Wien WUW, Vienna University of Economics and Business
References	Schneider and Buchinger 2009
Population:	Austria
Projected variable(s)	Number of dependent elderly; long-term care expenditure
Projection horizon (intermediate years)	2008-2030
Method of projection:	
- Micro or Macro (cell-based)	Macro
- Static or Dynamic	Dynamic (though unclear what this means exactly)
- Other characteristics	
Sources of data	Micro-census, Population census, administrative user data, expert interviews
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Population forecast of National Statistic Agency
- Household situation, supply of informal care	Five household types are distinguished (including living in an institution) "Using alteration rates, the trends in living arrangements over this time period were identified and extrapolated in the future"
- Health	
- Needs (ADL limitations)	"Seven prevalence rates were constructed for each federal stata indicating the different levels of dependency. The constructed 63 time series were forecasted via Double Exponential Smoothing for each federal state and year."
- Other	
How is need/demand for LTC determined?	Imputed using econometric equations (logistic) on aggregate data, using age, sex, loss of partner, price of institutional care relative to home care

How are supply restrictions taken into account?	Regional differences in the provision of long-term care services, their respective costs and projected developments in service supply.
Are results disaggregated by region?	Yes, by province (Land)
Comment	Many details of the projections are unclear. Other publications or reports could not be found on website of Research group (http://www.wu.ac.at/altersoekonomie)

Name	Ageing Working Group (AWG)
References	European Commission (2009)
Population:	EU Member states
Projected variable(s)	Costs of LTC
Projection horizon	2007-2060
Method of projection:	
- Micro or Macro (cell-based)	Macro (cell based)
- Static or Dynamic	Static
- Other characteristics	
Sources of data	Survey of Health and Ageing in Europe (SHARE), Survey of Income and Living Conditions (SILC)
The way future trends in driving variables are taken into account:	
- Population distribution by age and sex	Eurostat projections
- Household situation, supply of informal care	Household situation not mentioned. Informal care is default category. (p. 226)
- Health	See Needs
- Needs (ADL limitations)	"extrapolating age and gender-specific dependency ratios of a base year (estimated using disability rates) to the population projection (by age and gender)" (p. 226)
- Other	

How is need/demand for LTC determined?	"The split by type of care is made by calculating the "probability of receiving different types of long-term care by age and gender." This probability is calculated for a base year using data on the numbers of people with dependency (projected in step 1), and the numbers of people receiving care at home and in institutions (provided by Member states)
How are supply restrictions taken into account?	Not mentioned
Are results disaggregated by region?	No
Comments	Adapted from the PSSR model

Appendix 2.3.: Studies 'index cards'

Reference	European Commission 2009					
Model	AWG					
Projected variable(s)	Public expenditure on long-term care					
Project horizon	2007-2060					
Characteristics of scenario	"Pure demographic", disability rates by age and gender do not change; unchanged probabilities of receiving different types of care	"Constant disability", profile of disability rates by age is assumed to shift in line with life expectancy	"AWG Reference scenario", profile of disability rates by age is assumed to shift by half of the projected increase in life expectancy	"Shift from informal to formal care; at home"*	"Shift from informal to formal care; mix*	"Shift from informal to formal care; institutional"*
Main results (peruno change)						
BE	2.1	1.8	1.9	2.2	2.3	2.5
DK	2.0	1.8	1.9	2.2	2.1	2.0
DE	2.7	2.4	2.6	2.9	3.0	3.2
FR	1.6	1.5	1.6	1.7	1.8	1.9
IT	1.8	1.6	1.8	2.1	2.3	2.5
NL	2.5	2.2	2.4	2.6	2.7	2.8
AT	2.0	1.8	1.9	2.2	2.2	2.1
FI	2.5	2.4	2.4	2.6	2.8	3.1
SE	1.7	1.6	1.7	1.8	1.9	2.0
UK	1.6	1.5	1.6	1.8	1.8	1.9

*Note. *yearly shift into the formal sector of care of 1% of disabled elderly who so far received only informal care (during the first 10 years of the projection period)*

Reference	Schulz et al. 2004	
Model	DIW-UniUlm	
Projected variable(s)	Persons receiving long-term institutional care	
Project horizon	1999-2050	
Characteristics of scenario	Constant life expectancy	Increasing life expectancy (1999-2050): women: 80 y → 86.4 y; men 74y → 81.4 y
Main results	578 000→ 923 000 (+60%)	578 000 → 1 573 000 (+172%)

Reference	Wittenberg 2006				
Model	PSSRU				
Projected variable(s)	Numbers of people in institutions;				
Project horizon	2002-2041				
Characteristics of scenario	Base case: Prevalence rates of disability by age and gender unchanged	Low life expectancy population projection	High life expectancy population projection	85+ group grow 1% faster than base case	Brookings crompession of morbidity: "moving the age-specific disability rate upward by one year for each one year increase in life expectancy" (p. 16)
Main results (for each scenario)	+115%	+90%	+145%	+175%	+35%

Reference	Wittenberg 2006			
Model	PSSRU			
Projected variable(s)	Numbers of people in institutions			
Project horizon	2002-2041			
Characteristics of scenario	Half-Brookings crompession of morbidity: moving the age-specific disability rate upward by half a year for each one year increase in life expectancy (p. 16)	Double-Brookings crompession of morbidity: moving the age-specific disability rate upward by two years for each one year increase in life expectancy (p. 16)	1% pa decline in informal care (in proportion of moderately/severely disabled older people receiving informal care): shift to residential care	National Beds Inquiry (shift from institutional care to home care), projected numbers in institutions 10 percent lower than in the base case
Main results (for each scenario)	+75%	-45%	+215%	+95%

Reference	Lagergren 2005				
Model	ASIM III				
Projected variable(s)	Total yearly costs for the long-term care services for the elderly				
Project horizon	2000-2030				
Characteristics of scenario	Scenario 0 (continued ill-health trends)	Scenario A: continued ill-health trends until 2020, after that constant prevalence of ill-health	Scenario B: continued ill-health trends until 2010, after that constant prevalence of ill-health	Scenario C: constant prevalence of ill-health	Scenario D: reversed trend, returning to the 1985 level in 2030
Main results	+25%; Number of persons in institutional care +27%	+37%*	+41%*	+49%*	+69%; Number of persons in institutional care +74%
Comment:	* visual estimations from Diagram 6				

Reference	Polder 2002	
Model	Polder	
Projected variable(s)	National health care costs for long-term care for the 65+	
Project horizon	1994-2015	
Characteristics of scenario	Demographic projection	Demographic projection + age specific growth rates in health care costs
Main results	€5 051M → €7 175M (+1.7%/year)	€5 051M → €6 724M (+1.4%/year)

Reference	Jacobzone et al. 2000							
Model	OECD							
Projected variable(s)	Number of institutionalised persons; Number of older disabled persons							
Project horizon	2000-2020							
Characteristics of scenario	Dynamic projection, France	Static projection, France	Dynamic projection, Canada	Static projection, Canada	Dynamic projection, United States	Static projection, United States	Dynamic projection, Sweden	Static projection, Sweden
Main results								
Institutionalized persons (average annual growth rate in %)	1.3	2.3	1.1	2.4	0	1.4	0.8	1.2
Disabled older persons (average annual growth rate in %)	1.1	1.8	1.8	2.4	0.7	1.6	0.3	1.2

Reference	Heigl and Rosenkranz ,1994						
Model	Heigl and Rosenkranz ,1994						
Projected variable(s)	Number of persons requiring care						
Project horizon	1990-2050						
Characteristics of scenario	Constant life expectancy, no immigration	Increase life expectancy 1 year every 10, no immigration	Increase life expectancy 1,5 year every 10, no immigration	Increase life expectancy 1 year every 10, immigration 250K/year	Increase life expectancy 1,5 year every 10, immigration 250K/year	Increase life expectancy 1 year every 10, immigration 500K/year	Increase life expectancy 1,5 year every 10, immigration 500K/year
Main result	1.2M→ 1.5M (+25%)	1.2M → 2.8M* (+130%)	1.2M → 3.6M* (+200%)	1.2M→ 3.1M* (+150%)	1.2M→ 4.0M (+230%)	1.2M→ 3.5M (+190%)	1.2M →4.5M (+275%)

Reference	Johnson et al. 2007		
Model	Dynasim III		
Projected variable(s)	Number of older adults in nursing home care		
Project horizon	2000-2040		
Characteristics of scenario	Low disability scenario: decline in overall disability rates by 1% per year (Congressional Budget Office, 2004)	Intermediate disability scenario: no trend in disability rates	High disability scenario: increase in disability rates by 0.6 percent per year 2000-2014 (from Goldman et al. 2005)
Main result	1.2M→ 2.0M (+67%)	1.2M→ 2.7M (+125%)	1.2M→ 3.1M (+258%)

Reference	Le Bouler 2005
Model	Destinie
Projected variable(s)	"Nombre de places en établissement pour personnes âgées" Number of older persons in institutional care
Project horizon	2004-2030
Characteristics of scenario	

- Duration of life in dependency	Low: stable (prevalence rates diminish by 1.5% per year)	Low: stable (prevalence rates diminish by 1.5% per year)	Low: stable (prevalence rates diminish by 1.5% per year)	Low: stable (prevalence rates diminish by 1.5% per year)	Low: stable (prevalence rates diminish by 1.5% per year)
- Policy with respect to home vs. Institutional care	No change	Increased home care: entry into institutional care of singles equal to those of couples	Increased home care: entry into institutional care of singles equal to those of couples, except for the very dependant	Increased home care: entry into institutional care of couples equal to those of singles	Increased home care: entry into institutional care of couples equal to those of singles, but only for those very dependent
Main result	+41%	-55%	-20%	+65%	+50%
Comment	Model Destinie adapted with special hypotheses, extension to use of institutional care				

Reference	Le Bouler 2005				
Model	Destinie				
Projected variable(s)	"Nombre de places en établissement pour personnes âgées" Number of older persons in institutional care				
Project horizon	2004-2030				
Characteristics of scenario					
- Duration of life in dependency	High: increased (prevalence rates diminish by 1% per year)	High: increased (prevalence rates diminish by 1% per year)	High: increased (prevalence rates diminish by 1% per year)	High: increased (prevalence rates diminish by 1% per year)	High: increased (prevalence rates diminish by 1% per year)
- Policy with respect to home vs. Institutional care	No change	Increased home care: entry into institutional care of singles equal to those of couples	Increased home care: entry into institutional care of singles equal to those of couples, except for the very dependant	Increased home care: entry into institutional care of couples equal to those of singles	Increased home care: entry into institutional care of couples equal to those of singles, but only for those very dependent
Main result	+57%	-49%	-7%	+85%	+66%
Comment	Model Destinie adapted with special hypotheses, extension to use of institutional care				

Reference	Hoge Raad voor de Financiën 2007	
Year	2007	
Model	FPB	
Projected variable(s)	Expenditure on Long-term care	
Project horizon	2012-2050	2012-2050
Characteristics of scenario	Basic scenario: no change in disability-free life expectancy	Alternative scenario: increase in disability-free life expectancy is half of increase in overall life expectancy (implemented by upward shift in usage rates by age of 2 years over projection period)
Main results	+94%	+87%

Reference	Woittiez et al. 2009	
Model	VeVeRa III	
Projected variable(s)	Potential demand for / use of long-term institutional care (two categories, here aggregated)	
Project horizon	2005-2030	
Characteristics of scenario	Basic scenario: see VeVeRa III model description	Alternative scenario: substitution between forms of care: persons in institutions with a profile suitable for home care alternatives, move to home care
Main results (for each scenario)		
- Potential demand	+48%	
- Use	+44%	+24%
Comment	Own calculations form tables 7.7 and 7.10	

Reference	Schneider & Buchinger (2009)		
Model	WuW		
Projected variable(s)	Number of dependent elderly; costs of LTC services		
Project horizon	2008-2030		
Characteristics of scenario	Baseline scenario (stability of disability 1 year : 1 year)	Worst case scenario (expansion of morbidity, 2 years: 1 year; +20% in residential care)	Best case scenario compression of morbidity, 2 years: 1 year; -20% in residential care)
Main results (for each scenario)			
- Number of dependent elderly	+43.3%	+59.3%	+21.2%
- Costs of LTC services	+123%	+241%	+70%

APPENDICES TO CHAPTER 3

Appendix 3.1.: Literature search determinants of long-term care

Table A3.1: Literature search for determinants of institutional care.

Database	Search date	Search terms	Limits	# refs
PubMed	4.1.11	residential facilities[MeSH Major Topic] AND "risk factors"[MeSH Terms] AND "aged"[MeSH Terms] AND ("2008/01/06"[PDat] : "2011/01/04"[PDat])	65+	159
PubMed	4.1.11	PubMedCentral articles citing Gaugler et al. 2007		12
Web of Science	4.1.11	Topic=(institutionalization OR 'nursing home placement' OR 'nursing home admission') AND Topic=(factor* OR predictor*) Timespan=2008-2010. Databases=SCI-EXPANDED, SSCI.		429
Web of Science	4.1.11	Citing Article Miller EA et al. (2000) Predicting elderly people's risk for nursing home placement, hospitalization, functional impairment, and mortality: A synthesis , MEDICAL CARE RESEARCH AND REVIEW Volume: 57 Issue: 3 Pages: 259-297 Published: SEP 2000		78

Figure A3.1: Flow chart of database literature search.

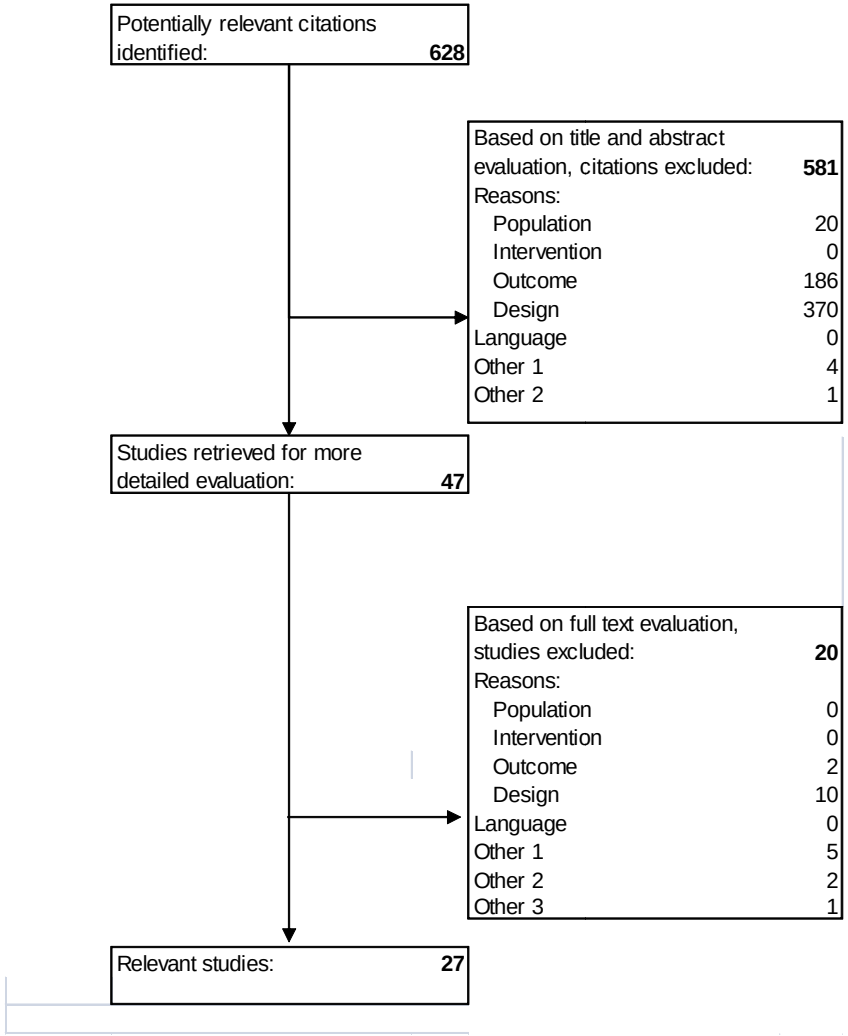


Table A3.2: Studies of determinants of long-term institutional care.

Ref	Popula-tion	Design	Time-varying covariates?	Name of study	Sample selection + sample size	Observation period	Outcome	Estimation method
Cai, Salmon, Rodgers, 2009	USA	Prospective panel	?	HRS/AHEAD;	65+; n=5980	1995-2002	Long-stay nursing home residency (entry / time to)	Logistic regression for entry; Cox proportional hazards for time in months until entry
Chen and Thompson, 2010	USA	Prospective panel		LSOA II,	70+; n=5294	1994-1999/2000	Remaining in community (latent variable)	Structural equation modelling
Connolly and O'Reilly, 2009	Northern Ireland	Retrospective panel	No	DRGP project;	65+; n = 28064	5 years	Entering of Care home	Poisson regression
Habermann et al., 2009	UK	Prospective panel	?	LASER-AD;	persons with Alzheimer's Disease; n=224	54 months	Time to 24-hour care entry	Cox proportional hazards
Harris and Cooper, 2006	USA	Prospective panel	?	HOS,	Medicare+Choice enrollees, 65+, n = 137000	3.5 years	Nursing home admission	Cox proportional hazards
Kasper, Pezzin, Rice, 2010	USA	Prospective panel	Mostly not, some change variables included in model	HRS/AHEAD;	70+; n=8093	1993-2002	Nursing home entry / time (months) to entry	Probit / competing risks Gompertz hazard model
Kelly, Conell-Price et al., 2010	USA	Retrospective panel	No	HRS,	home residents who died, n=1817	1992-2006	Length of Stay in Nursing homes	multivariate linear regression
Kendig, Browning et al., 2010	Australia	Prospective panel	No	Melbourne Longitudinal Studies on Healthy Ageing Program,	65+, n=1000	1994-2005	Entry into residential aged care (nursing home or hostel; "excluding retirement homes") during observation period	Cox regression (three-stage modelling to select significant predictors)
Luck, Luppa et al., 2008	Germany (Leipzig)	Prospective panel	?	LEILA	75+ with incident dementia, n=109	1997-2005	time until institutionalization in nursing home	Cox proportional hazards

Table A3.2: Studies of determinants of long-term institutional care (continued)

Luppa, Luck, et al., 2010	Germany (Leipzig)	Prospective panel	No	LEILA	75+ dementia-free, 1024	1997-2005	time until institutionalization in old-age home or nursing home	Cox proportional hazards
Muramatsu et al., 2007	USA	Prospective panel	Yes	HRS/AHEAD,	born <= 1923, n variable	1995-2002	time of nursing home admission	Discrete time survival using complementary log-log link
Noël-Miller, 2010	USA	Prospective panel	?; spousal death included	HRS/AHEAD,	couples both 65+, n=2116	1998-2006	timing of first observed admission to a nursing home	Propotional hazards
Sarma and Simpson, 2007	Canada (Manitoba)	Prospective panel	Yes ?	AIM (Aging in Manitoba survey).	Three cohorts: 1971: 65+, n = 4803; 1976: 60+, n=1302; 1983: 60+, n=2877	1971-1996; 1976-1996; 1983-1996	Living in nursing home = personal care home	Random effects multinomial logit
Nihtilä and Martikainen (2007); Nihtilä, Martikainen et al. (2007)	Finland	Administrative prospective panel	Apparently not		non-institutionalised at baseline, 65+, n=280722	1998-2003	Time until entry in 24-hour care in nursing homes, service homes, hospitals and health centres, lasting over 90 days	Cox proportional hazards
Jonker et al. 2007	Netherlands	Cross-sectional combination of survey and administrative data	No	(AVO 2003/OII 2004)	total population 30+	2004	Long-term stay in care home 'verblijf lang met verzorging plus', nursing home 'verblijf lang met verpleging plus'	Multinomiale logit

Table A3.3: Estimates of the impact of chronic conditions on nursing home entry.

		Gaugler et al., 2007	Luppa et al., 2010	Harris and Cooper, 2006	Nihtilä et al. 2007	
		Pooled Hazards Ratio	Level of evidence	Hazard ratio	Hazard ratios, women	Hazard ratios, men
Arthritis		n.s.	Inconclusive	1.05	1.39	1.16
Osteorarthritis					1.07	n.s.
Blood pressure		1.04				
	Hypertension		Inconclusive	n.s.		
Cancer		1.15		1.15	1.24	1.35
Cardiovascular disease		n.s.				
	Congestive heart failure			1.39		
	Myocardial infarction / heart attack			1.07		
	Heart disease				1.08	1.05
Diabetes		1.35	Moderate	1.42	1.52	1.66
Falls		1.16				
	Hip fracture				1.52	1.83
	Other accident of violence				1.46	1.28
Respiratory diseases			Inconclusive	1.34		
	chronic asthma and COPD				n.s.	1.09
	Lung disease	n.s.				
	Other respiratory diseases				1.23	1.33
Stroke		1.24	Inconclusive	1.33	1.93	2.23
Neurological problems	Parkinson's				2.15	2.4
	Other neurological diseases				1.3	1.4
Gastrointestinal problems				n.s.		
Depression			Inconclusive			
	Depressive symptoms			1.38	1.59	1.48
Mental health problems	Psychosis				1.95	1.4
	Other mental health disorders				1.67	1.74
(ADL Limitation included in model?)		?	Mostly	Yes, 1+ ADL	No	No

Table A3.4: Variables associated with home health care utilization.

		Contact with home health care		Amount or volume of home health care used	
		Evaluation of association (1)	Direction of association if significant	Evaluation of association (1)	Direction of association if significant
Predisposing variables	Age	Uncertain 22/37	+	Uncertain 6/14	+
	Gender	Uncertain 18/40	Female +	No 4/13	Female +
	Marital status	No 5/18	inconsistent	No 1/6	Unmarried +
	Employment of caregiver	Yes 1/2	+	Yes 1/1	+
	Education	No 9/23	Mostly +	No 1/4	+
	Race	No 8/26	inconsistent	No 1/5	Not white -
	Attitudes toward formal services	Yes 2/3	+	Yes 1/1	+
Enabling variables	Lives alone	Yes 17/20	+	Yes 3/3	+
	Lives with others / size of household	Uncertain 17/29	Inconsistent, interaction with race	Uncertain 2/4	-
	Informal support / social network	Yes 17/24	Mostly -	Uncertain 6/10	Mostly -
	Income	Uncertain 10/24	Mostly +	No 3/9	+
	Health insurance	Yes 15/23	+	Yes 6/6	+
	Population density (metropolitan / urban)	No 4/13	Mostly metro/urban +	No 0/3	
Need variable	Physical impairment	Yes 53/53	+ (except one)	Yes 14/15	+ (except one)
	Cognitive impairment	Uncertain 8/16	Inconsistent	Uncertain 4/9	Mostly +
	Depression of recipient	No 1/3	+	No 0/2	
	Caregiver need	Yes 9/9	+	Yes 2/3	Inconsistent

Notes (1) Numerator is # of studies which found a significant effect of predictor; denominator is total number of studies including the predictor
Source Adapted from Kadushin (2004), Appendix B

APPENDICES TO CHAPTER 5

Appendix 5.1.: Disability

We can write the logistic equation estimated on the HIS data with disability as the dependent variable as follows:

$$\ln\left(\frac{p_i}{1-p_i}\right) = b_0 + b_1 Sex_i + b_{2.a} Age_{group_i} + \sum_c b_{3.c} Chronic_{cond_{c.i}} + b_{4.p} Province_{p.i} \quad (1)$$

where p_i refers to the probability of being disabled (i.e. one or more ADL limitation) for individual i, $Age\_group_{a.i}$ refers to dummy variable indicating the age bracket (a = 1..7) of individual i, $Chronic\_cond_{c.i}$ is a dummy variable indicating whether individual i has chronic condition c (c = COPD, dementia, diabetes, hip fracture, Parkinson's disease), and $Province_{p.i}$ is a dummy variable indicating whether individual i lives in province p (p = 1...17). In the context of the projection, it makes sense to think of individual i as a representative individual for a group of individuals defined by age, sex, province and the five chronic conditions. b_0, b_1, $b_{2.a}$, $b_{3.c}$ and $b_{4.p}$ are the estimated coefficients ($b_{2.1}$ and $b_{4.1}$ are set to zero, since they refer to the reference age group and province, respectively).

We can rewrite equation (1) as:

$$p_i = {}^{1}/_{1+e^{-z_i}} \quad (2)$$

where z_i refers to the right-hand-side of (1).

Within any age-sex-province group we can calculate the proportion or probability of being disabled p^{asp} (where the superscript asp refers to an age-sex-province cell) as:

$$p^{asp} = \sum_{C5}^{asp} p_i n_i / \sum_{C5}^{asp} n_i \quad (3)$$

where $\sum_{C5}^{asp}$ indicates summation over the 32 cells defined by the five chronic conditions within any age-sex-province group, and n_i refers to the projected number of persons within the cell represented by individual i.

Appendix 5.2.: Projecting the prevalences of chronic conditions by age-sex group

In order to use the disability equation for the projections, we need projections of the prevalences of the selected chronic conditions by age-and-sex category for every year up to 2025. As far as we are aware, such projections have not been made for Belgium. Therefore, these prevalences will be produced using proportions by age, sex and education, estimated using the HIS data. Table A5.1 shows the results of logistic regressions for each of the selected chronic conditions. All selected chronic conditions, except dementia, are significantly less common among those with more than primary education, controlling for age and sex. Dummies for other education categories were included in preliminary models, but turned out to be not significant.

The future proportions of persons with only primary education by age-and-sex category will be taken from projections by the International Institute for Applied Systems Analysis (IIASA) [a] Using census data, the basic assumption of these projections is that after a certain age, educational level does not change any more. Corrections are made for migration and for differential mortality by educational level. See Samir et al. (2010) for details. We use the Constant Enrollment Scenario: the various scenarios projected are relevant mainly for young persons, though. [b] Table A5.2 shows the percentages of persons with only primary education or less by age bracket, sex and projection year, according to these projections. The precipitate decline in these percentages is clear, due to the replacement of older less-educated cohorts with higher-educated cohorts. For intermediate years, these proportions will be interpolated.

[a] See http://www.iiasa.ac.at/Research/POP/Edu07FP/index.html?sb=13

Table A5.1: Results of logistic regressions of selected chronic conditions, 65+ only, HIS 2004.

bronchitis	Odds Ratio	Standard error	Signifi-cance
sex (1 = female)	0.56	0.09	0.001
age 70-74	1.17	0.27	0.490
age 75-79	1.67	0.43	0.046
age 80-84	1.70	0.43	0.038
age 85-89	1.52	0.38	0.098
age 90-44	1.31	0.39	0.363
age 95+	1.39	0.70	0.514
Education more than primary	0.70	0.12	0.036
Antwerpen	1.14	0.30	0.610
Vlaams Brabant	0.50	0.21	0.099
West_Vlaanderen	1.13	0.31	0.647
Oost_Vlaanderen	0.61	0.20	0.125
Limburg	0.70	0.19	0.190
Brabant Wallon	0.76	0.39	0.594
Hainaut	1.36	0.30	0.165
Liege	0.97	0.27	0.923
Luxembourg	1.38	0.29	0.128
Namur	1.19	0.42	0.617

diabetes	Odds Ratio	Standard error	Signifi-cance
sex (1 = female)	0.99	0.16	0.973
age 70-74	1.10	0.24	0.670
age 75-79	1.44	0.34	0.132
age 80-84	0.93	0.26	0.791
age 85-89	1.22	0.31	0.438
age 90-44	0.50	0.17	0.041
age 95+	0.66	0.38	0.477
Education more than primary	0.62	0.10	0.003
Antwerpen	0.72	0.21	0.253
Vlaams Brabant	0.41	0.15	0.017
West_Vlaanderen	0.93	0.27	0.799
Oost_Vlaanderen	1.07	0.28	0.808
Limburg	0.62	0.21	0.149
Brabant Wallon	1.62	0.64	0.227
Hainaut	0.93	0.23	0.776
Liege	1.05	0.31	0.855
Luxembourg	1.03	0.25	0.894
Namur	1.53	0.53	0.227

hip fracture	Odds Ratio	Standard error	Significanc e
sex (1 = female)	1.76	0.91	0.276
age 70-74	1.69	1.28	0.485
age 75-79	0.56	0.48	0.494
age 80-84	3.77	2.84	0.077
age 85-89	2.75	1.93	0.150
age 90-44	3.68	2.75	0.082
age 95+	0.97	1.04	0.981
Education more than primary	0.29	0.14	0.009
Antwerpen	1.11	0.95	0.902
Vlaams Brabant	0.09	0.10	0.035
West_Vlaanderen	1.07	0.80	0.923
Oost_Vlaanderen	0.41	0.42	0.381
Limburg	0.19	0.18	0.084
Brabant Wallon	0.91	0.93	0.926
Hainaut	2.27	1.45	0.199
Liege	0.48	0.37	0.346
Luxembourg	0.54	0.38	0.375
Namur	1.93	1.48	0.394

parkinson	Odds Ratio	Standard error	Significan ce
sex (1 = female)	0.87	0.35	0.723
age 70-74	1.59	1.07	0.488
age 75-79	1.60	1.06	0.482
age 80-84	2.93	1.92	0.101
age 85-89	5.82	3.36	0.002
age 90-44	4.00	2.61	0.034
age 95+	6.45	5.57	0.031
Education more than primary	0.36	0.13	0.006
Antwerpen	0.66	0.35	0.434
Vlaams Brabant	0.31	0.26	0.169
West_Vlaanderen	0.63	0.41	0.479
Oost_Vlaanderen	0.24	0.20	0.090
Limburg	0.29	0.19	0.064
Brabant Wallon	0.68	0.61	0.666
Hainaut	0.86	0.38	0.743
Liege	0.15	0.10	0.004
Luxembourg	0.89	0.41	0.806
Namur	0.21	0.17	0.050

diabetes	Odds	Standard	Significanc
sex (1 = female)	0.99	0.16	0.973
age 70-74	1.10	0.24	0.670
age 75-79	1.44	0.34	0.132
age 80-84	0.93	0.26	0.791
age 85-89	1.22	0.31	0.438
age 90-44	0.50	0.17	0.041
age 95+	0.66	0.38	0.477
Education more than primary	0.62	0.10	0.003
Antwerpen	0.72	0.21	0.253
Vlaams Brabant	0.41	0.15	0.017
West_Vlaanderen	0.93	0.27	0.799
Oost_Vlaanderen	1.07	0.28	0.808
Limburg	0.62	0.21	0.149
Brabant Wallon	1.62	0.64	0.227
Hainaut	0.93	0.23	0.776
Liege	1.05	0.31	0.855
Luxembourg	1.03	0.25	0.894
Namur	1.53	0.53	0.227

Reference categories: Age 65-69, male, Capital region of Brussels; Education: no or only primary

Table A5.2: Projections of the percentage of older persons with only primary education or less.

WOMEN	65-69	70-74	75-79	80-84	85-89	90-94	95-99	All 65+
2005	40%	49%	58%	67%	74%	80%	86%	55.2%
2010	32%	40%	49%	58%	65%	72%	80%	47.5%
2015	27%	32%	40%	48%	56%	63%	71%	39.5%
2020	21%	27%	32%	39%	47%	54%	62%	32.1%
2025	15%	21%	26%	31%	37%	45%	53%	25.3%

MEN	65-69	70-74	75-79	80-84	85-89	90-94	95-99	All 65+
2005	34%	41%	48%	54%	61%	68%	75%	43%
2010	27%	33%	40%	47%	53%	60%	68%	37%
2015	23%	27%	33%	39%	45%	52%	59%	30%
2020	18%	23%	26%	32%	38%	44%	51%	25%
2025	13%	18%	22%	26%	31%	36%	43%	20%

Source: IIASA projections, 2010, reworked by author

APPENDICES TO CHAPTER 6

Appendix 6.1.: A comparison of the NIHDI scale of disability, and disability measures in the HIS 2004

The review in Chapter 3 made clear that disability (functional limitations) is a very important determinant of LTC use, in addition to age and living situation. The National Institute for Health Insurance and Disability (NIHDI) uses a specific disability scale, based on the Katz scale, to determine the level of dependency, which in turn determines the level of reimbursement. The scale is based on six items of personal care (washing, dressing, moving, visiting the toilet, incontinence and eating), and two items about the mental state (orientation in time, orientation in space). For each item there are four possible scores, which range from *no help needed* to *completely dependent on help* (for the personal care items), and from *no problem* to *completely disoriented* for the mental state items. On the basis of the scores on the items, persons are categorized into one of five cells (including O for no dependency), using a rather complex set of conditions (see Table A6.1 for details).

The goal of the analysis below is to show to what extent the information used in the NIHDI scale of disability is covered by the HIS2004.[c] The HIS contains a general question IL0110 (part of a larger battery of questions about limitations in various activities) about severity in limitations for bathing, showering and dressing, but given its generality, and because it does not ask about the degree of help needed, this question is of limited value. There are also a range of questions on more specific activities of daily living. See Table A6.2 on the details of those items. Some items in the HIS are more specific than the corresponding NIHDI criteria (e.g. washing vs. washing of hands and face; moving vs. getting in and out of bed). The response categories do not distinguish between various degrees of help. There is no information on mental dependency, except what can be gleaned from a question about the reason for the use of a proxy respondent.

[c] For this analysis only the HIS2004 data were used, as the HIS2008 data were not yet available at the time this was carried out.

For the comparison, only persons aged 65 or more were selected. We distinguish between persons living at home, and persons living in an institution, and further according to whether no proxy was used, a proxy was used for reasons of memory problems or mental disorder, or a proxy was used for other reasons. Only absolute unweighted numbers are given, as these are critical for the kinds of analyses that are possible with these data. The items were operationalized as follows:

Washing: IL0110 = 1 & IL09 = 3

Dressing : IL0110 = 1 & IL07 = 3

Moving: IL03 = 3 OR IL05 = 3 OR MB04 = 1

Toilet: IL13 = 3

Incontinence: IL1501 = 1

Eating: IL11 = 3

The number of older persons with limitations range from 219 (washing) to 308 (moving), with the exception of the item of incontinence, where 397 persons say that they have this problem 'constantly'.

Using the items as operationalised above, we have tried to construct an approximate NIHDI scale as best as possible. Lacking real data on mental dependency, the scale only reflects physical dependency. The categories are defined as follows:

O: no dependency on any item

A: Washing = 1 OR Dressing = 1

B: (Washing = 1 & Dressing = 1) & (moving = 1 OR toilet = 1)

C: (Washing = 1 & Dressing = 1) & (moving = 1 & toilet = 1) & eating = 1

The item incontinence was not used, as it apparently could not discriminate those who were totally incontinent. The HIS2004 questionnaire contains question IL.15.01. "Do you sometimes lose control of your bladder?" with responses: 1. "yes, constantly", 2 "yes, every now and then", 3 "no". 406 respondents, or 11.3% of the sample aged 65+, answered "yes, constantly", which is considerably more than for the other ADL items. Perhaps because of the word *sometimes* in the question, it seems that it does not discriminate well enough those who are totally incontinent according to the NIHDI criterion. Only persons choosing response 2 were routed to a follow-up question IL1502 on the frequency of the incontinence problem, where the most intensive category was "once a week". In the HIS2008, there was only a general question whether persons had suffered from urinary incontinence, ever, and during the last 12 months. So it appears that the HIS questions were not specific enough to identify those with incontinence problems which are really disabling.

Table A6.1: Scale of disability used by the Belgian NIHDI to determine dependency. Part A: Items.

Criterion	1	2	3	4
Washing	Can wash him/herself without any help	Needs partly help to wash him/herself above OR under the waist	Needs partly help to wash him/herself above AND under the waist	Is completely dependent on help to wash him/herself above AND under the waist
Dressing	Can dress him/herself without any help	Needs partly help to dress him/herself above OR under the waist (apart from laces)	Needs partly help to dress him/herself above AND under the waist	Is completely dependent on help to dress him/herself above AND under the waist
Moving and change of position [standing – sitting – lying down]	Can move him/herself [within the house] without any help, and without the aid of appliances	Can move him/herself [within the house] without any help, with the aid of appliances	Is completely dependent on help for at least one move or change of position	Is bedridden or in a wheelchair and completely dependent on help to move and him/herself
Going to toilet	Can go to the toilet, dress and clean him/herself without any help,	Needs help for at least one of the following 3 items: moving, dressing, cleaning	Needs help for at least two of the following 3 items: moving, dressing, cleaning	Needs help for at all three of the following 3 items: moving, dressing, cleaning
Incontinence	Not incontinent for urine and faeces	Only incidentally incontinent for urine or faeces	Incontinent for urine or faeces	Incontinent for urine and faeces
Eating	Can eat and drink without any help	Needs help in advance for eating or drinking	Needs partly help during eating or drinking	Is completely dependent on help for eating or drinking
Orientation in time	No problem	Now and then	Almost every day problem	Completely disoriented or impossible to determine
Orientation in space	No problem	Now and then	Almost every day problem	Completely disoriented or impossible to determine

Table A6.1: Scale of disability used by Belgian NIHDI to determine dependency. Part B: Categories.

Category	Level of physical dependence*		Level of mental dependence*
O	No dependence	AND	No dependence
A	Dependent in washing and/or dressing	OR	Disoriented in time and space, but physically independent
B	Dependent in washing and dressing, AND dependent for moving and/or going to the toilet	OR	Disoriented in time and space, AND dependent in washing and/or dressing
C	Dependent in washing and dressing, AND dependent for moving and going to the toilet AND dependent for incontinence and/or eating	AND	No dependence
Cdement	Dependent in washing and dressing, AND dependent for moving and going to the toilet AND dependent for incontinence and/or eating	AND	Disoriented in time and space

** A score of 3 or 4 on an item is regarded as 'being dependent' or 'being disoriented'*
Source: Rijksinstituut voor Ziekte en Invaliditeitsverzekering (no date), Dienst voor geneeskundige verzorging, Richtlijnen bij het gebruik van de evaluatieschaal, van toepassing vanaf 2006, Brussels, document.

Table A6.2: Concordance between the scale of disability used by Belgian NIHDI to determine dependency, and information on limitatio ns in the HIS 2004.

Criterion	HIS variable name	Description	Response categories
Washing	IL0110	"Does your health now limit you in bathing, showering or dressing yourself? If so, how much?"	1) Yes limited a lot / 2) Yes, limited a little / 3) No, not limited at all
	IL09	"Can you wash your hands and face on your own?	1) Yes, without difficulty / 2) Yes, with some difficulty / 3) I can only wash my hands and face with someone to help me
Dressing	IL0110	"Does your health now limit you in bathing, showering or dressing yourself? If so, how much?"	1) Yes limited a lot / 2) Yes, limited a little / 3) No, not limited at all
	IL07	"Can you dress and undress yourself on your own?	1) Yes, without difficulty / 2) Yes, with some difficulty / 3) I can only dress and undress yourself with someone to help me
Moving and change of position	IL03	"Can you get in and out of your bed on your own?	1) Yes, without difficulty / 2) Yes, with some difficulty / 3) I can only get in and out of your bed with someone to help me
	IL05	"Can you get in and out of a chair on your own?	1) Yes, without difficulty / 2) Yes, with some difficulty / 3) I can only get in and out of a chair with someone to help me
	MB04	"Are you bedridden due to this (these) illness(es), chronic condition(s) or handicap(s)?"	1) Continually / 2) At intervals / 3) Not or seldom /
Going to toilet	IL13	"Can you get to and use the toilet on your own?	1) Yes, without difficulty / 2) Yes, with some difficulty / 3) I can only get to and use the toilet with someone to help me
Incontinence	IL1501	"Do you sometimes lose control of your bladder?"	1) Yes, constantly / 2) Yes, every now and then / 3) No
	IL1502	"How frequently do you lose control of your bladder?"	1) At least once a week / 2) Less than once a week, but at least once a month / 3) Less than once a month
Eating	IL11	"Can you, without the help of someone else, feed yourself and cut up food for yourself?"	1) Yes, without difficulty / 2) Yes, with some difficulty / 3) I can feed and cut up food for myself with someone to help me
Orientation in time **Orientation in space**	NR04	"Why was the selected person not capable of answering the question personally?" [Asked in case of proxy interview, if the reason for proxy interview (NR02) was that "the selected person was not capable to respond personally"	7 reasons, among which: 3) Because of a memory problem (e.g. amnesia, senile dementia) / 6) Because of a serious mental disorder

Table A6.3: Dependency as measured in the HIS 2004, by situation of the person (65+ only; absolute unweighted numbers) .

Item	Type of respondent							Total
	Living at home			Living in institution			Unknown	
	Self	Proxy, mental	Proxy, other	Self	Proxy, mental	Proxy, other		
Washing	29	28	43	22	42	33	22	219
Dressing	66	35	51	39	46	37	24	298
Moving	60	37	58	40	48	39	26	308
Toilet	24	27	41	35	45	37	24	233
Incontinence	202	28	33	36	44	36	18	397
Eating	41	29	41	25	37	33	17	223
Overall number	2 794	68	178	170	77	71	95	3 453
NIHDI category (as estimated using HIS2004 data)								
O	2 676	30	119	123	25	30	67	3 070
A	52	12	20	22	12	12	4	134
B	10	6	12	9	8	4	5	54
C	9	19	24	10	29	24	16	131
Total	2 747	67	175	164	74	70	92	3 389

Note: see text for explanations

Again we see that those who are dependent, and especially those in the heaviest category C, are overrepresented among the persons in institutions. We find that a total of 141 persons were interviewed by proxy because of a memory problem or because of a serious mental disorder. About half of those are living in an institution. Most likely, the majority of these are suffering from dementia. We also observe a fair number of persons in category O (no dependency) living in institutions. It must be kept in mind that these are unweighted results. Also, several of the items used are more specific than the NIHDI criteria. The mental criteria and the incontinence item could not be applied at all. It therefore is likely that we have ascribed a NIHDI category to some persons that is lighter than that to which they are in fact assigned (by the caregivers of by the NIHDI).

Yet, perhaps the most important finding of this preliminary exercise is that it shows that there are a sufficient number of older persons in HIS with functional limitations to make analysis possible. Unfortunately, there are no figures on functional limitations for the Belgian population, other than the HIS figures.

Appendix 6.2.: Dementia in HIS 2004 and 2008

There are no direct questions on dementia in the HIS surveys of 2004 and 2008. However, indications of dementia could be derived from three different pieces of information.

1. Reason for proxy interview.

The first indicator is derived from the answers to the question "Why was the selected person not capable of answering the question personally" (NR04; asked in case of proxy interview). The answers "because of a memory problem (e.g. amnesia, senile dementia)" (code 2) and "because of a serious mental disorder" (code 6), were regarded as indicating dementia.

In addition, the open-ended specifications in case of 'other reason' (variables NR0401 / NR0301), also sometimes indicated dementia.

2. Data on medication use.

HIS2004. For the second indicators, the file *his_dr_en.dta* was used, which has one record for each medication taken by a respondent. In accordance with the approach used by the KCE, medication with an ATC code starting with N06D was labelled as anti-Alzheimer, and medication with an ATC code starting with N05A was labelled as anti-psychotic. In total there were 272 records with anti-psychotic medicines, and 34 records with anti-Alzheimer medicines, belonging to 268 separate individuals (4 individuals used three such medicines, and a further 30 used two such medicines). Of these 268 individuals, 165 were 65+, most of the 102 others were between 55 and 64 years old.[4]

HIS2008. The file *hisfile_dr* was used, which, in contrast to the corresponding HIS2004 file, contains CNK codes, which is a unique code for the medicine package, while the ATC code indicates the active ingredient. Using a file downloaded from the pharmacists website, the CNK codes in *hisfile_dr* were linked to the ATC code. From this point on, the same procedure was used as for HIS2004. This dementia indicator points to 78 persons aged 65+. It is not clear why the number is less than half of that in 2004.

3. Questions on chronic conditions

The *HIS2004* questionnaire on chronic conditions contains two open-ended questions:

- MA0118 "Other serious psychiatric problems, specify ....."
- MA0139 "Other mental diseases, which ones ...."
- Most of the open-ended answers to these questions turned out to indicate dementia. Most of the other answers referred to nervousness. When the answers contained the words "Alzheimer", "dementia", "hallucinations", "aggressiveness", "loss of memory" or "disorientation" (or words to the same effect), ***and*** the respondent indicated that he/she had seen a health care professional about the problem, the third dementia indicator variable was coded 1.

[4] The health reasons given by the respondents (or by their proxies) why they use these medicines rather vary. Some say it is against Alzheimer, hallucinations, or memory problems or for 'brain metabolism', others mention 'headaches' or even 'bowel problems'.

The HIS2008 contains only one general open-ended question about 'other chronic conditions' (MA0137). This turned out to have produced a few answers indicating dementia.

The overlap between these three variables is not as large as one might have expected. In HIS 2004, of the 145 individuals who appear demented according to the proxy, only 44 reported using dementia-relevant medication, and 29 indicated dementia-like problems on the open-ended questions. Of the 165 individuals who reported using dementia-relevant medication, only 23 indicated dementia-like problems on those open-ended questions. In HIS 2008, of the 152 individuals who scored positive on the proxy-indicator of dementia, only 20 reported using anti-dementia or anti-psychotic drugs.

The number of persons scoring on the several indicators of dementia, and scoring on at least one of these is reported below. The overall weighted percentage is lower in 2008 than in 2004, mainly because the indicator based on medication use was less productive in the former year.

Table A6.4: Indicators of dementia, HIS 2004 and 2008.

Respondents aged 65+ only, unweighted numbers	2004	2008
based on reasons for proxy interview, closed answers (NR04/ NR03)	145	152
based on reasons for proxy interview, open answers (NR0401/ NR0301)	5	10
based on medication use	165	78
based on open-ended questions about chronic conditions	53	17
At least one positive indicator of dementia	284	223
As % of all persons aged 65+ (weighted)	5.9%	4.1%

Appendix 6.3.: Full results of logistic regressions

First we tested whether the data justified imposing a single model on both HIS2004 and HIS2008, despite the large difference in prevalence. For this purpose, we performed a Chi-square test by comparing the sum of the "-2*log-likelihood" of separate models for both years, with the "-2*log-likelihood" of a single model for both years (with a dummy variable indicating the year). Table A6.5 shows that both for model 3 (without province) and model 4 (with province), Chi-square was not significant.[5] This result justifies imposing a single model on both years.

Table A6.5: Chi-square test of single model for disability, HIS 2004 and 2008.

	Model 3	Model 4
Chi² difference	0.46	6.96
Df	15	25
p(Chi²)	1.000	1.000

Table A6.6: Descriptives for variables used in logistic model for disability, HIS 2004 and 2008.

	HIS 2004 unweighted	HIS 2008 unweighted	HIS 2004 weighted	HIS 2008 weighted
adl (dep. var.)	0.119	0.089	0.077	0.046
sex (1 = female)*	1.607	1.628	1.585	1.585
age 70-74*	0.222	0.155	0.288	0.275
age 75-79*	0.162	0.156	0.196	0.197
age 80-84*	0.142	0.152	0.170	0.181
age 85-89*	0.159	0.273	0.044	0.083
age 90-44*	0.088	0.081	0.024	0.024
age 95+*	0.021	0.028	0.006	0.007

[5] In fact, the chi-square test statistics are suspiciously low. I double checked the computations, but could find no mistake.

asthma	0.064	0.050	0.067	0.055
bronchitis	0.124	0.088	0.116	0.087
diabetes	0.111	0.113	0.111	0.107
glaucoma	0.067	0.063	0.063	0.058
hip fracture	0.018	0.029	0.016	0.015
osteoporosis	0.137	0.162	0.123	0.152
parkinson	0.025	0.021	0.014	0.016
dementia	0.084	0.076	0.062	0.040
Antwerpen	0.093	0.119	0.166	0.180
Vlaams Brabant*	0.049	0.066	0.098	0.093
West Vlaanderen*	0.066	0.074	0.126	0.131
Oost Vlaanderen*	0.076	0.070	0.141	0.137
Limburg*	0.078	0.055	0.069	0.072
Brabant Wallon*	0.032	0.032	0.026	0.026
Hainaut*	0.110	0.130	0.127	0.120
Liège*	0.081	0.110	0.091	0.094
Luxembourg*	0.108	0.029	0.025	0.019
Namur*	0.040	0.057	0.037	0.041
heart	-3.000	0.090	-3.000	0.078
high blood pressure	0.340	0.354	0.341	0.361
depression	0.077	0.071	0.066	0.067
cancer	0.026	0.048	0.024	0.060
arthritis	0.190	0.196	0.183	0.203
rheuma	0.352	0.413	0.338	0.394
stroke	0.027	0.041	0.023	0.029
educ. lower second	0.232	0.226	0.238	0.249
educ. higher second. tech. vocat.	0.134	0.144	0.146	0.168
educ. higher second. profess.	0.039	0.054	0.043	0.059
educ. higher	0.131	0.137	0.115	0.129
educ. no info	0.056	0.063	0.040	0.034
income €750-1000	0.220	0.257	0.230	0.272
income €1000-1500	0.193	0.181	0.207	0.210
income €1500-2500	0.136	0.100	0.125	0.092
income €2500+	0.080	0.092	0.068	0.085
income no info	0.153	0.199	0.142	0.170
n	3 116	2 745		

Table A6.7: Logistic regression of disability (at least 1 ADL), HIS 2004 (65+ only), n=3319 (unweighted), models 1 -4.

	Model 1			Model 2			Model 3			Model 4		
	Odds-ratio	St. Error	p	Odds-ratio	St. Error	p	Odds-ratio	St. Error	p	Odds-ratio	St. Error	p
Year (1 = 2008)*	**0.53**	0.05	0.000	**0.54**	0.05	0.000	**0.54**	0.06	0.000	**0.53**	0.05	0.000
sex (1 = female)*	**1.91**	0.21	0.000	**1.92**	0.22	0.000	**1.72**	0.20	0.000	**1.75**	0.21	0.000
age 70-74*	1.37	0.40	0.289	1.29	0.38	0.396	1.27	0.38	0.436	1.26	0.38	0.440
age 75-79*	**3.09**	0.83	0.000	**2.91**	0.79	0.000	**2.65**	0.73	0.000	**2.70**	0.75	0.000
age 80-84*	**5.64**	1.43	0.000	**5.12**	1.32	0.000	**4.52**	1.19	0.000	**4.66**	1.23	0.000
age 85-89*	**12.08**	2.89	0.000	**10.32**	2.49	0.000	**8.78**	2.17	0.000	**8.97**	2.23	0.000
age 90-44*	**22.38**	5.53	0.000	**20.37**	5.09	0.000	**15.45**	3.98	0.000	**16.16**	4.18	0.000
age 95+*	**36.54**	10.46	0.000	**36.49**	10.60	0.000	**27.78**	8.43	0.000	**28.62**	8.74	0.000
asthma				0.93	0.20	0.731	0.94	0.21	0.772	0.95	0.21	0.816
bronchitis				**1.82**	0.26	0.000	**1.90**	0.28	0.000	**1.88**	0.28	0.000
diabetes				**1.64**	0.22	0.000	**1.64**	0.23	0.000	**1.67**	0.24	0.000
glaucoma				1.13	0.19	0.468	1.29	0.23	0.146	1.28	0.23	0.163
hip fracture				**3.13**	0.65	0.000	**3.05**	0.67	0.000	**3.16**	0.70	0.000
osteoporosis				1.18	0.14	0.165	1.18	0.15	0.204	1.20	0.15	0.154
parkinson				**6.63**	1.33	0.000	**5.32**	1.15	0.000	**5.32**	1.16	0.000
dementia							**8.17**	0.97	0.000	**8.28**	0.99	0.000
Antwerpen										*1.46*	0.26	0.037
Vlaams Brabant*										1.31	0.31	0.250
West Vlaanderen*										**1.83**	0.35	0.002
Oost Vlaanderen*										1.03	0.22	0.888
Limburg*										1.36	0.30	0.163
Brabant Wallon*										*1.78*	0.46	0.024
Hainaut*										*1.44*	0.24	0.031
Liège*										0.77	0.16	0.213
Luxembourg*										0.93	0.21	0.735
Namur*										1.01	0.26	0.979
Chi² (df)	653.06	(8)		810.89	(15)		1111.05	(16)		1136.1	(26)	
Pseudo R^2	0.164			0.2037			0.279			0.2853		
Likelihood ratio test with respect to previous model: Chi², df, p				157.83	7	0.000	300.16	3	0.000	25.05	10	0.005

Table A6.8: Results of logistic regression of disability (at least 1 ADL), HIS 2004 (65+ only), n = 3 319 (unweighted), models 5-6.

	Model 5			Model 6		
	Odds-ratio	St. Error	p	Odds-ratio	St. Error	p
Year (1 = 2008)*	0.41	0.32	0.259	0.43	-1.05	0.293
sex (1 = female)*	**1.63**	0.20	0.000	**1.52**	3.31	0.001
age 70-74*	1.18	0.37	0.585	1.19	0.55	0.582
age 75-79*	**2.69**	0.76	0.000	**2.65**	3.45	0.001
age 80-84*	**4.53**	1.22	0.000	**4.33**	5.43	0.000
age 85-89*	**9.10**	2.29	0.000	**8.51**	8.44	0.000
age 90-44*	**17.09**	4.50	0.000	**14.68**	10.11	0.000
age 95+*	**30.63**	9.51	0.000	**26.91**	10.45	0.000
asthma	0.94	0.21	0.797	0.98	-0.11	0.915
bronchitis	**1.69**	0.26	0.001	**1.63**	3.09	0.002
diabetes	**1.63**	0.24	0.001	**1.57**	3.00	0.003
glaucoma	1.14	0.21	0.466	1.19	0.94	0.348
hip fracture	**2.92**	0.67	0.000	**2.87**	4.52	0.000
osteoporosis	1.00	0.14	0.979	0.99	-0.07	0.943
parkinson	**5.16**	1.16	0.000	**5.05**	7.06	0.000
dementia	**7.97**	1.00	0.000	**7.14**	15.32	0.000
Antwerpen	*1.58*	0.29	0.014	*1.44*	1.94	0.053
Vlaams Brabant*	1.35	0.33	0.222	1.21	0.76	0.448
West Vlaanderen*	**1.97**	0.39	0.001	**1.78**	2.83	0.005
Oost Vlaanderen*	1.08	0.24	0.734	0.97	-0.14	0.886
Limburg*	1.43	0.33	0.113	1.26	0.98	0.325
Brabant Wallon*	*1.59*	0.42	0.084	1.53	1.54	0.123
Hainaut*	*1.50*	0.26	0.019	*1.38*	1.81	0.070
Liège*	0.84	0.18	0.420	0.76	-1.29	0.196
Luxembourg*	0.95	0.22	0.806	0.85	-0.71	0.479

Namur*	0.91	0.25	0.732	0.86	-0.53	0.596
heart	1.07	0.27	0.798	1.05	0.19	0.853
high blood pressure	*0.79*	0.09	0.038	*0.78*	-2.21	0.027
depression	**1.77**	0.28	0.000	**1.70**	3.32	0.001
cancer	*1.58*	0.41	0.078	*1.57*	1.70	0.089
arthritis	1.22	0.16	0.115	1.22	1.57	0.117
rheuma	**1.39**	0.16	0.003	**1.42**	3.08	0.002
stroke	**6.28**	1.25	0.000	**6.18**	9.00	0.000
educ. lower second				**0.58**	-3.81	0.000
educ. higher second. tech. vocat.				**0.49**	-3.59	0.000
educ. higher second. profess.				0.64	-1.52	0.129
educ. higher				**0.54**	-3.15	0.002
educ. no info				*1.47*	2.12	0.034
income €750-1000				0.96	-0.27	0.789
income €1000-1500				1.13	0.69	0.493
income €1500-2500				1.31	1.47	0.141
income €2500+				1.11	0.42	0.678
income no info				1.27	1.44	0.150
Chi² (df)	1236.47	(33)		1283.49	(43)	
Pseudo R²	0.3138			0.3257		
Likelihood ratio test with respect to previous model: Chi², df, p	Test not possible, since number of observations differ			47.02	10	0.000

Reference categories: Year=2004; Sex=Male; Age 65-69; Province: Brussels; educ. no/primary; income < 750€
*Notes: Odds-ratios in **bold:** significant at 0.01 level; odds-ratios in italic: significant at 0.05 level (one-sided)*

Appendix 6.4.: Evaluation of imputation of disability, using the HIS data

Table A6.9: Comparison of predicted ADL with actual ADL on the individual level, HIS2004-2008.

		Predicted ADL limitation		
		No	**Yes**	**Total**
Measured ADL	**No**	89.6%	4.5%	94.0%
	Yes	4.4%	1.6%	5.9%
	Total	94.0%	6.0%	100.0%

Table A6.10: Comparison of prevalence of predicted ADL with that of actual ADL by age group, HIS2004-2008.

	Incidence		Distribution	
Age category	**Measured ADL**	**Predicted ADL**	**Measured ADL**	**Predicted ADL**
65-69	1.1%	1.3%	4.6%	5.5%
70-74	2.0%	0.9%	9.3%	4.4%
75-79	4.8%	6.1%	15.6%	20.2%
80-84	11.4%	11.2%	33.8%	33.9%
85-89	18.2%	17.0%	19.6%	18.7%
90-94	30.8%	31.0%	12.3%	12.7%
95+	44.5%	41.4%	4.8%	4.6%
Total	**6.0%**	**5.9%**	**100.0%**	**100.0%**

Table A6.11: Comparison of prevalence of predicted ADL with that of actual ADL by sex, HIS 2004-2008.

	Incidence		Distribution	
Sex	**Measured ADL**	**Predicted ADL**	**Measured ADL**	**Predicted ADL**
Male	3.6%	3.6%	25.0%	25.1%
Female	7.7%	7.6%	75.0%	74.9%
Total	6.0%	5.9%	100.0%	100.0%

Table A6.12: Comparison of prevalence of predicted ADL with that of actual ADL by province, HIS2004-2008.

	Incidence		Distribution	
Province	**Measured ADL**	**Predicted ADL**	**Measured ADL**	**Predicted ADL**
Antwerpen	5.4%	4.6%	15.4%	13.4%
Vlaams Brabant	6.2%	6.0%	9.9%	9.7%
West-Vlaanderen	7.3%	8.0%	15.5%	17.4%
Oost-Vlaanderen	4.6%	4.0%	10.7%	9.4%
Limburg	7.0%	8.3%	8.2%	9.9%
Bruxelles/Brussel	6.7%	6.6%	10.1%	10.1%
Brabant Wallon	7.7%	9.1%	3.2%	3.9%
Hainaut	7.8%	6.5%	16.0%	13.5%
Liège	4.0%	3.2%	6.3%	5.0%
Luxembourg	5.5%	8.8%	2.0%	3.2%
Namur	4.3%	6.8%	2.8%	4.5%
Total	6.0%	5.9%	100.0%	100.0%

Table A6.13: Comparison of prevalence of predicted ADL with that of actual ADL by education, HIS 2004-2008.

	Incidence		Distribution	
Education	**Measured ADL**	**Predicted ADL**	**Measured ADL**	**Predicted ADL**
Only primary	9.6%	7.6%	61.6%	50.0%
Lower secondary	3.5%	4.4%	14.3%	18.2%
Higher technical or vocational	2.6%	4.1%	6.7%	11.0%
Higher general	2.7%	4.4%	2.3%	3.9%
Higher education	2.7%	4.3%	5.5%	8.9%
No information	15.6%	12.9%	9.6%	8.1%
Total	6.0%	5.9%	100.0%	100.0%

APPENDICES TO CHAPTER 7

Appendix A.1.: Insurance for minor risks

Before January 1st, 2008 the insurance status of minor risks for (formerly) self-employed could be categorized in (1) public insurance, (2) voluntary insurance and (3) no insurance. In principle, minor risks of self-employed were not covered by the public insurance system, except for disabled persons and some specific categories of elderly low-income self-employed.[6] Minor risks of starters and self-employed pensioners eligible for an income allowance for the elderly were covered by the public insurance system since July 2006, as a first step of the integration of the minor risks of the self-employed in the public insurance system. This appendix assembles data to support the conclusions about minor risks in the main text; the goal here is not to provide an analysis of the evolution of minor risks.

Table A7.1 shows that in the EPS data for 2002-2009 3.7% of observations (person-quarters had no public insurance for minor risks. Most of these persons had taken voluntary insurance for these risks.

Table A7.1: Distribution of type of insurance for minor risks, in terms of person-quarters, EPS 2002-2009.

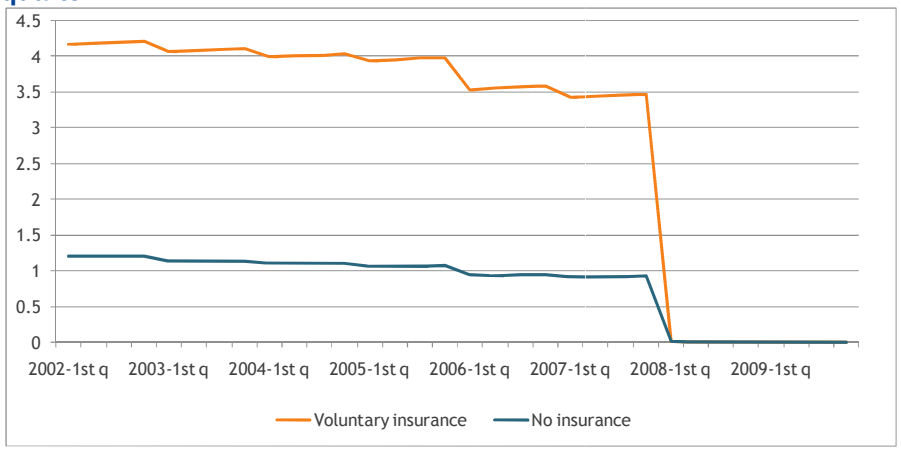
	Number	Percent
Minor risks public insurance	2 769 466	96.32
Minor risks voluntary insurance	83 037	2.89
Minor risks no insurance	22 691	0.79
Total	2 875 194	100

Figure A7.1 shows that over time, the proportion of persons who are not covered by public insurance has declined. After 1/1/2008 it is reduced to zero, but also before that moment, many persons had moved under coverage by the public insurance for minor risks, in particular at the end of 2005. This was the result of specific policy interventions to broaden the coverage of public insurance for minor risks[7], as well as of changes in personal situations As there was an age limit of 50 years to buy voluntary insurance for the first time, very few older persons changed from no insurance to voluntary insurance during this period, moves from public insurance to no insurance or voluntary insurance are extremely rare.

6 http://www.cm.be/cm-tridion/nl/100/Resources/Magazine%20CM-Info%20231_Zelfstandigen_tcm24-44775.pdf

7 In July 2006, retired self-employed persons who received the Guaranteed Income for the Elderly were brought under the cover of the public insurance for small risks.

Figure A7.1: Trend in the proportion of persons with no insurance and with voluntary insurance for minor risks, EPS 2002-2009, by quarter.



Tables A7.2-A7.4 show the prevalence of non-insurance, public insurance and voluntary insurance by age, sex and province. Not being insured by public insurance for minor risks, and especially having no insurance, was slightly more likely for those aged 90+ than for younger persons. The same was true for males compared to females. The proportion of older persons with no coverage for public insurance was higher in the provinces of West-Vlaanderen and Luxembourg.

Table A7.2: Type of insurance for minor risks, by age category, EPS 2002-2007.

Age	Minor risks public insurance %	Minor risks voluntary insurance %	Minor risks no insurance %	Total %
65-69	95.0	4.0	1.0	100
70-74	94.9	4.1	0.9	100
75-79	94.8	4.1	1.1	100
80-84	95.4	3.5	1.2	100
85-89	95.8	3.1	1.2	100
90-94	95.3	3.0	1.7	100
95-99	94.1	3.8	2.1	100
100+	93.2	3.4	3.4	100
Total	95.1	3.9	1.1	100

Table A7.3: Type of insurance for minor risks, by sex, EPS 2002-2007.

Sex	Minor risks public insurance	Minor risks voluntary insurance	Minor risks no insurance	Total
Male	94.2	4.5	1.3	100
Female	95.7	3.4	0.9	100
Total	95.1	3.9	1.1	100

Table A7.4: Type of insurance for minor risks, by province, EPS 2002-2007.

Province	Minor risks public insurance	Minor risks voluntary insurance	Minor risks no insurance	Total
Antwerpen	95.5	3.8	0.7	100
Vlaams Brabant	95.0	3.8	1.3	100
West-Vlaanderen	92.8	6.1	1.2	100
Oost-Vlaanderen	94.2	4.6	1.2	100
Limburg	95.8	3.4	0.8	100
Bruxelles/Brussel	96.6	2.4	1.0	100
Brabant Wallon	94.9	3.8	1.3	100
Hainaut	96.4	2.8	0.8	100
Liège	96.2	2.7	1.1	100
Luxembourg	89.9	8.1	2.0	100
Namur	94.7	3.7	1.6	100
Total	95.1	3.9	1.1	100

Figures A7.2 and A7.3 show the trend in the proportion of older persons using residential care and home care, by type of insurance for minor risks. As mentioned, since home care and care in homes for the elderly for those was only recorded in the EPS for persons with public insurance for minor risks, these trends may not reflect actual changes in usage. The bottom two lines in each figure show that among those who are not covered by public insurance in the current year, use of residential care (in nursing homes) is recorded for less than 2% of persons, and home care use for virtually no-one. Whether persons had voluntary insurance or not, does not seem to make any difference. The other lines are for persons that are characterized by their type of insurance in 2002. For persons who had public insurance at that time (and in fact also in all later years), use of residential care increased from about 6% to about 9%, which of course is a consequence of the ageing of this cohort. If we look at the cohort of persons who were not covered for minor risks by public insurance at the start of the EPS in the first quarter of 2002, we observe a strong increase in the use of both residential care and home care, which accelerates in 2008. For home care, the gap between those formerly not publicly covered for minor risks, and those who enjoyed such coverage from at least 2002 on, seems to close quickly. Even before 2008, nearly all these new users were persons who had come under coverage by the public insurance for "minor risks" in years after 2002. Again, there is hardly any difference between those with voluntary insurance, and those with no insurance for minor risks.

Figure A7.2: Trend in the proportion of persons using residential care, EPS 2002-2009, by type of insurance for minor risks.

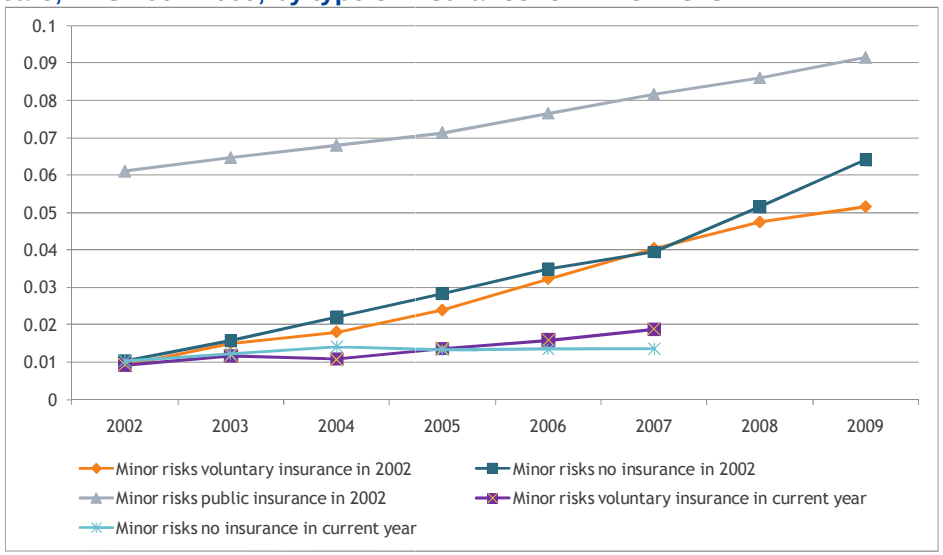
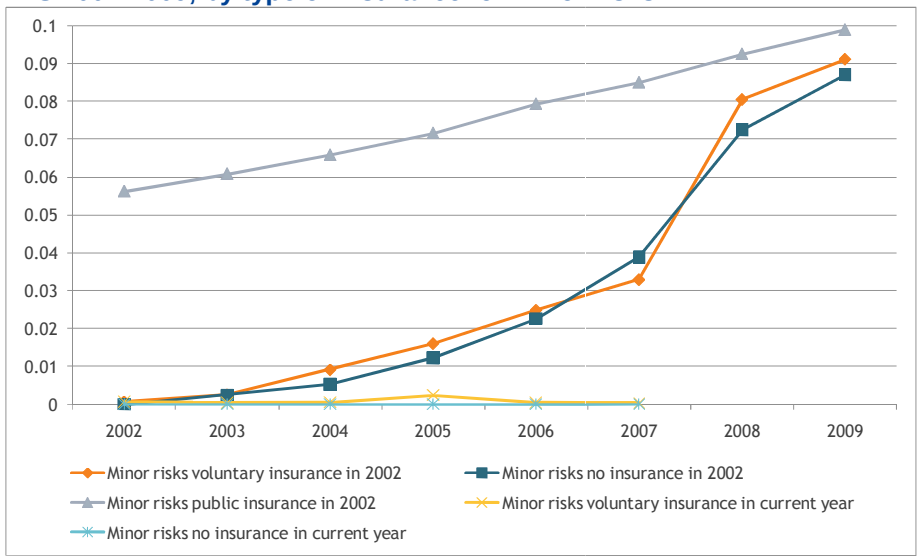


Figure A7.3: Trend in the proportion of persons using home care, EPS 2002-2009, by type of insurance for minor risks.

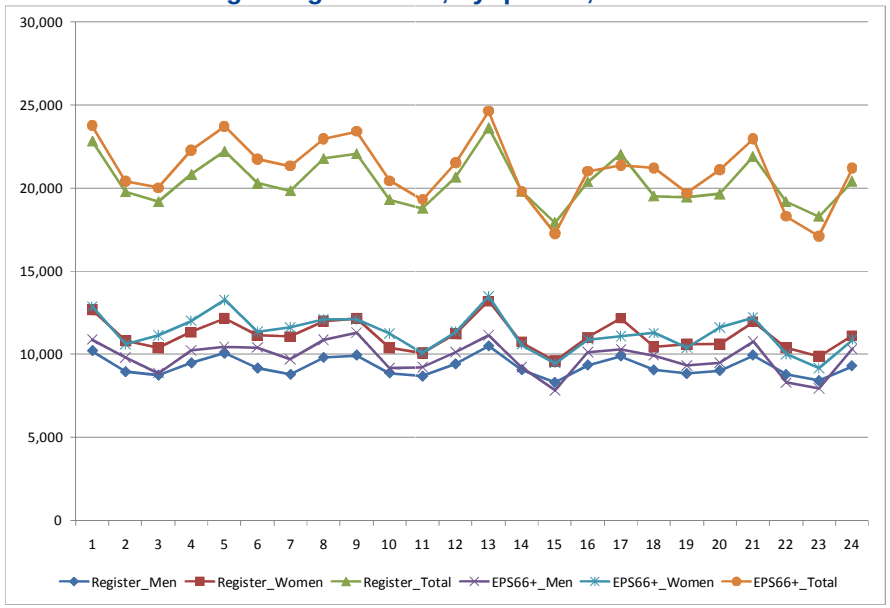


Appendix 7.2.: Comparison of the EPS data with external data

Tables not shown here but available upon request show that the EPS sample closely matches population data in terms of sex and age bracket, as would be expected given that the EPS is an administrative sample.

Figure A7.4 shows that the number of deaths as registered in the EPS closely matches official register data, both in terms of numbers and in the seasonal fluctuations. In the period before mid-2004, the number of deaths among men appears to be slightly overestimated in the EPS. The close match is important, since the transition to death determines the length of stay in residential care, and therefore also the number of older persons in this form of LTC at any given moment.

Figure A7.4: Number of deaths among persons aged 66 or more in the EPS and according to register data, by quarter, 2002-2007.



Source of register data: National Register, calculations by Statistics Belgium
Note: EPS data extrapolated to population numbers

Table A7.5: Distribution (%) of older persons in residential care, by care level, EPS data compared with NIHDI data.

EPS	2002	2003	2004	2005	2006	2007	2008	2009
Resid. care O	20.4%	19.3%	20.3%	20.7%	20.8%	19.5%	18.7%	17.8%
Resid. care A	16.1%	14.8%	16.2%	16.2%	16.5%	17.5%	17.1%	17.0%
Resid. care B	21.3%	22.1%	20.5%	21.7%	21.4%	22.8%	23.7%	24.3%
Resid. care C	21.1%	20.9%	13.2%	12.1%	11.3%	11.3%	11.8%	12.2%
Resid. care Cd	21.1%	22.9%	29.7%	29.3%	30.0%	29.0%	28.7%	28.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NIHDI*	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Resid. care O	22.3%	21.4%	22.5%	23.1%	23.8%	21.6%	19.1%	18.4%
Resid. care A	16.9%	16.5%	16.3%	16.1%	15.8%	16.3%	16.0%	15.9%
Resid. care l B	19.1%	19.4%	19.7%	20.2%	20.6%	21.7%	23.7%	24.5%
Resid. care l C	12.7%	12.9%	12.3%	11.8%	11.4%	11.5%	11.9%	12.1%
Resid. care Cd	29.0%	29.8%	29.3%	28.9%	28.5%	28.9%	29.3%	29.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NIHDI**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Resid. care O	20.1%	19.3%	19.8%	20.9%	20.6%	19.4%	18.6%	18.2%
Resid. care A	15.8%	15.8%	17.1%	16.8%	16.7%	17.0%	16.8%	16.8%
Resid. care B	21.8%	21.8%	20.6%	20.7%	21.5%	22.3%	22.8%	23.5%
Resid. care C	13.2%	13.5%	13.7%	12.6%	12.2%	12.0%	12.3%	12.2%
Resid. care Cd	29.1%	29.6%	28.9%	28.9%	28.9%	29.3%	29.4%	29.2%
Ccoma	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

*Notes: EPS data for first quarter of each year; * based on micro data on Katz scale, as determined for each patient on March 31st; ** based on number of reimbursed days.*
Source: NIHDI website

Table A7.6: Absolute number of older persons in residential care, by care level, EPS data compared with NIHDI data.

EPS	2002	2003	2004	2005	2006	2007	2008	2009
Resid. care O	20 900	20 320	21 800	22 320	22 860	21 820	21 180	20 680
Resid. care A	16 440	15 520	17 420	17 420	18 180	19 620	19 380	19 760
Resid. care B	21 780	23 260	22 040	23 360	23 480	25 560	26 900	28 260
Resid. care C	21 640	21 980	14 200	13 040	12 460	12 660	13 360	14 180
Resid. care Cd	21 640	24 060	31 920	31 580	32 920	32 500	32 600	33 460
Total	102 400	105 140	107 380	107 720	109 900	112 160	113 420	116 340
NIHDI*	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Resid. care O	23 777	23 953	25 646	26 083	27 927	25 558	22 945	22 736
Resid. care A	18 045	18 526	18 564	18 194	18 519	19 217	19 304	19 613
Resid. care B	20 379	21 709	22 407	22 839	24 197	25 642	28 556	30 278
Resid. care C	13 523	14 474	13 968	13 340	13 385	13 619	14 357	14 896
Resid. care Cd	30 982	33 335	33 425	32 643	33 439	34 175	35 269	35 977
Total	106 706	111 997	114 010	113 099	117 467	118 211	120 431	123 500

*Notes: EPS data for first quarter of each year, extrapolated to population numbers; * based on micro data on Katz scale, as determined for each patient on March 31st;*

Appendix 7.3. : NIHDI codes for the LTC situations

LTC Situation	NIHDI codes
1. **no long-term care, no hospitalization**	Default situation
2. **home-care use 'light'**	425110, 425515, 425272, 425670, 426075, 426215, 426230, 423430, 423452, 423474, 424712, 424734, 424756, 424771, 424793, 424815, 424830, 424852, 426370, 426392, 426414
3. **home-care use 'heavy'**	425294, 425692, 426090, 425316, 425714, 426112, 426252, 764514, 764536
4. **residential care, category O**	763195, 763291, 763394, 763490, 764315,
5. **residential care, category A**	763210, 763313, 763416, 763512, 764330
6. **residential care, category B**	763033, 763114, 764094, 763232, 763335, 763431, 763534, 764352, 764374
7. **residential care, category C**	763055, 763136, 764116, 763254, 763350, 763453, 763556, 764396, 764433
8. **residential care, category Cd**	763070, 763151, 764131, 763276, 763372, 763475, 763571, 763092, 763173
9. **hospitalization**	Any hospital stay lasting at least 20 days, and including the last day of a quarter

Appendix 7.4. : Short-term stays

Introduction

Regional authorities have created the possibility for older persons to stay in rest homes (MRPA/ROB) or nursing homes (MRS/RVT) for short periods. The number of beds assigned to this purpose is the subject of specific regulations, using particular criteria. The maximum length of an uninterrupted short-term stay is 60 days and the maximum number of days during a calendar year is 90 (although in Flanders this can be extended in exceptional cases). Since July 2007 the NIHDI has introduced special reimbursement codes for short-term stays; for this reason we can only distinguish short-term stays in the EPS data from the second half of 2007 on. There is a total of 10 NIHDI codes for short-term stays, which are distinguished according to the intensity of care (O, A, B, C, Cd), and whether the compensation is complete or partial. However, since there were only (unweighted) 12 cases in the EPS with partial compensation for short-term stays (and the compensation amounts to barely €1 per day), the short-term stays with partial compensation are ignored below, and only short-stays with complete compensation were included.

Statistics on short-term stays

First we present some general results from the data on short-term stays. The total number of short-term stays over the period 2007-2009 in the EPS was 1 980, corresponding to 39 600 such stays in the population. Table A7.7 shows that the number of short-term stays increased between 2007 and 2008 (even when taking into account that the arrangement was in effect only during the second half of 2007), and stayed nearly at the same level in 2009. The large majority of these stays happen in Flanders, and nearly none in Brussels; in fact no short-term beds were programmed for Brussels. Most short-term stays are in the less intensive care categories O, A, and B, although C and Cd are not rare (Table A7.8).

Figure A7.5 shows that most short-term stays last a few days or weeks, the median being 15 days, though 5% are longer than 60 days. The average length of short-term stay was 20.6 in 2007, 20.1 in 2008, and increased to 23.5 in 2009. Short-term stays are longer in Wallonia (average 28.1 days) than in Flanders (average 20.1 days). There are no significant differences in length of stay across NIHDI codes (intensity of care). The share of short-term stays in category O is slightly higher in Wallonia than in Flanders. Figure A7.6 shows that although reimbursement claims are made throughout the year, there are clear spikes at the end of each quarter. This is important, since only claims that are submitted at the end of a quarter were counted as instances of long-term residential care.

Although slightly more than 50% of persons who ever had a short-term stay during the period 2007-09 only had one such stay, nearly a quarter of those persons accumulated three or more stays (Figure A7.7).

Table A7.7: Number* of short-term stays, by year and region.

Region	2007**	2008	2009	Total
Brussels	60	20	20	100
Flanders	5 220	12 620	13 300	31 140
Wallonia	980	3 480	3 700	8 160
Total	6 260	16 120	17 020	39 400

*Notes: * extrapolated to population numbers; ** short-term stays were separately coded only from 1 July 2007 on.*

Table A7.8: Distribution (%) of short-term stays across intensity category, by region.

Category	Brussels	Flanders	Wallonia	Total
Cat O	60	18	25	19
Cat A	20	27	26	26
Cat B	20	31	27	30
Cat C	0	11	11	11
Cat Cd	0	14	11	13
Total	100	100	100	100

Figure A7.5: Distribution of length of short-term stays in days.

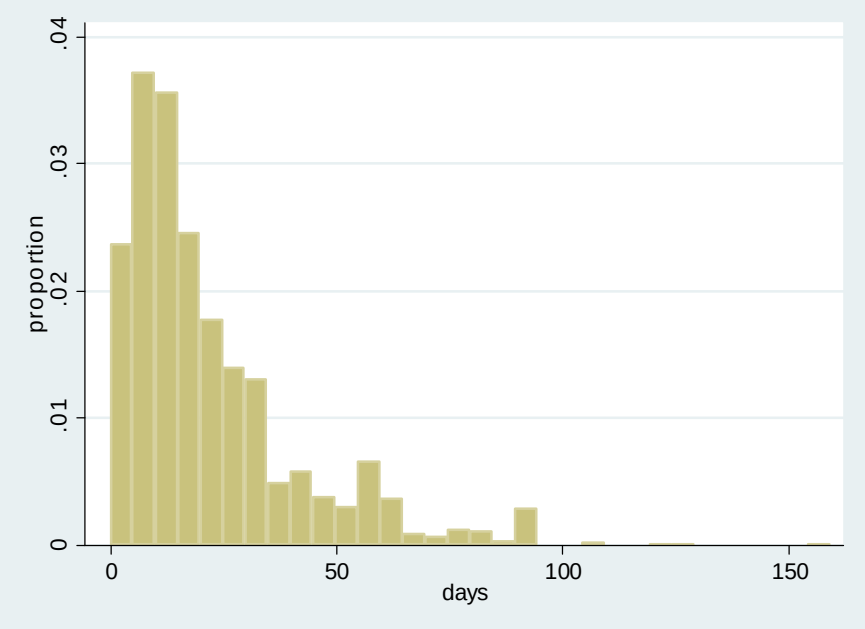


Figure A7.6: Week of reimbursement claims for short-term stays.

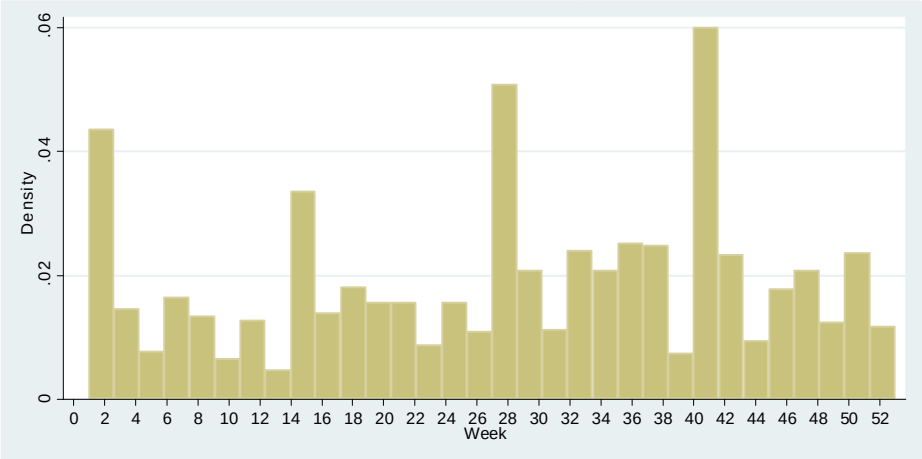
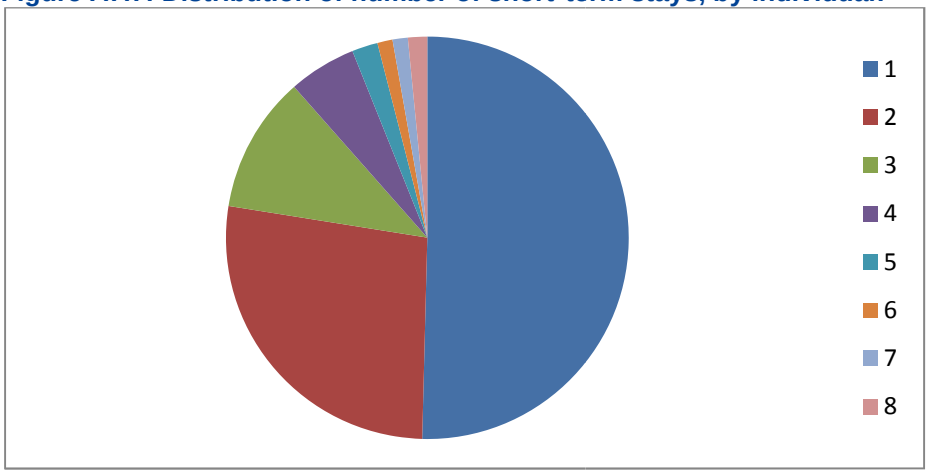


Figure A7.7: Distribution of number of short-term stays, by individual.



Short-term stays and long-term care situation as currently defined

How do short-term stays fit into the long-term care situation categories as defined previously? The NIHDI codes for short-term stays were in fact included in the codes for residential care, according to the appropriate intensity level. However, not all instances of such codes were counted as a person-quarter in residential care, as we looked only at the last two weeks (three for quarter 4) of any quarter to determine the long-term care situation. Requests for reimbursement for short-term stays are submitted throughout the year (though there are spikes at the end of each quarter).

Table A7.9 shows the long-term care categories to which observations of short-term stays were in fact assigned (here the unit of observation is a person/quarter). The large majority (61%) of short-term stays were counted as residential care, although not always at the same intensity level as the short-term stay in question.[8] If persons with short-term stays were assigned to one of the LTC situations at home, the likelihood that it was one of the home care categories increased with the intensity level of the short-term stay, as did the likelihood that it was home care at a high level, rather than home care at a low level. Table A7.10 shows that, overall, only 0.7% of all observations classified in long-term residential care could be in fact short-term observations.

Table A7.11 reveals that the large majority of persons having a short-term stay were at home in the previous quarter (most of them receiving home care), while only 7% were in residential care. In the quarter after their short-term stay, however, more than one-third were in long-term residential care. Note that observations where the long-term care situations before and after could in fact be short-term stays have been excluded from this table. Short-term stays seem to be a precursor of long-term stays in residential care for many older persons.

[8] There can be several reasons for this. A short-term stay can be followed by a long-term stay within the same quarter, or by another short-term stay at a different intensity level. Also, the regulations do not seem to preclude that a long-term inmate of one institution enjoys a short-term stay at another institution, although such a move may make little sense.

Table A7.9: LTC situation to which observations of short-term stays were assigned.

LTC situation	Short-term stay category					Total
	O	A	B	C	Cd	
No care	110	55	59	9	23	256
Home Low	44	105	61	15	5	230
Home High	4	29	51	58	54	196
Residential-O	188	13	4	3	0	208
Residential -A	14	264	7	3	1	289
Residential -B	6	31	336	4	2	379
Residential -C	1	4	23	106	2	136
Residential -D	0	3	19	7	160	189
All residential	209	315	389	123	165	1201
Hospital	6	8	5	2	6	27
Deceased	2	5	19	8	17	51
Total	375	517	584	215	270	1 961

Table A7.10; Percentage of observations (person-quarters) with a short-term stay, by level of intensity (residential care only).

	no short-term stay	short-term stay
Residential-O	99.39	0.61
Residential -A	98.99	1.01
Residential -B	99.02	0.98
Residential -C	99.43	0.57
Residential -Cd	99.61	0.39
Total	99.31	0.69

Table A7.11; Long-term care situation in quarter before and in quarter after short-term stay.

Long-term care situation in quarter after short-term stay	Long-term care situation in quarter before short-term stay				
	No care	Home care	Resid. Care	Other	Total
No care	16.1	3.4	0.5	1.0	**20.9**
Home care	5.2	22.0	1.1	1.8	**30.1**
Resid. Care	12.8	15.9	4.0	4.5	**37.1**
Other	3.4	5.4	1.4	1.7	**11.9**
Total	**37.4**	**46.5**	**7.0**	**9.0**	**100.0**

Notes:Percentage sum to 100 across table, n = 984 (unweighted); Long-term care situations before and after exclude short-term stays

Characteristics of older persons with short-term stays

Tables A7.12 – A7.14 show that the profile of persons with short-term stays, as far as age, sex and family size are concerned, is rather similar to that of older persons who receive home care, though the former tend to be somewhat older than the latter.

Table A7.12: Age profile of persons in short-term stays, compared with other persons in various long-term care situations (%).

	short-term stays	no short-term stays				
Age category		no care	home care	resid. care	other	Total
65-69	3.93	25.22	5.05	2.87	8.3	21.98
70-74	7.57	29.14	11.36	6.45	13.97	26.1
75-79	15.8	23.61	21.23	13.6	19.87	22.72
80-84	29.79	14.85	29.32	25.23	22.56	16.67
85-89	28.48	5.48	21.38	26.53	18.36	8.22
90-94	11.58	1.41	9.12	18.06	11.52	3.27
95-99	2.55	0.26	2.31	6.42	4.67	0.92
100+	0.29	0.03	0.23	0.83	0.73	0.11
Total	100	100	100	100	100	100

Table A7.13: Sex of persons in short-term stays, compared with other persons in various long-term care situations (%).

	short-term stays	no short-term stays				
Sex		no care	home care	resid. care	other	Total
Men	30.08	44.17	28.02	21.8	44.92	41.85
Women	69.92	55.83	71.98	78.2	55.08	58.15
Total	100	100	100	100	100	100

Table A7.14: Family size of persons in short-term stays, compared with other persons in various long-term care situations (%).

	short-term stays	no short-term stays				
Family size		no care	home care	resid. care	other	Total
1	56.15	30.96	50.33	82.24	50.9	35.95
2+	43.85	69.04	49.67	17.76	49.1	64.05
Total	100	100	100	100	100	100

Appendix 7.5. : Imputation of short episodes of no care between periods of residential LTC use

The raw data revealed a large number of episodes of one quarter (rarely also of two quarters) of no LTC, sandwiched between longer periods of being in residential care before and after that episode, or between residential care and death. As they occurred most often in the fourth quarter, such episodes appear to be artefacts of delays in the reimbursement requests. Therefore these episodes were imputed with the LTC situation before that episode. Table A7.15 shows under which conditions and for how many cases such imputations were made. Most cases concern observations where sample persons were in residential care in the quarters before and after the apparent quarter of no care, but observations where this quarter was situated between residential care and death, or between home care and residential care also occur.

Table A7.15: Imputation of short episodes of no care between periods of residential LTC use.

Situation before	Problem	Situation after	n	Imputation
Residential care	1 quarter 'no care'	Residential care	9 750	LTC sit. in previous quarter*
Residential care	1 quarter 'no care'	Death	1 296	LTC sit. in previous quarter
Home care	1 quarter 'no care'	Residential care	1 248	LTC sit. in next quarter
Home care	1 quarter 'no care'	Death	1 186	No imputation
Home care	1 quarter 'no care'	Home care	2 899	No imputation
Residential care	1 quarter 'no care'	Home care	67	No imputation
Residential care	2 quarters 'no care'**	Residential care	752	LTC sit. in previous quarter
Residential care	2 quarters 'no care'**	Death	220	LTC sit. in previous quarter
(No apparent problem)			2 893 018	No imputation

** in 79% of cases, the LTC-UC before and after was the same; ** each quarter is counted as a separate imputation*

Appendix 7.6.: Living situation

The EPS data of Release 5 contain a number of new flag variables on the potential availability of household members for informal care. Household members are persons who live in a household with the same reference person as the sample person, according to the National Register. The assumption is that household members are able to give such care if they are not prevented from doing so by having to do paid work, or by ill-health. The first condition is supposed to be met if household members are either not working full-time (var. PP1004), or are at the charge of another person (var. PP1002), or are aged 65 or more, or are pensioned (var. PP0030). Household members are supposed to be sufficiently healthy if they are not recognized as a disabled person (var. PP1009), and do not have a certificate for chronic diseases (var. PP2001 – PP2011) and are not entitled to an allowance for the disabled (var. PP3011). The age categories used are: 0-24; 25-44; 45-64; 65-74; 75-84; 85+; also sex is taken into account. The combination of the age categories and sex produces 12 indicator (flag) variables, which are set to

- 0 if no household members present in category
- 1 if one or more household member are present in category, but none of them available for informal care
- 2 if one or more household members are present in category, at least one of them available for informal care

Only household members other than the sample person her/himself are considered, implying that these variables are all equal to 0 for persons living alone.

In order link the household situation to the typology used in the projections of household situations made Poulain (2011), and also to reduce the number of variables, those twelve variables were reduced to six variables, each with the same three categories. The first one indicates the presence and availability of a person in the same age category and different sex as the sample person (the “partner”). The second one indicates the presence and availability of a much younger female person than the sample person (a “daughter”). The third one indicates the presence and availability of a much younger male person than the sample person (a “son”). The fourth one indicates the presence of a much older person than the sample person (a “parent”). The fifth and sixth ones indicate the presence of a person in the same age category as the sample person in addition to the partner, or with the same sex as the sample person (an “other woman” or “other man”). Each of these six variables has three values, with the same meaning as those of the original variables: not present (0); present but not available for informal care (1); present and available for informal care (2). The labels “partner”, “daughter” “son” and parent are used for convenience, but since information on family relationships is lacking in the EPS data, the variables can of course also refer to persons related in another way to the sample person. In particular, the “partner” can also be a sibling, or even a father or mother. Also, the distinction between “partners” and “children” is made on the basis of the age (difference), which is of course an imperfect criterion. We do not make a distinction between female and male “partners”, since the sex of the partner is likely to be strongly correlated to the gender of the sample person him- or herself.

Table 7A.16 shows how the variables mentioned are derived from the EPS flag variables. A partner should be not much older or younger than the sample person. When the mid-point of the age bracket of the household member was 10 or more years below the lower limit of the age bracket of the sample person, she or he was regarded as a “daughter” or a “son”, respectively. Household members much older than the sample person are designated as a “parent”. Sample persons are assumed to have a partner of the opposite sex, and to have at most one partner. Where those conditions were not met, option B was exercised. “Other men” and “other women” are therefore mostly household members of roughly the same age as the sample person, and either of the same sex, or in addition to a partner.

Table 7A.17 shows the prevalence of the various household members by sex and age of the sample persons. Obviously, the proportion of persons with a partner drops with increasing age, especially for women. The number of partners who are unavailable for care is very low, except among those aged 65-69, presumably because the partner is still at work. About 8 % of all older persons are living with a daughter; the proportion is highest among the very old. Sons are more prevalent than daughters (10%), but are more evenly spread across the age categories (which suggest that older persons start to live with a daughter in order to receive informal care;

while the sons simply never left the home). By construction, parents occur only among those aged 65-74. Other women and other men are a rather rare phenomenon.

We can compare our household situation variables with data for the year 2006 from the National Register, which are contained in projections of living situation for Belgium that have been made available to us by Michel Poulain. (2011). In those projections, living situation is a variable with four categories: living alone, living in married couple, living with others, and living in a collective household. In order to be able to use these projections of living situations in our model of residential care, we had to align the EPS living situation variables to the categories used by Poulain (2011). For this purpose a living situation variable was constructed within the EPS database with three categories:

1. living alone, i.e. living in a household with no other household members
2. living in a couple, i.e. having a partner, but no other household members
3. living with others, i.e. all other situations.

Furthermore, in the results from the National Register 'living in a collective household' was collapsed with 'living alone'. Within the EPS data, we cannot distinguish between these two categories, as no household members are registered as living in the same household for sample persons in both living situations. Of course, we do know whether persons are in residential care, but not all persons registered as 'living in a collective household' are in residential care (some are in convents, prisons etc.), and, more importantly, a large proportion of older persons in residential care are not registered as 'living in a collective household'. For our purposes it is more useful to regard use of residential care as a variable separate from living situation, rather than as a category of the latter variable.

In Table A7.18 we compare the distributions of the population by age category and sex across the three living situations derived from the EPS with the distribution from the National Register. The results from the EPS have been adjusted so that the population totals by sex and age category match exactly. Despite being constructed in a rather different way, these distributions are quite similar. For single persons the differences are quite small. Compared to the National Register, there are too many couples in the EPS, and too few 'other households'. This is probably due to brother or sisters of sample persons being regarded as partners in the construction of the EPS living situation variables.

Table A7.16: Construction of household situation variables in the EPS.

Informal care variables original			Option	Sample person is in age category:						
Name	Referring to: Sex	Age		65-69	70-74	75-79	80-84	85-89	90-94	95+
ic_avail_sa11	Men	0-24		-----	-----	-----	-----	-----	-----	-----
ic_avail_sa12	Men	25-44		Son	Son	Son	Son	Son	Son	Son
ic_avail_sa13	Men	45-64	A	Partner (2)	Son	Son	Son	Son	Son	Son
			B	Son						
ic_avail_sa14	Men	65-74	A	Partner (1)	Partner (1)	Partner (2)	Partner (3)	Son	Son	Son
			B	Other man	Other man	Other man	Other man			
ic_avail_sa15	Men	75-84	A	Partner (3)	Partner (2)	Partner (1)	Partner (1)	Partner (2)	Partner (2)	
			B	Other man	Other man	Other man	Other man	Other man	Other man	Son
ic_avail_sa16	Men	85+	A	Parent	Parent	Partner (3)	Partner (2)	Partner (1)	Partner (1)	Partner (1)
			B			Other man	Other man	Other man	Other man	Other man
ic_avail_sa21	Women	0-24		-----	-----	-----	-----	-----	-----	-----
ic_avail_sa22	Women	25-44		Daughter	Daughter	Daughter	Daughter	Daughter	Daughter	Daughter
ic_avail_sa23	Women	45-64	A	Partner (2)	Daughter	Daughter	Daughter	Daughter	Daughter	Daughter
			B	Daughter						
ic_avail_sa24	Women	65-74	A	Partner (1)	Partner (1)	Partner (2)	Partner (3)	Daughter	Daughter	Daughter
			B	Other woman	Other woman	Other woman	Other woman	Other woman	Other woman	
ic_avail_sa25	Women	75-84	A	Partner (3)	Partner (2)	Partner (1)	Partner (1)	Partner (2)	Partner (2)	Daughter
			B	Other woman	Other woman	Other woman	Other woman	Other woman	Other woman	
ic_avail_sa26	Women	85+	A	Parent	Parent	Partner (3)	Partner (2)	Partner (1)	Partner (1)	Partner (1)
			B			Other man	Other man	Other man	Other man	Other man

Note: Option B is chosen if household member has same sex as sample person, or if a partner has already been assig ned. Otherwise Option A is chosen.

Number in cells with "partner" refer to order in which the original informal care variables are evaluated when trying to iden tify a "partner", where preference is given to household members of which the age is close to t hat of the sample person.

Table A7.17: Distribution of household situation variables in the EPS by sex and age category.

%	Partner			Daughter			Son			Parent			Other woman			Other man		
	No	Unaiv.	Avail.	No	Unaiv.	Avail.	No	Unaiv.	Avail.	No	Unaiv.	Avail.	No	Unaiv.	Avail.	No	Unaiv.	Avail.
Man, 65-69	20.5	7.1	72.4	92.4	5.5	2.1	89.5	8.5	2.0	98.7	0.0	1.2	99.8	0.0	0.2	99.3	0.0	0.7
Man, 70-74	31.2	0.4	68.4	85.2	5.7	9.2	90.0	7.9	2.2	99.3	0.0	0.7	99.9	0.0	0.1	99.2	0.0	0.8
Man, 75-79	27.2	0.6	72.2	92.4	4.3	3.4	91.4	6.8	1.8	100.0	0.0	0.0	99.7	0.0	0.3	99.1	0.0	0.9
Man, 80-84	33.4	0.7	65.9	94.1	3.5	2.4	92.2	6.0	1.8	100.0	0.0	0.0	99.9	0.0	0.1	99.2	0.1	0.8
Man, 85-89	46.4	1.0	52.6	91.1	3.6	5.4	92.1	5.3	2.6	100.0	0.0	0.0	100.0	0.0	0.0	99.5	0.0	0.5
Man, 90-94	66.1	1.1	32.9	90.8	3.7	5.5	90.0	6.0	4.0	100.0	0.0	0.0	100.0	0.0	0.0	99.6	0.0	0.4
Man 95-99	86.8	0.4	12.8	85.6	3.0	11.4	90.1	3.8	6.1	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0
Man 100+	94.3	0.0	5.7	76.2	9.5	14.3	86.7	5.7	7.6	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0
Woman, 65-69	32.4	3.5	64.1	93.7	4.7	1.6	89.6	8.1	2.4	98.7	0.1	1.3	99.3	0.0	0.7	99.8	0.0	0.2
Woman, 70-74	43.7	0.5	55.8	94.0	4.0	2.0	88.5	8.4	3.1	99.0	0.0	1.0	99.0	0.1	0.9	99.9	0.0	0.1
Woman, 75-79	56.2	0.5	43.3	93.4	4.3	2.3	89.5	7.8	2.7	100.0	0.0	0.0	98.6	0.1	1.4	99.9	0.0	0.1
Woman, 80-84	71.4	0.4	28.3	92.6	4.2	3.3	90.1	7.0	3.0	100.0	0.0	0.0	98.5	0.1	1.5	100.0	0.0	0.1
Woman, 85-89	85.6	0.3	14.1	90.7	3.7	5.6	89.2	5.7	5.1	100.0	0.0	0.0	98.7	0.0	1.3	100.0	0.0	0.0
Woman, 90-94	95.1	0.1	4.7	89.0	3.2	7.8	88.9	4.4	6.7	100.0	0.0	0.0	98.3	0.1	1.6	100.0	0.0	0.0
Woman 95-99	98.5	0.1	1.5	87.1	2.3	10.7	88.4	3.4	8.2	100.0	0.0	0.0	99.3	0.0	0.7	100.0	0.0	0.0
Women 100+	99.5	0.0	0.5	85.3	1.4	13.3	87.9	2.7	9.5	100.0	0.0	0.0	99.8	0.0	0.2	100.0	0.0	0.0
All	44.4	1.7	53.9	91.9	4.4	3.6	89.8	7.4	2.7	99.5	0.0	0.5	99.2	0.0	0.7	99.6	0.0	0.4

Table A7.18: Comparison of distribution of older persons by household situation in EPS and according to the National Register.

	National Register		EPS		RATIO NR/EPS	
	Men	Women	Men	Women	Men	Women
	Living alone + Collective households		Single			
65-69	35 409	65 805	38 094	69 117	93%	95%
70-74	34 133	86 896	34 926	86 841	98%	100%
75-79	32 727	108 259	32 216	105 240	102%	103%
80-84	28 918	110 014	28 238	108 123	102%	102%
85+	21 276	96 160	20 147	96 845	106%	99%
All 65+	152 463	467 134	153 621	466 166	99%	100%
	Married couples		With partner			
65-69	140 653	136 706	148 540	145 718	95%	94%
70-74	132 877	118 724	128 854	126 768	103%	94%
75-79	100 690	80 219	105 775	91 018	95%	88%
80-84	58 180	38 917	62 659	46 962	93%	83%
85+	19 786	9 605	21 868	13 386	90%	72%
All 65+	452 186	384 171	467 696	423 852	97%	91%
	Others		Others			
65-69	54 415	54 838	43 842	42 514	124%	129%
70-74	40 702	49 312	43 932	41 324	93%	119%
75-79	27 818	42 982	23 244	35 202	120%	122%
80-84	16 745	33 355	12 946	27 201	129%	123%
85+	7 908	24 988	6 956	20 522	114%	122%
All 65+	147 588	205 475	130 920	166 762	113%	123%
	TOTAL					
65-69	230 477	257 349	230 477	257 349	100%	100%
70-74	207 712	254 932	207 712	254 932	100%	100%
75-79	161 235	231 460	161 235	231 460	100%	100%
80-84	103 843	182 286	103 843	182 286	100%	100%
85+	48 970	130 753	48 970	130 753	100%	100%
All 65+	752 237	1 056 780	752 237	1 056 780	100%	100%

Source for National Register: Poulain (2011); EPS figures extrapolated and adjusted to match population totals by sex and age

Appendix 7.7. : Results of binary and logistic regressions of transitions in LTC situations

Table A7.19: Logistic regression of transition to death.

	From "No care"			From "Home care"			From "Home residential care"			From "Hospital"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
Man	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Woman	**-0.98**	0.02	0.000	**-0.83**	0.04	0.00	**-0.55**	0.03	0.000	**-0.53**	0.06	0.000
Age 65-69	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Age 70-74	**0.20**	0.04	0.000	0.18	0.10	0.07	*0.28*	0.12	0.022	**0.43**	0.11	0.000
Age 75-79	**0.32**	0.04	0.000	*0.19*	0.10	0.05	**0.56**	0.11	0.000	**0.53**	0.12	0.000
Age 80-84	**0.34**	0.05	0.000	**0.34**	0.10	0.00	**0.63**	0.11	0.000	**0.78**	0.13	0.000
Age 85-89	**0.60**	0.06	0.000	**0.53**	0.10	0.00	**0.83**	0.11	0.000	**1.03**	0.14	0.000
Age 90-95	**0.87**	0.07	0.000	**0.82**	0.12	0.00	**1.07**	0.12	0.000	**1.20**	0.17	0.000
Age 95+	**1.21**	0.10	0.000	**1.32**	0.14	0.00	**1.39**	0.12	0.000	**1.75**	0.24	0.000
Disability risk (4th root)	**3.96**	0.12	0.000	-0.25	0.16	0.13	**-0.35**	0.11	0.002	0.04	0.25	0.876
Home care low				Ref. cat								
Home care high				**0.89**	0.04	0.00						
Res. care O							Ref. cat					
Res. care A							**0.56**	0.06	0.000			
Res. care B							**0.93**	0.06	0.000			
Res. care C							**1.51**	0.06	0.000			
Res. care CD							**1.71**	0.05	0.000			
No partner	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Partner unav.	**0.55**	0.08	0.000	*0.42*	0.16	0.01	0.10	0.25	0.678	*0.61*	0.25	0.015
Partner avail.	**-0.21**	0.02	0.000	**0.22**	0.04	0.00	*0.09*	0.04	0.033	0.01	0.06	0.881

Notes: coefficients in bold: significant at 0.1% level; coefficient in italic: significant at 5% level

Table A7.19: Logistic regression of transition to death (continued)

	From "No care"			From "Home care"			From "Home residential care"			From "Hospital"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
Antwerpen-Mechelen	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Turnhout	*-0.15*	0.07	0.032	*-0.31*	0.10	0.00	0.10	0.08	0.221	**-0.63**	0.18	0.001
Brussels	0.04	0.05	0.351	-0.17	0.10	0.10	0.04	0.05	0.495	**0.40**	0.10	0.000
Halle-Vilvoorde	**-0.27**	0.06	0.000	0.04	0.10	0.64	0.04	0.07	0.548	0.11	0.14	0.423
Leuven	**-0.24**	0.06	0.000	-0.06	0.09	0.55	0.08	0.07	0.255	0.15	0.14	0.279
Nivelles	*-0.16*	0.07	0.013	-0.04	0.13	0.74	0.10	0.08	0.187	0.19	0.17	0.270
West-Vlaanderen-Kust	**-0.31**	0.05	0.000	**-0.43**	0.09	0.00	*-0.13*	0.06	0.036	**-0.61**	0.14	0.000
West-Vlaanderen-Binnen	**-0.33**	0.06	0.000	**-0.50**	0.09	0.00	**-0.21**	0.06	0.001	-0.21	0.14	0.137
Gent-Aalst	0.04	0.05	0.437	-0.12	0.08	0.14	-0.06	0.06	0.286	0.06	0.12	0.610
Oost-Vlaanderen-rest	0.05	0.05	0.324	*-0.21*	0.09	0.02	-0.10	0.06	0.113	-0.14	0.13	0.294
Charleroi-Mons-Soignies	0.02	0.05	0.606	-0.05	0.08	0.54	0.00	0.06	0.934	0.07	0.12	0.569
Hainaut-autre	*-0.14*	0.06	0.024	-0.10	0.10	0.29	-0.09	0.07	0.170	-0.24	0.15	0.100
Liège	**0.22**	0.04	0.000	**0.27**	0.09	0.00	0.03	0.05	0.571	0.14	0.11	0.185
Limburg	**-0.28**	0.05	0.000	**-0.41**	0.08	0.00	0.04	0.07	0.582	-0.14	0.13	0.263
Luxembourg	0.06	0.08	0.450	0.08	0.16	0.61	0.03	0.09	0.743	0.27	0.19	0.156
Namur-Namur	**0.25**	0.07	0.000	*0.23*	0.12	0.05	-0.01	0.09	0.865	0.01	0.18	0.937
Namur-autre	*0.25*	0.08	0.003	*0.26*	0.13	0.04	*0.29*	0.12	0.012	0.28	0.24	0.245
Constant	**-6.74**	0.06	0.000	**-3.56**	0.12	0.00	**-4.10**	0.13	0.000	**-2.75**	0.14	0.000
Number of observations	1 648 344			131 088			123 702			19 191		
Pseudo R^2	0.0530			0.0529			0.0559			0.0318		

Notes: coefficients in bold: significant at 0.1% level; coefficient in italic: significant at 5% level

Table A7.20: Logistic regression of transition to hospital.

	From "No care"			From "Home care"			From "Home residential care"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
Man	Ref. cat			Ref. cat			Ref. cat		
Woman	**-0.28**	0.02	0.000	**-0.23**	0.04	0.00	**-0.23**	0.07	0.001
Age 65-69	Ref. cat			Ref. cat			Ref. cat		
Age 70-74	0.04	0.04	0.328	-0.06	0.10	0.52	-0.14	0.16	0.407
Age 75-79	*-0.09*	0.04	0.027	-0.17	0.09	0.08	-0.22	0.15	0.151
Age 80-84	**-0.24**	0.05	0.000	**-0.31**	0.10	0.00	**-0.53**	0.15	0.001
Age 85-89	**-0.24**	0.06	0.000	**-0.36**	0.11	0.00	**-0.69**	0.16	0.000
Age 90-95	**-0.42**	0.08	0.000	**-0.58**	0.12	0.00	**-0.94**	0.17	0.000
Age 95+	**-0.69**	0.15	0.000	**-0.90**	0.17	0.00	**-1.69**	0.24	0.000
Disability risk (4th root)	**4.38**	0.12	0.000	**1.25**	0.17	0.00	**0.67**	0.23	0.004
Home care low				Ref. cat					
Home care high				**0.23**	0.04	0.00			
Res. care O							Ref. cat		
Res. care A							0.23	0.09	0.014
Res. care B							0.18	0.09	0.043
Res. care C							**0.26**	0.10	0.010
Res. care CD							-0.20	0.09	0.038
No partner	Ref. cat			Ref. cat			Ref. cat		
Partner unav.	*-0.21*	0.11	0.045	0.10	0.18	0.57	0.17	0.51	0.740
Partner avail.	**-0.36**	0.02	0.000	**-0.15**	0.04	0.00	0.05	0.09	0.599

Table A7.20: Logistic regression of transition to hospital (continued)

	From "No care"			From "Home care"			From "Home residential care"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
Antwerpen-Mechelen	Ref. cat			Ref. cat			Ref. cat		
Turnhout	**-0.27**	0.07	0.000	**-0.36**	0.10	0.00	-0.26	0.23	0.271
Brussels	0.07	0.04	0.096	0.10	0.10	0.33	**0.48**	0.12	0.000
Halle-Vilvoorde	**-0.37**	0.05	0.000	*-0.26*	0.10	0.01	-0.01	0.18	0.940
Leuven	**-0.46**	0.06	0.000	**-0.38**	0.10	0.00	-0.28	0.21	0.193
Nivelles	**-0.47**	0.07	0.000	*-0.43*	0.15	0.00	0.10	0.19	0.617
West-Vlaanderen-Kust	**-0.27**	0.05	0.000	-0.11	0.08	0.17	*0.30*	0.15	0.041
West-Vlaanderen-Binnen	**-0.39**	0.06	0.000	*-0.24*	0.08	0.00	-0.13	0.17	0.451
Gent-Aalst	**-0.23**	0.05	0.000	*-0.21*	0.08	0.01	*0.27*	0.14	0.050
Oost-Vlaanderen-rest	-0.03	0.05	0.511	**-0.29**	0.09	0.00	0.19	0.14	0.170
Charleroi-Mons-Soignies	**-0.25**	0.05	0.000	**-0.42**	0.09	0.00	*0.33*	0.13	0.013
Hainaut-autre	**-0.19**	0.06	0.001	-0.18	0.10	0.06	0.27	0.15	0.070
Liège	0.04	0.04	0.368	-0.02	0.10	0.85	*0.28*	0.12	0.025
Limburg	**-0.69**	0.06	0.000	**-0.51**	0.08	0.00	*0.43*	0.15	0.005
Luxembourg	-0.11	0.08	0.148	-0.22	0.19	0.25	0.10	0.23	0.672
Namur-Namur	-0.03	0.07	0.633	**-0.62**	0.16	0.00	0.04	0.20	0.857
Namur-autre	*-0.27*	0.10	0.008	**-0.62**	0.18	0.00	-0.41	0.37	0.261
Constant	**-6.56**	0.05	0.000	**-3.69**	0.12	0.00	**-4.45**	0.20	0.000
Number of observations	1 566 818			121 266			111 196		
Pseudo R^2	0.0269			0.0068			0.0162		

Notes: coefficients in bold: significant at 0.1% level; coefficient in italic: significant at 5% level

Table A7.21: Logistic regression of transition to residential care.

	From "No care"			From "Home care light"			From "Home care intensive"			From "Hospital"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
Man	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Woman	**-0.23**	0.04	0.000	-0.06	0.06	0.31	-0.04	0.08	0.644	**-0.27**	0.05	0.000
Age 65-69	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Age 70-74	*0.34*	0.11	0.003	0.15	0.21	0.49	0.39	0.28	0.161	0.12	0.12	0.285
Age 75-79	**0.66**	0.11	0.000	0.38	0.19	0.05	*0.53*	0.26	0.046	*0.34*	0.11	0.002
Age 80-84	**0.99**	0.12	0.000	0.35	0.19	0.07	*0.56*	0.27	0.036	**0.40**	0.12	0.001
Age 85-89	**1.16**	0.12	0.000	*0.59*	0.20	0.00	0.43	0.28	0.119	**0.66**	0.13	0.000
Age 90-95	**1.32**	0.14	0.000	**0.69**	0.21	0.00	0.28	0.29	0.341	**0.87**	0.15	0.000
Age 95+	**1.30**	0.17	0.000	*0.69*	0.23	0.00	-0.06	0.32	0.859	*0.59*	0.23	0.010
Disability risk (4th root)	**6.54**	0.18	0.000	**3.06**	0.21	0.00	**2.89**	0.28	0.000	**3.72**	0.20	0.000
No partner	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Partner unav.	-0.57	0.29	0.051	-0.32	0.31	0.30	*0.73*	0.30	0.014	-0.47	0.28	0.090
Partner avail.	**-0.82**	0.05	0.000	**-0.24**	0.06	0.00	*-0.25*	0.08	0.004	**-1.01**	0.06	0.000
No daughter	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Daughter unav.	*-0.27*	0.10	0.009	-0.20	0.15	0.18	-0.08	0.17	0.641	*-0.32*	0.15	0.029
Daughter avail.	**-0.57**	0.11	0.000	-0.16	0.13	0.23	*-0.33*	0.15	0.023	**-0.81**	0.14	0.000

Notes: coefficients in bold: significant at 0.1% level; coefficient in italic: significant at 5% level

Table A7.21: Logistic regression of transition to residential care (continued)

	From "No care"			From "Home care light"			From "Home care intensive"			From "Hospital"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
No son	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Son unav.	*-0.25*	0.09	0.005	*-0.32*	0.11	0.01	-0.23	0.15	0.119	*-0.30*	0.12	0.012
Son avail.	**-0.42**	0.11	0.000	*-0.26*	0.13	0.05	*-0.42*	0.17	0.012	**-0.51**	0.16	0.001
Antwerpen-Mechelen	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Turnhout	-0.07	0.13	0.593	-0.19	0.12	0.10	0.05	0.19	0.777	-0.20	0.14	0.155
Brussels	**0.36**	0.07	0.000	0.16	0.12	0.17	-0.17	0.19	0.375	-0.02	0.09	0.819
Halle-Vilvoorde	-0.17	0.09	0.066	-0.22	0.12	0.07	-0.17	0.20	0.393	*-0.29*	0.12	0.019
Leuven	*-0.30*	0.11	0.004	**-0.41**	0.12	0.00	*-0.61*	0.22	0.004	*-0.35*	0.14	0.012
Nivelles	0.17	0.10	0.087	-0.06	0.15	0.69	-0.39	0.24	0.106	*-0.44*	0.16	0.007
West-Vlaanderen-Kust	**-0.53**	0.10	0.000	**-0.71**	0.11	0.00	*-0.33*	0.17	0.046	**-0.56**	0.11	0.000
West-Vlaanderen-Binnen	**-0.42**	0.11	0.000	**-0.63**	0.11	0.00	-0.29	0.17	0.094	*-0.27*	0.11	0.016
Gent-Aalst	0.16	0.09	0.063	*-0.23*	0.10	0.02	-0.16	0.17	0.333	0.04	0.10	0.690
Oost-Vlaanderen-rest	**0.40**	0.09	0.000	**-0.35**	0.11	0.00	-0.27	0.18	0.138	0.17	0.11	0.116
Charleroi-Mons-Soignies	-0.03	0.08	0.698	-0.12	0.10	0.21	**-0.73**	0.17	0.000	-0.17	0.10	0.089
Hainaut-autre	0.04	0.10	0.672	0.07	0.11	0.52	*-0.47*	0.19	0.012	-0.15	0.12	0.213
Liège	**0.84**	0.07	0.000	**0.52**	0.10	0.00	0.12	0.18	0.514	0.08	0.10	0.409
Limburg	**-0.90**	0.12	0.000	**-0.92**	0.11	0.00	**-0.89**	0.16	0.000	**-0.38**	0.11	0.001
Luxembourg	0.20	0.13	0.122	*0.49*	0.20	0.01	*-0.85*	0.38	0.026	-0.25	0.18	0.175
Namur-Namur	**0.44**	0.11	0.000	0.10	0.15	0.54	-0.28	0.26	0.279	0.03	0.17	0.842
Namur-autre	0.29	0.15	0.053	-0.06	0.18	0.73	*-1.36*	0.43	0.002	-0.40	0.25	0.110
Constant	**-9.83**	0.13	0.000	**-5.79**	0.22	0.00	**-5.08**	0.29	0.000	**-3.02**	0.13	0.000
Number of observations	1 557 641			92 820			25 281			12 342		
Pseudo R^2	0.1441			0.0442			0.0361			0.1398		

Table A7.22: Multinomial regression of level of residential care, given that persons enter residential care.

	To "Res. Care A"			To "Res. Care B"			To "Res. Care C"			To "Res. Care Cd"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
Man	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Woman	-0.03	0.09	0.727	-0.01	0.08	0.88	-0.05	0.09	0.576	**-0.40**	0.09	0.000
Age (continuous)	0.00	0.01	0.787	**-0.02**	0.01	0.01	0.01	0.01	0.201	**-0.03**	0.01	0.000
Disability risk (4th root)	**1.14**	0.35	0.001	**2.78**	0.32	0.00	**1.31**	0.38	0.001	**4.10**	0.34	0.000
Currently "No care"	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Currently "Home care low"	**1.05**	0.10	0.000	**1.01**	0.09	0.00	**1.18**	0.12	0.000	**0.84**	0.11	0.000
Currently "Home care high"	**1.31**	0.24	0.000	**2.20**	0.22	0.00	**3.37**	0.23	0.000	**2.88**	0.22	0.000
Currently "Hospital"	**0.66**	0.09	0.000	**0.87**	0.08	0.00	**1.80**	0.10	0.000	**1.36**	0.09	0.000
No partner	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Partner unav.	0.74	0.57	0.196	0.72	0.58	0.22	0.64	0.63	0.309	0.52	0.59	0.379
Partner avail.	-0.07	0.09	0.463	0.06	0.08	0.43	*0.28*	0.10	0.003	**0.51**	0.09	0.000

Notes: Coefficients relative to Base category: Residential care level O; coefficients in bold: significant at 0.1% level; coefficient in italic: significant at 5% level

Table A7.22: Multinomial regression of level of residential care, given that persons enter residential care (continued)

	To "Res. Care A"			To "Res. Care B"			To "Res. Care C"			To "Res. Care Cd"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
Antwerpen-Mechelen	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Turnhout	0.46	0.25	0.067	*0.64*	0.23	0.01	**0.99**	0.27	0.000	*0.68*	0.25	0.007
Brussels	-0.04	0.14	0.783	*-0.41*	0.13	0.00	0.13	0.17	0.426	-0.15	0.15	0.315
Halle-Vilvoorde	-0.06	0.18	0.730	*-0.46*	0.17	0.01	-0.19	0.22	0.374	-0.19	0.19	0.308
Leuven	-0.10	0.22	0.647	-0.05	0.19	0.81	*0.50*	0.23	0.031	*0.47*	0.20	0.020
Nivelles	0.05	0.21	0.819	-0.05	0.19	0.78	0.18	0.26	0.473	-0.13	0.23	0.572
West-Vlaanderen-Kust	*0.53*	0.20	0.007	*0.54*	0.18	0.00	**0.84**	0.22	0.000	**0.74**	0.20	0.000
West-Vlaanderen-Binnen	0.17	0.20	0.384	0.18	0.18	0.32	*0.55*	0.22	0.011	0.31	0.20	0.117
Gent-Aalst	*0.34*	0.17	0.043	*0.37*	0.15	0.02	*0.49*	0.19	0.011	**0.62**	0.17	0.000
Oost-Vlaanderen-rest	0.01	0.17	0.950	-0.14	0.15	0.34	*0.42*	0.19	0.025	-0.02	0.18	0.927
Charleroi-Mons-Soignies	*0.46*	0.16	0.003	0.01	0.15	0.96	**0.70**	0.18	0.000	0.24	0.16	0.152
Hainaut-autre	0.03	0.18	0.881	-0.30	0.17	0.08	0.29	0.21	0.165	0.02	0.18	0.901
Liège	0.15	0.14	0.276	0.13	0.13	0.30	**0.54**	0.16	0.001	*0.32*	0.14	0.026
Limburg	0.27	0.22	0.222	0.25	0.19	0.20	**0.95**	0.22	0.000	0.39	0.21	0.063
Luxembourg	*-0.54*	0.27	0.043	-0.37	0.23	0.10	-0.24	0.31	0.443	-0.30	0.27	0.259
Namur-Namur	0.30	0.25	0.230	*0.47*	0.22	0.04	*0.56*	0.28	0.046	*0.79*	0.25	0.002
Namur-autre	0.38	0.30	0.202	0.01	0.29	0.98	0.21	0.38	0.580	0.05	0.35	0.886
Constant	-0.96	0.54	0.074	-0.18	0.50	0.72	**-3.45**	0.62	0.000	-0.74	0.54	0.173
Number of observations	9 383											
Pseudo R^2	0.0557											

Notes: coefficients in bold: significant at 0.1% level; coefficient in italic: significant at 5% level

Table A7.23: Multinomial regression of level of residential care, given that persons were in residential care to start with.

Destination category	Variable	From "Res. Care O"			From "Res. Care A"			From "Res. Care B"			From "Res. Care C"			From "Res. Care Cd"		
		Coeff.nt	St. error	Sig.	Coeff.nt	St. error	Sig.	Coeff.nt	St. error	Sig.	Coeff.nt	St. error	Sig.	Coeff.nt	St. error	Sig.
O	Age	**Base outcome**			0.00	0.01	0.479	0.01	0.01	0.522	0.00	0.03	0.917	*-0.05*	0.02	0.029
	Disability risk (4th root)				-0.28	0.31	0.374	**-1.50**	0.44	0.001	-0.63	1.07	0.556	-1.15	1.08	0.285
	Constant				**-2.41**	0.47	0.000	**-3.60**	0.66	0.000	*-5.06*	1.93	0.009	-1.30	1.59	0.413
A	Age	0.00	0.01	0.730	**Base outcome**			0.00	0.01	0.862	-0.01	0.01	0.702	-0.02	0.02	0.356
	Disability risk (4th root)	**1.76**	0.26	0.000				-0.42	0.26	0.111	0.27	0.61	0.650	-0.18	0.72	0.797
	Constant	**-3.91**	0.41	0.000				**-2.86**	0.39	0.000	**-3.74**	0.92	0.000	**-4.07**	1.21	0.001
B	Age	0.00	0.01	0.807	0.01	0.00	0.088	**Base outcome**			0.00	0.01	0.673	*-0.02*	0.01	0.008
	Disability risk (4th root)	**2.82**	0.32	0.000	**1.39**	0.22	0.000				*0.86*	0.40	0.033	0.29	0.35	0.418
	Constant	**-5.21**	0.57	0.000	**-4.01**	0.36	0.000				**-3.50**	0.63	0.000	**-2.50**	0.57	0.000
C	Age	0.01	0.02	0.660	*0.03*	0.01	0.011	*0.02*	0.01	0.005	**Base outcome**			0.01	0.01	0.483
	Disability risk (4th root)	**2.76**	0.64	0.000	*1.27*	0.46	0.006	0.33	0.29	0.249				-0.42	0.44	0.340
	Constant	**-7.15**	1.17	0.000	**-6.90**	0.75	0.000	**-5.01**	0.46	0.000				**-4.68**	0.65	0.000
Cd	Age	0.00	0.02	0.965	*0.03*	0.01	0.004	*-0.01*	0.00	0.022	0.00	0.01	0.685	**Base outcome**		
	Disability risk (4th root)	**3.50**	0.71	0.000	*1.56*	0.51	0.002	**2.05**	0.20	0.000	**1.71**	0.30	0.000			
	Constant	**-7.36**	1.31	0.000	**-7.66**	0.81	0.000	**-3.17**	0.33	0.000	**-4.05**	0.51	0.000			
	Nbr of ob's	22 665			19 002			24 667			12 612			29 975		
	Pseudo R^2	0.0116			0.0063			0.0053			0.0050			0.002		

Notes: coefficients in bold: significant at 0.1% level; coefficient in italic: significant at 5% level

Table A7.24: Logistic regression of transitions to and within home care.

	From "No care" to "Home care"			"Home care high", rather than "Home care low", given "No care" currently			From "Home care low" to "Home care high "			From "Home care high" to "Home care low"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
Man	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Woman	**0.08**	0.02	0.000	**-0.30**	0.05	0.000	**-0.23**	0.05	0.000	0.02	0.07	0.831
Age 65-69												
Age 70-74	**0.32**	0.04	0.000	0.02	0.11	0.888	-0.04	0.13	0.757	0.18	0.16	0.262
Age 75-79	**0.45**	0.04	0.000	*-0.33*	0.11	0.003	*-0.36*	0.12	0.003	0.17	0.16	0.291
Age 80-84	**0.46**	0.05	0.000	**-0.59**	0.12	0.000	**-0.49**	0.12	0.000	*0.33*	0.16	0.043
Age 85-89	**0.55**	0.05	0.000	**-0.45**	0.13	0.001	**-0.49**	0.13	0.000	0.21	0.18	0.241
Age 90-95	**0.48**	0.06	0.000	*-0.35*	0.16	0.031	-0.24	0.14	0.091	0.03	0.20	0.890
Age 95+	0.17	0.10	0.105	0.30	0.24	0.225	-0.07	0.18	0.709	*-0.70*	0.28	0.014
Disability risk (4th root)	**5.65**	0.09	0.000	**2.26**	0.24	0.000	**3.05**	0.19	0.000	*-0.62*	0.28	0.025
No partner	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Partner unav.	-0.03	0.10	0.726	0.43	0.27	0.114	*0.59*	0.21	0.004	-0.16	0.33	0.626
Partner avail.	**-0.30**	0.02	0.000	**0.64**	0.05	0.000	**0.53**	0.05	0.000	**-0.42**	0.07	0.000
No daughter	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Daughter unav.	**-0.21**	0.05	0.000	*0.27*	0.12	0.032	**0.39**	0.10	0.000	*-0.38*	0.14	0.009
Daughter avail.	**-0.24**	0.05	0.000	**0.86**	0.12	0.000	**0.32**	0.10	0.001	*-0.42*	0.13	0.002
No son	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Son unav.	0.04	0.03	0.233	0.09	0.10	0.329	0.10	0.08	0.204	-0.15	0.11	0.155
Son avail.	0.06	0.05	0.257	**0.45**	0.12	0.000	*0.27*	0.10	0.005	**-0.51**	0.15	0.001

Table A7.24: Logistic regression of transitions to and within home care (continued)

	From "No care" to "Home care"			"Home care high", rather than "Home care low", given "No care" currently			From "Home care low" to "Home care high "			From "Home care high" to "Home care low"		
	Coeff.nt	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**	**Coeff.nt**	**St. error**	**Sig.**
Antwerpen-Mechelen	Ref. cat			Ref. cat			Ref. cat			Ref. cat		
Turnhout	**0.59**	0.05	0.000	0.02	0.16	0.876	0.17	0.12	0.160	-0.10	0.18	0.590
Brussels	**-0.33**	0.05	0.000	**0.89**	0.13	0.000	0.09	0.15	0.567	*-0.61*	0.19	0.002
Halle-Vilvoorde	**-0.20**	0.05	0.000	*0.39*	0.14	0.005	0.10	0.13	0.445	*-0.45*	0.20	0.026
Leuven	0.09	0.05	0.070	0.06	0.15	0.703	-0.17	0.13	0.176	-0.19	0.18	0.300
Nivelles	**-0.37**	0.06	0.000	**0.65**	0.17	0.000	0.13	0.17	0.451	0.17	0.20	0.406
West-Vlaanderen-Kust	**0.14**	0.04	0.001	0.08	0.13	0.556	0.13	0.10	0.224	0.01	0.14	0.972
West-Vlaanderen-Binnen	**0.38**	0.04	0.000	-0.04	0.14	0.751	0.04	0.11	0.744	0.00	0.15	0.979
Gent-Aalst	**0.54**	0.04	0.000	*0.30*	0.12	0.016	**0.34**	0.10	0.001	0.01	0.14	0.958
Oost-Vlaanderen-rest	**0.63**	0.04	0.000	0.13	0.14	0.341	0.16	0.11	0.156	*-0.33*	0.16	0.044
Charleroi-Mons-Soignies	*0.09*	0.04	0.024	**0.67**	0.12	0.000	*0.32*	0.11	0.003	**-0.61**	0.15	0.000
Hainaut-autre	**0.23**	0.05	0.000	0.20	0.14	0.172	*0.26*	0.13	0.038	**-0.78**	0.20	0.000
Liège	*-0.10*	0.04	0.020	**0.61**	0.13	0.000	*0.39*	0.13	0.002	-0.22	0.17	0.204
Limburg	**0.35**	0.04	0.000	**0.38**	0.12	0.001	*0.23*	0.10	0.018	*-0.32*	0.14	0.021
Luxembourg	**-0.26**	0.08	0.001	**0.77**	0.21	0.000	*0.49*	0.23	0.033	-0.55	0.33	0.093
Namur-Namur	**0.44**	0.06	0.000	**0.79**	0.16	0.000	0.20	0.17	0.250	-0.13	0.21	0.551
Namur-autre	**0.47**	0.07	0.000	**0.72**	0.20	0.000	*0.49*	0.18	0.006	-0.03	0.23	0.891
Constant	**-7.93**	0.05	0.000	**-3.23**	0.16	0.000	**-5.47**	0.16	0.000	**-2.26**	0.21	0.000
Number of observations	1 554 276			13 487			90 753			24 373		
Pseudo R^2	0.0887			0.0483			0.0273			0.0181		

Notes: coefficients in bold: significant at 0.1% level; coefficient in italic: significant at 5% level

Appendix 7.8.: Comparison of predicted probabilities from hierarchical logistic regressions with those from a multinomial regression

In order to test whether the results of the hierarchical logistic regressions deviated much from a multinomial logistic regression, a multinomial logistic regression, using the same independent variables as were used in the logistic regressions for the transition into residential care, was estimated for persons with origin state "No care". This origin state was chosen, because it has by far the largest number of observations, and also because from this state transitions occur to every other LTC situation distinguished in our model. Since neither the coefficients, nor the predicted average effects from the binary logistic regressions are directly comparable to those produced by the multinomial logistic regression, we compared the probabilities of transition into various LTC situations as predicted by the two kinds of regressions. Predicted probabilities are calculated by Stata directly from the results of the multinomial logistic regression. To make the predicted probabilities from the binary logistic regressions comparable to the former, we had to combine them in the following way:

pr(home_care_low) = (1-p_death) * (1-p_hosp) * (1-p_resid) * p_home * (1-p_home_high)

pr(home_care_low) = (1-p_death) * (1-p_hosp) * (1-p_resid) * p_home * p_home_high

pr(res_care_O) = (1-p_death) * (1-p_hosp) * (p_resid) * p_ res_care_O

pr(res_care_A) = (1-p_death) * (1-p_hosp) * (p_resid) * p_ res_care_A

pr(res_care_B) = (1-p_death) * (1-p_hosp) * (p_resid) * p_ res_care_B

pr(res_care_C) = (1-p_death) * (1-p_hosp) * (p_resid) * p_ res_care_C

pr(res_care_Cd) = (1-p_death) * (1-p_hosp) * (p_resid) * p_ res_care_Cd

where the expressions on the left-hand-side represent the unconditional predicted probabilities of making the transition to the LTC situation indicated in the next quarter, for any person in origin LTC situation "no care". The expressions on the right-hand-side are the (mostly) conditional probabilities that are derived from the binary logistic regressions, as follows:

p_death: predicted probability of death, as derived from logistic regression reported in Table A7.19

p_ hosp: predicted probability of death, conditional on no death, as derived from logistic regression reported in Table A7.20

p_ resid: predicted probability of moving to residential care, conditional on no death and not moving to hospital, as derived from logistic regression reported in Table A7.21

p_ home: predicted probability of moving to home care, conditional on no death, not moving to hospital and not moving into residential care, as derived from logistic regression reported in Table A7.24

p_ home_high: predicted probability of moving to home care high (rather than home care low), conditional on no death, not moving to hospital, not moving into residential care and moving into home care, as derived from logistic regression reported in Table A7.24

p_ res_care_O, p_ res_care_A, p_ res_care_B, p_ res_care_C, p_ res_care_D, p_ res_care_Cd: predicted probabilities of moving to home residential care level O, A, B, C and CD, conditional on no death, not moving to hospital, and moving into residential care, as derived from multinomial logistic regression reported in Table A7.22

Table A7.25 shows the results of this comparison. It is clear that the results are extremely close. Average predicted probabilities, as well as their dispersion, are the same. The correlations on the individual level are extremely close to 1.0 (implying that the predicted probabilities are in fact equal for all practical purposes), except for the residential care categories C and Cd (though also these are still equal to 0.97), probably because of the very low probabilities of entry into these categories from the state of "no care". The correlation of the predicted probabilities of moving into any form of residential care (between the two techniques) is 0.9986.

Table A7.25: Comparison of predicted probabilities for making a transition to various long-term care situations (origin state is "no care") as derived from hierarchical binary logistic models with those derived from a multinomial logistic model.

	Derived from binary logistic		Derived from multinomial logistic		Correlation*
	Mean	Std. dev.	Mean	Std. dev.	
Home care low	0.72%	0.90%	0.72%	0.90%	0.9994
Home care high	0.13%	0.22%	0.13%	0.22%	0.9957
Res. care O	0.06%	0.11%	0.06%	0.11%	0.9920
Res. care A	0.04%	0.10%	0.04%	0.09%	0.9912
Res. care B	0.06%	0.15%	0.06%	0.15%	0.9975
Res. care C	0.02%	0.04%	0.02%	0.04%	0.9686
Res. care Cd	0.03%	0.08%	0.03%	0.08%	0.9733

** correlation on the individual level between predicted probabilities derived from the binary logistic regressions, and from a multinomial logistic regression*

APPENDICES TO CHAPTER 8

Appendix 8.1.: Projection of living situations

Projections of living situation for Belgium have been made available to us by Michel Poulain. (2011),cf. Table A8.1 below. In those projections, living situation is a variable with four categories: living alone, living in married couple, living with others, and living in a collective household. This variable and the projections are based on information extracted from the National Register. In order to be able to use these projections of living situations in our model of residential care, we had to align the EPS living situation variables to the categories used by Poulain. For this purpose a living situation variable was constructed within the EPS database with three categories:

1. living alone, i.e. living in a household with no other household members
2. living in a couple, i.e. having a partner, but no other household members
3. living with others, i.e. all other situations.

Furthermore, in the projections made by Poulain 'living in a collective household' was collapsed with 'living alone'. Within the EPS data, we cannot distinguish between these two categories, as no household members are registered as living in the same household for sample persons in both living situations. Of course, we do know whether persons are in residential care, but not all persons registered as 'living in a collective household' are in residential care (some are in convents, prisons etc.), and, more importantly, a large proportion of older persons in residential care are not registered as 'living in a collective household'. For the purposes of our projections it was more useful to regard use of residential care as a variable separate from living situation, rather than as a category of the latter variable.

For the base year 2006 we could compare the distributions of the population by age category and sex across the three living situations derived from the EPS with those produced by Poulain. Despite being constructed in a rather different way, these distributions match fairly closely. Nevertheless, some adjustment of the projections by Poulain was necessary to align them to the EPS results for the base year 2006. More precisely, the absolute numbers provided by Poulain were converted into proportions by age-and-sex group; the difference between these proportions and those resulting from the EPS was subtracted from the first in all years. The projections are made only for 2006, 2011, 2016, 2021 and 2026. For other years, the proportions were calculated by linear interpolation.

Household situations involving household members other than partners ('daughters', 'sons', 'parents', 'other women' and/or 'other men') are regarded as subcategories of the main household category 'living with others'. For the projections we assumed that the proportional distribution of the population across these subcategories within the household category 'living with others', by age, sex and province, remained constant over the projection period.

Table 8A.1: Projection of living situations for Belgium, 2006-2026.

	Men					Women				
	2006	2011	2016	2021	2026	2006	2011	2016	2021	2026
Living alone										
65-69	31.933	35.021	49.460	56.358	66.986	61.452	61.855	80.409	86.434	96.362
70-74	30.548	31.946	34.527	47.820	53.991	80.268	74.388	72.816	92.210	97.016
75-79	28.444	30.417	31.813	34.462	47.480	96.342	90.475	84.339	82.228	103.570
80-84	23.520	25.076	27.051	28.311	30.739	89.602	90.985	89.496	86.451	86.721
85+	14.513	21.647	27.096	31.507	34.916	58.928	82.423	99.285	109.405	115.056
65+	128.958	144.108	169.947	198.457	234.113	386.592	400.126	426.345	456.727	498.726
Married couples										
65-69	140.653	138.912	175.926	177.603	187.763	136.706	132.570	168.573	172.656	184.350
70-74	132.877	130.231	130.425	167.242	171.933	118.724	117.418	115.915	149.894	156.352
75-79	100.690	107.228	107.361	110.173	143.822	80.219	87.294	88.600	89.933	119.441
80-84	58.180	66.551	73.835	77.024	82.398	38.917	44.960	50.083	51.998	54.082
85+	19.786	32.332	42.549	51.208	57.833	9.605	16.320	21.474	25.545	28.270
65+	452.186	475.254	530.096	583.250	643.749	384.171	398.562	444.645	490.025	542.494
Others										
65-69	54.415	53.026	68.169	73.289	82.333	54.838	51.735	64.515	68.759	76.681
70-74	40.702	39.510	39.731	51.735	56.457	49.312	45.096	43.304	54.113	57.742
75-79	27.818	29.278	29.232	30.184	39.669	42.982	41.438	38.513	37.460	46.827
80-84	16.745	18.550	20.139	20.787	22.140	33.355	33.898	33.211	31.535	31.230
85+	7.908	11.170	13.519	15.257	16.407	24.988	30.153	32.988	33.469	32.571
65+	147.588	151.533	170.790	191.251	217.005	205.475	202.322	212.531	225.336	245.051

	Men					Women				
	2006	2011	2016	2021	2026	2006	2011	2016	2021	2026
Collective households										
65-69	1.613	1.559	1.877	1.913	1.991	2.135	1.849	2.088	2.054	2.073
70-74	2.646	2.684	2.654	3.135	3.205	4.403	3.968	3.635	4.074	4.025
75-79	3.740	3.818	3.838	3.883	4.615	11.465	10.276	9.326	8.683	9.434
80-84	6.004	6.005	6.069	6.019	6.086	22.228	20.873	19.343	17.896	16.984
85+	7.966	10.519	12.118	13.159	13.796	43.341	52.112	56.778	57.718	56.751
65+	21.969	24.586	26.556	28.111	29.694	83.572	89.078	91.171	90.425	89.267
Totals										
65-69	230.477	230.318	297.600	311.372	341.373	257.349	249.930	317.754	332.037	361.619
70-74	207.712	205.324	208.278	271.045	286.724	254.932	242.875	237.508	302.349	317.169
75-79	161.235	171.296	172.802	179.266	236.257	231.460	229.889	221.146	218.645	279.644
80-84	103.843	115.576	126.481	131.534	140.748	182.286	189.011	190.553	186.418	187.630
85+	48.970	74.079	93.452	109.144	120.869	130.753	173.663	202.523	218.002	224.648
65+	752.237	796.593	898.613	1.002.361	1.125.971	1.056.780	1.085.368	1.169.484	1.257.451	1.370.710

Appendix 8.8: Comparison with results from project 'FELICIE'

Projection on the number of persons in residential care in Belgium were also made within the FELICIE project (Gaymu, Ekamper and Beets, 2007, 2008; Gaymu et al. 2008; cf. Chapter 2). In Table 8A.2, a comparison is made between the projections presented in this report, and the FELICIE projections, for the years which figure in both projections. The results are presented in terms of index numbers, only for those aged 75 or more, and separately for men and women, since the FELICIE projections have been published in that way.

It is clear that FELICIE also projects a rising trend in the number of users of residential care, but one that is considerably below the one implied by our basis scenario. The projected trends the period under consideration for the prevalence rate of residential care among men aged 75+ are quite similar (Table 8A.3). For women aged 75+, FELICIE projects a fairly flat trend between 2010 and 2025 (after a substantial drop between 2000 and 2005), while our projections imply an (not monotonously) increasing trend. Note that for 2010 the FELICIE prevalence rate for women is considerably below the projected by us (while the latter is quite close to the observed one for 2008).

It is not completely clear why these differences occur. Both projections take account of sex, age, disability and living situation (although in rather different ways). The scenarios are defined in a rather similar way, with one important exception: the FELICIE results incorporate the effect of the decreasing proportion of older women who do not have a surviving child, which dampens the demand for residential care. On the other hand, within FELICIE disability rates were estimated in a rather roundabout way. They are based on the answers to a single question in the ECHP (European Community Household Panel) from married persons only, taking account of the institutionalized populations recorded in the census, and extrapolated to widowed, single and divorced persons using odds-ratios estimated on national health surveys (Gaymu, Ekamper and Beets, 2007). The ECHP question asked whether persons were hampered in their daily activities by any health problem, giving ample room for interpretation to respondents. In the Health Interview Survey data that we used, by contrast, the measure of disability was based on six specific questions about limitations in ADL (cf. Chapter 6). Moreover, the population projections used by FELICIE imply a smaller rise in the number of older persons than the more recent ones used in the current projections. In the FELICIE projections, the number of men aged 75+ increases by 93% and the number of women aged 75+ by 54% between 2001 and 2031 (Kalogirou and Murphy, 2006). The corresponding figures for the FPB-ADSEI projections used here are 216% and 57%. Also, in the FELICIE projections only two age groups are distinguished: 75-84 and 85+. However, as can be seen in Table 8.1, there are important differences within the group of women aged 85+ between those aged 85-89 and those aged 90+, both in terms of the prevalence of residential care and the increase in numbers over the projection period.

Table 8A.2: Comparison of projections with those by project 'FELICIE' (index numbers, 2010 = 100).

	Felicie, "constant" scenario		Current project, base scenario				
	Women 75+	**Men 75+**	**Women 75+**	**Men 75+**	**Women 65-74**	**Men 65-74**	**Total**
2010	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2015	103.7	109.0	113.3	117.7	104.7	113.2	113.6
2020	104.5	116.8	120.9	131.6	124.2	141.1	123.6
2025	109.6	136.3	127.2	149.1	133.6	158.8	132.3

Source for FELICIE results: Tables 2A & 2C on CD-ROM enclosed with Gaymu et al. (2008)

Table 8A.3: Comparison of projections with those by project 'FELICIE' (prevalence).

	Felicie, constant scenario		This report, base scenario	
	Women 75+	**Men 75+**	**Women 75+**	**Men 75+**
2010	11.9	5.1	16.0	5.7
2015	12.0	5.3	17.4	6.1
2020	12.1		18.5	6.5
2025	11.5	5.5	17.6	6.2

Source for FELICIE results: Tables 2B & 2D on CD-ROM enclosed with Gaymu et al. (2008)

Appendix 8.3 : Evolution of prevalence of chronic conditions in “better education” scenario

Table 8A.4: Evolution of prevalences of chronic diseases in "Better education" scenario, 2006-2026.

	COPD	dementia	diabetes	hip fracture	Parkinson
2006	8.7%	5.3%	12.3%	1.1%	2.0%
2007	8.8%	5.4%	12.3%	1.1%	2.1%
2008	8.6%	5.3%	11.9%	1.0%	1.9%
2009	8.6%	5.3%	11.9%	1.0%	1.9%
2010	8.6%	5.3%	11.9%	1.1%	1.9%
2011	8.6%	5.4%	11.8%	1.1%	2.0%
2012	8.6%	5.4%	11.8%	1.1%	1.9%
2013	8.4%	5.2%	11.4%	1.0%	1.8%
2014	8.4%	5.2%	11.4%	1.0%	1.8%
2015	8.4%	5.2%	11.4%	1.0%	1.8%
2016	8.4%	5.2%	11.4%	1.0%	1.8%
2017	8.4%	5.2%	11.4%	1.0%	1.8%
2018	8.3%	5.1%	11.1%	0.9%	1.6%
2019	8.3%	5.1%	11.1%	0.9%	1.6%
2020	8.3%	5.1%	11.1%	0.9%	1.6%
2021	8.3%	5.0%	11.1%	0.9%	1.6%
2022	8.3%	5.0%	11.1%	0.9%	1.6%
2023	8.2%	4.9%	10.8%	0.8%	1.5%
2024	8.2%	4.9%	10.8%	0.8%	1.5%
2025	8.2%	4.9%	10.8%	0.8%	1.5%

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