

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

SYNTHESIS



KCE REPORTS 167C
HEALTH SERVICES RESEARCH



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KAREL VAN DEN BOSCH, PETER WILLEMÉ, JOANNA GEERTS, JEF BREDÁ, STEPHANIE PEETERS, STEFAAN VAN DE SANDE, FRANCE VRIJENS,
CARINE VAN DE VOORDE, SABINE STORDEUR



■ SYNTHESIS

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1. INTRODUCTION

Demographic ageing of the population in the coming decades is expected to have significant implications on the future needs and use of long-term care (LTC) in most, if not all, industrialised nations. Belgium is no exception to this demographic trend: according to the latest demographic projections made by The Belgian federal Planning Bureau (2011), the share of older persons in the total population (aged 65 or older) is expected to rise from around 17% in 2010 to 21% in 2025 and almost 26% in 2050. The share of the oldest old (aged 85 and older) is likely to grow even more dramatically, from 2.2% in 2010 to almost 3% in 2025 and 5.8% in 2050. Unless radical shifts occur in the prevalence of age-related disability, these demographic trends will translate in growing numbers of older people in need of help with their activities of daily living, either at home or in residential care facilities.

Against this backdrop of an ageing population, and given the division of responsibilities between the federal and the regional political authorities, three protocol agreements (1997, 2003 and 2005) have been concluded between the federal government and the regional authorities, formulating common objectives for LTC for older persons and imposing a moratorium on the number of beds. The agreements aimed at progressively replacing lower-care beds in homes for the elderly (MRPA/ROB) by higher-care nursing home beds (MRS/RVT), leading to a higher financing of heavily care-dependent residents, but within the margins set by the moratorium. The third protocol agreement (2005) covered a 6-year period. It defined a common policy framework based on the following principles: supporting older persons to live at home independently for as long as possible; supporting informal caregivers; guaranteeing access to affordable formal care services; improving coordination and integration of care. The moratorium was set to expire on 1st October 2011.

The current study was commissioned by the Federal Public Service for Health, Food Chain Safety and Environment, in order to obtain a scientifically based estimate of the future number of older persons likely to use residential care. This estimate will help policymakers negotiating a new protocol agreement and setting new limits on the number of residential care beds for the period 2011-2025.

2. LONG-TERM CARE IN BELGIUM: ORGANISATION AND FINANCING

The overall goal of Long-Term Care (LTC) policy in Belgium is to provide universal access to affordable and high-quality care services. As in most European countries, the LTC system in Belgium aims at allowing older care dependent persons to keep on living in their own homes for as long as possible. The public LTC system consists of a wide range of benefits in cash and in kind, organized at the federal, regional and municipal levels, and is related to health and social service provision. Cities and municipalities also intervene in financing the construction of the residential structures for old people. The bulk of LTC services are provided as part of the federal public compulsory health insurance system, which is mainly financed by social security contributions and general taxes. Since public health insurance practically covers the whole population, LTC coverage is also nearly universal. However, since LTC services provided through the health insurance system only cover nursing care (as well as paramedical and rehabilitation care) and part of personal care to dependent persons, a whole range of services is organized and provided at the regional and local level. The regional governments have issued decrees that regulate a wide range of issues related to LTC services: certification of facilities such as nursing homes and day care centres, integration and coordination of services at the local level, quality monitoring systems and so on. While public health insurance generally covers all age categories, many LTC services in Belgium are specifically targeted at the older dependent population. Separate regulations exist regarding special provisions and benefits for disabled persons younger than 65 years.

The Belgian LTC system can be characterized as a mixed system with extensive publicly financed formal care services which complement significant informal care provided mainly within the family.

In residential facilities, public health insurance funding of care is based on a case-mix system, the level of funding varying according to the care dependency profile of the residents and the numbers of qualified staff. In other words, facilities handling severe cases receive more financing. Board and lodging costs are not covered by public health insurance. Public health

insurance funding of home nursing is based on a mixed system of fee-for-service payment (for technical nursing interventions), and lump sum payment (for nursing interventions for patients with activities of daily living limitations).

There are two major cash benefits targeted at alleviating the financial burden of non-medical expenses incurred by LTC recipients: 1) At the federal level, the Allowance for Assistance to Elderly Persons (Tegemoetkoming voor hulp aan bejaarden / Allocation pour l'aide aux personnes âgées), financed by general taxes, is a monthly allowance allocated to persons aged 65 years or older suffering from limitations in activities of daily living; 2) At the regional level, Flanders has set up a separate LTC insurance scheme, providing a lump-sum monthly allowance to care dependent persons, regardless of age, the beneficiary's income and degree of care dependency. Eligibility is limited to the Flemish territory, with residents of the Brussels Capital Region being allowed to opt in. This insurance is financed by a combination of general taxes and a specific contribution paid by every adult resident into a designated fund.

Furthermore, specific monthly or annual allowances are paid by the federal health insurance to cover non-medical expenses of chronically ill persons: annual allowance for the use of incontinence material, annual care allowance, palliative care allowance, allowance for persons in a vegetative or minimally responsive state.

The communities and regions finance other services such as family aid and delivery of meals and so on.

Total LTC expenditures were approximately €5.7 billion in 2006 (1.8% of GDP), of which almost 98% was financed by a combination of social security contributions (59%) and taxes (39%). Very broadly speaking, the part of LTC covered by the universal health insurance system (residential care and home nursing) is mainly financed with (non-earmarked) social security contributions paid by workers, employers and retirees (€3.3 billion), and to a lesser extent by taxes (€1.5 billion), while home care organized at the regional level is to a large extent financed by taxes (€728 million), and to a lesser extent by out-of-pocket expenditures (€99 million) and specific contributions (approximately €54 million contributed to the Flemish Care Insurance scheme and allocated to home care).

3. LONG TERM CARE MAIN SERVICES

The long-term care system includes the following main services: home nursing, family care, centres for day care and short-stay centres, homes for the elderly and nursing homes.

The LTC system is devoted to older people suffering from limitations in accomplishing basic or instrumental Activities of Daily Living (ADL), with or without cognitive impairment (disorientation in time or space). ADL refer to daily self-care activities including personal hygiene, dressing and undressing, eating, functional transfers (getting from bed to wheelchair, using the toilet, etc.). Instrumental activities of daily living (IADLs) allow an individual to live independently in a community and include activities such as housework, taking medications as prescribed, managing money, shopping for groceries or clothing,...

Home nursing care is available for persons with low to severe ADL limitations and/or cognitive, irrespective of their age. Care provided by home nurses includes technical nursing interventions and basic nursing care. The latter partly overlaps with care provided by family care services, which are subsidized by the regional governments.

Day care centres and short stay centres provide nursing and personal care services for older persons with moderate to severe ADL or cognitive limitations who still live at home but (temporarily) lack adequate informal care or whose caregivers need respite time. In day care centres, older persons are taken care of during one or more weekdays, but they spend the night at home. Short-stay centres provide residential services to older persons for a limited time period to temporarily alleviate the burden of informal caregivers. Additionally, no or low-care older people can stay in 'service flats' and similar accommodation which combine individual living arrangements with collective facilities (meals, home help, ...).

If limitations in ADL become too severe and adequate support at home (both informal and professional) is unavailable or insufficient, the dependent person should have access to suitable and affordable residential care facilities. In the residential sector, homes for the elderly [Woonzorgcentra, previously called Rustoorden, in Dutch, Maisons de repos pour personnes âgées (MRPA) in French, and Altenwohnheime in



German] provide nursing and personal care as well as living facilities for dependent older people. The medical responsibility rests with a general practitioner.

Older persons who are strongly dependent on care but who do not need permanent hospital treatment are admitted to nursing homes [Rust-en verzorgingstehuis (RVT) in Dutch, Maison de repos et de soins (MRS) in French, and Pfl egewohnheime in German]. Each RVT/MRS must always have a functional link with a hospital and additionally must have a coordinating and advisory physician who coordinates the continuity of care with general practitioners, the medical record of each resident, the medical activities related to dangerous illnesses for the residents and the personnel, the use of a pharmaceutical formulary and teaching activities for the personnel (hygiene, palliative care,...). Nursing homes must cooperate with the geriatric service of the hospital and a specialised service of palliative care.

In residential care, the cost of stay is paid by the occupant while medical costs and the cost of care are taken by the compulsory health insurance scheme (based on an objectively assessed degree of care needed).

Residential care services are provided by local Public Centres for Social Welfare (abbreviated as OCMW in Dutch and CPAS in French), umbrella organizations of municipalities (Intercommunale) and by both non-profit and for-profit private organizations.

The diversification of LTC services is being accompanied by several initiatives to improve the collaboration between care providers in different settings (residential, semi-residential, at home) and to provide patient-oriented integrated services. At the federal level, 'Integrated Home Care Services' (Geïntegreerde Diensten voor Thuisverzorging, or GDTs/Services Intégrés de Soins à Domicile, or SISDs) coordinate the provision of care in rather broadly defined geographical areas. These services organise and facilitate multidisciplinary co-operation between primary care providers, mainly GP's, nurses and paramedical professionals. In Flanders, home care is further coordinated by 'Primary Care Cooperation Initiatives' (Samenwerkingsinitiatieven Eerstelijnszorg, or SELs). In Wallonia, 'Coordination Centres for Home Care Services' (Centres de Coordination de Soins et Services à Domicile, or CSSDs) operate. In Brussels, a further home care cooperation initiative has been taken by the French Community Commission (COCOF).

4. MANAGEMENT AND RESPONSIBILITIES

4.1. Distribution of responsibilities

The organisation of long-term care services is divided between the federal, regional and local levels according to the division of responsibilities in Belgian constitutional law. The main actors are the federal parliament (issuing the main laws governing the system), the ministries of Health and Social Affairs, the National Institute for Health and Disability Insurance (NIHDI, RIZIV/INAMI) and the sickness funds. The federal Ministries of Health and Social Affairs are, together with the NIHDI, responsible for the overall LTC budget (essentially residential care and home nursing care, which are part of the public health insurance system), overall capacity planning (mainly number of beds in nursing homes), fees and levels of public intervention (via negotiations with the providers' organisations). A part of the budget corresponding with the maximum number of beds set at the federal level is allocated to the regions, which can decide on the allocation over services in different semi-residential and residential settings or to supporting home care. Home care services are regulated at the regional level and organized locally.

4.2. Protocol agreements

Responsibilities for the planning and accreditation of residential care facilities (homes for the elderly and nursing homes) are divided between the different political levels, with the regional authorities having most of the competence.

This division of responsibilities creates its own coordination problems, which are being addressed in inter-ministerial conferences. Since 1997, three protocol agreements (1997, 2003 and 2005) have been concluded between the federal government and the regional authorities, formulating common objectives for LTC for older persons and imposing a moratorium on the number of beds.

The agreements aimed at progressively replacing lower care beds in homes for the elderly by higher care nursing home beds. In this way, policymakers aimed at guaranteeing a better financing of care-dependent residents, but within the margins set by the moratorium. The agreements

allowed each authority to decide autonomously on the implementation of the common objectives, taking local demographic needs into account.

The main objective of the first protocol agreement (1997) was to allow older people to stay in their own homes for as long as possible, but to guarantee at the same time access to residential care if needed. Other priorities of the protocol were to harmonize federal and regional programming and accreditation policies; to foster information exchange between federal and regional authorities; to limit supply of new beds in homes for the elderly. The first protocol agreement covered a 5-year period. It was planned to convert each year 5 000 beds in homes for the elderly into nursing home beds. In this way, policy makers aimed at guaranteeing a better quality of care since nursing home beds receive more funding than beds in homes for the elderly. At the same time however, and to keep expenses under control, a moratorium was imposed limiting the expansion of the number of beds in residential structures.

The second protocol agreement (2003) emphasized the principle of regional autonomy in implementing the commonly agreed goals and in adapting actions to local needs. At the end of the period covered by the second protocol, on 31 December 2005, total capacity in homes for the elderly and nursing homes could not exceed 81 264 and 47 587 beds respectively.

The third protocol agreement (2005) covered a 6-year period. It defined a common policy framework based on the following principles: supporting older persons to live at home independently for as long as possible; supporting informal caregivers; guaranteeing access to affordable formal care services; improving coordination and integration of care. It was decided to convert 28 000 beds in homes for the elderly and to spend at least 20% of the resources made available for this conversion on alternative forms of care and support, such as crisis care services, night care services, services supporting intergenerational housing arrangements or care pathway initiatives. The moratorium was set to expire on 1 October 2011 and the new propositions have to be formulated for the future.

According to the moratorium, the total number of beds in nursing homes and homes for the elderly (including beds for persons in a vegetative or minimally responsive state and short stay beds) could not exceed 140 049 (communication SPF Public Health).

On 1 January 2011, the total number of beds in residential settings equalled 129 732 (homes for the elderly, nursing homes and coma beds), 131 489 (adding short stays) or 133 370 (adding day care places) according to types of beds/places included.

4.3. Regional differences in programming criteria for homes for the elderly and nursing homes

The Flemish government regulates the residential care for older persons based on the Decree on Residential and Home Care ("Woonzorgdecreet") of 13 March 2009 (M.B./B.S. 14/05/2009). It aspires to bring about an integrated regulation of all care services for older persons and home care services. Within its programming, Flanders differentiates according to age. The maximum number of living facilities in residential care facilities amounts to:

- 1 living facility per 100 seniors between 65 and 74 years old;
- 4 living facilities per 100 seniors between 75 and 79 years old;
- 12 living facilities per 100 seniors between 80 and 84 years old;
- 23 living facilities per 100 seniors between 85 and 89 years old;
- 32 living facilities per 100 seniors aged 90 years and older.

The resulting number of living facilities is multiplied by 1.047 to adjust for the fact that the Decree increases the minimum age for persons to enter into residential care from 60 to 65 years. The programming numbers are calculated regionally up to the municipal level.

With the Decree of 30 April 2009 concerning the housing and accommodation of the elderly (M.B./B.S. 16/07/2009), the Walloon government aims to bring about an integrated programming and regulation of a diversified supply of facilities for older persons. The programming only concerns homes for the elderly, nursing homes, short-stay and day-care centres. The Decree emphasizes a more homogeneous regional distribution of services and free choice between the public, profit and non-profit sector. The maximum capacity of beds in homes for the elderly is fixed at 47 546, including beds in homes for the elderly converted to nursing home beds. The programming per district takes into account the population aged 75 years and older. The number of beds in an institution must lie between 50 and 150 beds, including short-stay beds and nursing



home beds. At least 29% of the beds are reserved for the public sector, at least 21% for the non-profit sector and at the most 50% for the profit sector.

In the Brussels Capital Region, the programming for each category of residential care facilities for older persons is determined by the French Community Commission (Commission Communautaire française, COCOF). The programming takes into account the needs of the older persons and their state of health, the demographic evolution, the rules concerning the programming of certain categories of residential institutions and the geographical distribution of the existing institutions and services. The Flemish government also programs residential care facilities in the bilingual Brussels Capital Region. The Joint Community Commission (Commission Communautaire Commune, COCOM/GGC) determines the programming of the facilities for the elderly in the bilingual region. The programming criteria are arithmetic rules or formulas to measure the needs, taking into account, among other things, demographic figures, age structure, socioeconomic indicators, morbidity and the fair distribution of services.

With regard to the programming of care facilities, the regions apply similar criteria, such as age and geographical spread. A significant difference lies in the fact that, for the Walloon government, the legal status of the operator is taken into account in the programming distribution: at least 29% of the beds are reserved for the public sector, at least 21% for the non-profit sector and at the most 50% for the profit sector.

Not many eligibility criteria are set by legislation. Residential care facilities for older persons are aimed at seniors aged 60 and over in Wallonia. Age of access has been raised from 60 to 65 in Flanders, in line with increased life expectancy and increased healthy life expectancy of older persons. Otherwise, no standard admission criteria have been established for the facilities to apply.

In 2010, the number of beds in homes for the elderly per 100 inhabitants of 65 years and older / 75 years and older was considerably higher in Wallonia and Brussels than in Flanders; the nursing home cover ratio does not diverge much between the regions. Overall, the number of beds in residential facilities in relation to the elderly population is much higher in Wallonia and Brussels than in Flanders.

5. TRENDS IN LONG TERM CARE SUPPLY AND USE

Successive agreements between the federal and regional governments have aimed at progressively replacing lower care beds in homes for the elderly by higher care nursing home beds. A limited number of nursing home beds have been converted into so-called 'coma' beds, devoted to persons in a vegetative or minimally responsive state. Consequently, the number of beds in homes for the elderly has decreased steadily in the last decade, from around 88 000 in 2000 to 64 000 in 2011, while the number of beds in nursing homes almost doubled, from around 33 000 to 65 000 over the same period (Table 1). Relative to the older population, availability of beds in nursing homes is practically equal in the three regions.

This shift was parallel to an increase in the total number of residents eligible for coverage by the public health insurance scheme^a (from 115 965 in 2000 to 126 720 in 2010), and an increase in the fraction of residents with moderate or high functional limitations (levels of care dependency B, C and Cd), from 60% in 2000 to 65% in 2010.

The availability of places in semi-residential care facilities such as day care centres and short-stay centres has increased substantially over the same period (Table 1), but is still rather limited. Neither the number of short-stay beds nor the number of places in day care centres exceed 1.5 per 1 000 people aged 65 and over or 2.5 per 1 000 people aged 75 and over.

As for home care, the number of 60+ users of home nursing has gone up from 107 985 in 2000 to 157 280 in 2011. A needy older person has a higher probability of using ambulatory care or residing in a service flat in Flanders than in Wallonia or Brussels, but a lower probability of entering a bed in a home for the elderly. There are no divergent probabilities in the use of nursing home beds. Clearly different regional authorities conduct their own regional policies.

^a Persons living in Belgium, but being insured under a foreign social security regime as well as persons covered by the Belgian health insurance scheme, but residing outside Belgium are not included in these statistics.

Table 1. Evolution of the number of available beds/places in facilities for older persons, 2000-2011.

Years	Nursing Homes	Homes for the elderly	Coma beds	Short stay	Day Care places
2000	33 103	87 940	0	241	713
2011	65 325	64 255	152	1 757	1 881

Over the past decade, a more diversified range of care services has become available, better tailored to the needs of care dependent older persons. The shift to providing care at home rather than in residential care facilities is striking: during the past decade the number of home nursing care users has grown by more than 40% and the number of users of family care has grown by more than 20%, while the increase in residential care users amounts to less than 10% only. However, service flats are much more developed in Flanders than in Wallonia. Wallonia has only achieved 10% of the number of service flats available in Flanders.

6. OBJECTIVES OF THE STUDY

The aim of this study is to develop a projection model that takes into account variables related to population structure in terms of sex and age, familial composition and the availability of informal carers, trends in population health status (including cognitive and physical health) and use of residential structures (proportion of the older population, age at admission, transitions in LTC situations between different levels of care,...). The model will be used in order to calculate the number of beds in residential structures (MRPA/ROB, MRS/RVT) needed for older people over the next 15 years (2011-2025) in Belgium.

In order to reach this objective, the following research questions have to be answered:

- What are the driving factors of the use of formal long-term care in residential structures and at home?
- Which models currently exist to forecast older persons' care needs? Which additional variables, for which data are currently available in Belgium, would be useful to add in current forecasting models for older

persons' needs? Where and how can these additional variables be obtained?

- Which forecasting of residential structures for older persons' needs can be done on the basis of a dynamic forecasting model that includes these additional variables?
- Which hypotheses have to be formulated to underlie a dynamic forecasting model (e.g. use of alternative forms of care for old people, evolution of the population structure)?

7. ELABORATION OF A LONG-TERM CARE PROJECTION MODEL

7.1. Literature review: The determinants of long-term care use by older persons

Studies of the determinants of long-term care use were reviewed to answer the following question: What are the driving factors of the use of formal long-term care in residential structures (nursing homes in the literature) and at home?

First, it is important to note that there is a fairly large number of high-quality studies on the entry into nursing homes, but much less attention for exit from, or length of stay in such homes. Second, there is relatively little attention for the social, economic and policy context in which older persons live and seek care, and which may well influence the impact of predictors on formal care. Third, a longitudinal study design is the only valid way to examine risk factors for institutionalisation. Fourth, the frequently used Andersen model distinguishes between predisposing, enabling and need variables as predictors. Fifth, among persons with dementia, predictors may have attenuated effects on nursing home admission, compared to the dementia-free population, because dementia is often in itself a sufficient reason for institutionalisation.

7.1.1. Predisposing variables

Among the predisposing variables, the impact of age and home-ownership on the chances of institutionalisation appear well-established. Entry rates into nursing homes increase strongly with age, even when controlling for health, functional impairments and living situation. Home-owners are much



less likely to enter an institution than others. Regarding other predisposing variables, including sex, education, income, net worth, other possessions and level of urbanisation, results are either inconsistent across studies, or based on too few studies to draw definite conclusions.

7.1.2. *Need variables*

Functional impairment resulting in limitations in Activities of Daily Living (ADL) is a very important predictor of institutionalisation whereas the evidence is less clear-cut regarding Instrumental Activities of Daily Living (IADL) limitations. Persons who are cognitively impaired have a higher probability to enter a nursing home. The impact of the more specific condition of dementia is particularly strong. The evidence for subjective health is more mixed. Due to limitations in studies, it is difficult to conclude unambiguously which chronic conditions are most strongly associated with institutionalisation. While dementia is the only chronic condition universally acknowledged as a very important predictor of institutionalisation, other potential predictors include stroke, diabetes, hip fracture, Parkinson's disease, depression and other mental problems. The same chronic conditions plus arthritis are also identified in the literature as potential predictors of disability. For the following conditions as predictors of disability, results were less conclusive: heart attack and other cardiovascular diseases, chronic obstructive pulmonary disease (COPD) and asthma, impaired cognition, hearing impairment, vision impairment, osteoporosis and hypertension.

7.1.3. *Enabling variables*

Living alone strongly increases the likelihood of entering an institution, particularly for men, while living with a spouse decreases it substantially.

The evidence for the impact of other sources of informal help than the spouse, including children, is less conclusive. Studies fail to find a clear impact of public or private insurance on nursing home entry. Prior nursing home use is a very strong predictor of future nursing home admission.

7.2. Literature review: Long term care projection models

As the aim of the research project is to develop a projection model of the number of older persons in residential care in Belgium up to 2025, the first step of the project consisted in reviewing studies using or presenting long-term care projection models, and the results thereof. The search was

focused on models which yield quantitative projections of the number of older persons needing, demanding or using formal care, or of the aggregate costs of such care, for a country or large region.

7.2.1. *Models characteristics*

LTC projection models have been developed for several developed countries, but by no means for all of them. Disregarding international studies, models have been found for Belgium, the Netherlands, France, Germany, the UK, Austria, Sweden and the USA.

The projected time period varies substantially across models and studies. Interestingly, it is often shorter for the large models (e.g. 2005-2030 for VeVeRa III) than for some of the single-study models (e.g. 2000-2050 for the Cass model). The choice of horizon is rarely, if ever, explicitly motivated. The large models incorporate many predictor variables which are difficult to project far into the future. Single-study models, by contrast, are often based on population projections only, which are fairly reliable up to a distant horizon.

Projected variables also vary. They can be categorized in three groups:

1. Number of older persons in disability. In practice this variable is equivalent to need for care, as it is assumed that anyone with a sufficiently severe level of disability needs some form of care (whether formal or informal);
2. Number of older persons demanding or using formal care. While the distinction between demand and use is conceptually important and also very relevant for policy, it is one that is implemented in few of the models reviewed. Variables that would affect the translation from latent (potential) demand to explicit demand to actual use, such as price and supply of care, are generally not included in these models.
3. Costs of care (public or public-plus-private costs). Costs are mostly split up between formal home care and institutional care, sometimes all costs of care are aggregated.

Most projection models are static macro-models (cell-based). Dynamic micro-simulation models of LTC are mostly modules or add-ons of dynamic models developed for other purposes.

All models use data from a variety of sources, as the primary database never contains all necessary data. These databases vary in terms of

representativeness and origin of data (administrative or survey). Projections of the population by age and sex are generally taken from an external source.

Disability is nearly always imputed in a 'static' way using either prevalence rates by age and sex (sometimes additional variables), or a logistic equation. At the moment only the French model 'Destinie' contains dynamic modelling of disability. The impact of future trends in disability is mostly explored through different scenarios. Observed past trends in disability are seldom projected into the future as such, but used to define plausible scenarios.

Future trends in household situation, in particular the presence of a partner, are often incorporated in the population projections from an external source. The availability of informal care is generally not modelled (except sometimes as an outcome, i.e. informal care use as an alternative to formal care). With one exception, the projections assume a steady state (conditional on background variables) regarding the propensity to provide informal care. The possible impact of changes in the supply of informal care is explored through scenarios, where this variable is mostly adjusted in an arbitrary way.

Nearly all models make the implicit or explicit assumption that the supply of formal care will adjust to match demand, which implies that the projection results are driven by changes in demand. Other variables that are sometimes used in the projections are: education, income, housing tenure, ethnicity, degree of urbanization, price of care; exceptionally (at the macro-level) immigration.

Given projections of the determinants, the demand for / use of care is projected on the basis of prevalence rates (conditional on those determinants) or of an econometric (e.g. logistic) equation. While in most models a distinction is made between formal home care and institutional care, the relationships between these forms of care is not modelled. Some studies explore the possible impact of changes in the relationships between home and institutional care through scenarios.

The model currently used by the Belgian federal Planning Bureau for the projections of the costs of long-term care, is a static macro hierarchical model. In the modelling of the use of care, rather detailed distinctions are made between types of care and intensity of care. Disability is not explicitly

modelled. Apart from the population distribution by age and sex, no trends in driving factors are extrapolated into the future.

7.2.2. Models results

All studies predict large increases in the demand for / the use of formal care, including institutional care, during the coming decades, driven by the ageing of populations.

Most studies consider a scenario with constant prevalence rates of disability by age and sex categories as too pessimistic. Most researchers assume that the onset of disability will shift to later ages, but it is not clear whether this shift will be slower than, equal to, or faster than the expected increase in longevity. These assumptions are equivalent to the expansion of morbidity, the dynamic equilibrium and the contractions of morbidity hypotheses, respectively. Different scenarios incorporating different assumptions about future trends in disability result in very divergent projections of long-term care.

Scenarios where the supply of informal care is changed are always completely hypothetical, making it difficult to judge whether they are in any way realistic. Yet, results show that such changes could have enormous consequences on the demand for formal care. Substitution between various forms of formal care could also have an important impact.

Projections for the costs of long-term care in Belgium indicate that these costs could increase by about 1.4% of GDP between now and 2060, implying a doubling of these costs.

Whereas dynamic micro-simulation may be superior to static micro-simulation if the goal is to model transitions between states, it requires human and data resources, that were not available to conduct this research project. A macro-model (cell-based), partly dynamic, using the Health Interview Survey and from the Permanent Sample will be used instead.



7.3. Available databases in Belgium to build a projection model

Data that will be used to develop a projection model of the number of older persons in residential care in Belgium up to 2025 should meet three requirements:

1. they have to allow the modelling of the impact of a broad range of risk factors (e.g. health status, chronic diseases and disability, lifestyle indicators, income, educational level and household situation) on functional limitations (needs for care);
2. they have to allow the development of a model that links care needs (limitations) to formal care use, including residential care, taking account of mediating variables such as living situation;
3. they have to be able to provide estimates of the transition rates between care levels and care settings. Such estimates require longitudinal data on a sufficiently large sample over a period of a number of years.

Databases suitable for these purposes are:

1. the Health Interview Survey (HIS), a cross-sectional survey conducted in 1997, 2001, 2004 and 2008 on a representative sample of the Belgian population. The HIS database was the only database that includes institutionalized older persons in sufficient numbers, due to oversampling of older age groups, and that reports information on ADL and disabilities, chronic conditions and socio-economic characteristics. More recent versions (2004 and 2008) were considered. A total of 12 945 persons in 2004 and 11 254 in 2008 were interviewed.
2. the “Permanent Sample” (EPS), designed by IMA-AIM (Intermutualistic Agency) and governmental partners (NIHDI) to study and monitor health care consumption and expenditure in Belgium. In March 2011, it contained data for the years 2002-2009. The sampling fractions are 1/40 for the population aged 0-64, and 1/20 for the population of 65 and over. The EPS contained data on the specific reimbursement codes by procedure, service, admission, drug delivery, etc. including date, provider, institution and cost. In addition, it had data on age, gender, social status within the health insurance system, place of residence and family size. The EPS allowed the estimation of transition rates between

care levels and care settings. Disability was imputed for each individual aged 65+, using an equation estimated on the HIS data. Chronic conditions predictive for disability and entry in residential institutions were identified in the EPS data, using information on medical treatments.

7.4. Model specification

The projection model is a macro (cell-based), partly dynamic, simulation model. In cell-based models, the population is divided into a number of cells or groups, which are defined by combinations of the categories of relevant variables (e.g., age, sex, living situation, disability). The model is dynamic in that long-term care transition rates are used, i.e. rates that indicate the probability to be in a particular long-term care situation at a particular time, given that one was in a particular long-term care situation in the previous period. The projections are made for each year in the period 2010 – 2025, and for the population that is included in the Belgian health insurance scheme, and living in Belgium. Persons living in Belgium, but being insured under a foreign social security regime, are not included in the current projections, since those persons are excluded from the EPS sample. This has the unfortunate implication that French and Dutch older persons who are living in a care home or nursing home in Belgium, and whose care is paid for by Dutch or French insurance or by themselves, are not included in the projections per se. The assumption made is that the proportion of these persons, relative to the total institutionalised population in Belgium, will remain constant. Persons covered by the Belgian health insurance scheme, but residing outside Belgium are also excluded, as the population projections refer to the persons living in Belgium.

The projection model incorporates the most important variables determining long-term care use:

1. the projected future distribution of the population by age and sex;
2. the living situation (availability of informal carers) of older persons;
3. the level of disability (limitations in ADL) of older persons.

The projection proceeds in five steps:

- Step 1. The distribution of the total population of 65 years and older in Belgium, by age, sex and projection year (2010 – 2025), in absolute numbers. The most recent population projections produced jointly by

the statistical service of the ministry of economics (ADSEI/SGSIE) and the Federal Planning Bureau have been used.

- Step 2. The proportional distribution of the population by living situation, for each age and sex category, and for each projection year. Living situation refers to the presence of a partner, a daughter or son, or other persons in the older persons household. For future years, we used projections of living situations estimated by Michel Poulain (UCL, 2011), where living situation has 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 and 3) living with others, i.e. all other situations.
- Step 3. The proportional distribution of the population by disability level (having at least one ADL limitation), for each age and sex category, and for each projection year. This was imputed, using the model estimated on the Health Interview Survey (HIS) data. The independent variables are age, sex, selected chronic conditions (COPD, dementia, diabetes, hip fracture, Parkinson's disease) and province.
- Step 4. The proportional distribution of the population across ten long-term care categories (no care; two home care situations 'low' and 'high'; five levels of residential care - categories O, A, B, C and Cd; hospitalization; and, finally death), for each age and sex group, and for each projection year, taking into account the distributions by living situation and by disability level. These distributions are derived from the estimated transition probabilities.
- Step 5. Application of the proportions using long-term care obtained in step 4 to the projected overall population numbers by age and sex obtained in step 1, and summation to aggregated results.

7.5. Modelling disability using the Health Interview Survey

This section describes how the model which is used to impute disability in the EPS data was developed, using the data of the Health Interview Survey (HIS).

The HIS 2004 and 2008 provide data on problems with six ADL (getting in and out of bed, getting in and out of a chair, dressing, washing hands and face, eating and cutting one's food, getting to and using the toilet). Disability was defined as having at least 1 ADL limitation. Logistic

regression was used to model the presence of any ADL limitation, coded 1 if there is any limitation and 0 otherwise. The measured prevalence of disability is three percent-points lower in 2008 than it is in 2004, probably due to the fact that in 2008 the ADL items had four response options, instead of three as in 2004. The pattern of disability across age and sex is very similar in the two years, increasing with age for persons aged 75 and more, and higher for women than for men within any age bracket.

The independent variables were age, sex, a number of chronic conditions (selection guided by the literature review), province of residence, education and income.

For the estimation, only those aged 65 or more were selected. Six logistic models were estimated, in which variables were included subsequently. The models were estimated on the pooled HIS 2004 and HIS 2008 data.

Age, sex, province and specific chronic conditions (dementia, Parkinson's disease, hip fracture, COPD and diabetes) were found to have a significant effect on disability. Income and education were found to have only a limited impact on disability, controlling for age, sex and chronic conditions. Overall, province turned out to have a small but significant effect, though none of the provinces has an impact on disability that is different from the capital region of Brussels. Region (Brussels, Flanders, Wallonia) in itself did not have a significant effect.

The logistic equation with estimates of the coefficients makes it possible to impute disability in the EPS.

7.6. Modelling transitions in LTC situations

This step consisted in building a model that estimates the probabilities for an old person to go from one LTC situation in Q_0 to another, in the next period (Q_1) (one quarter later). In other words, this model will estimate the probability for an old person, being in Q_0 in a specific LTC situation among the 10 defined LTCs (no care, hospitalization, death, two home care situations based on NIHDI scores – 'home care low' defined as category T, category A and care in day care centres (other than category F) and 'home care high' defined as category B, category C and day care centres (category F) and five levels of residential care – O, A, B, C and Cd) to evolve to another LTC situation in Q_1 , taking into account his/her age, sex, disability level, household situation (partner, daughter, son, parent, other



woman, other man, available or not for informal care) and province of residence.

Some provinces were split in two, when preliminary analyses indicated that the effects of arrondissements within a province were rather different. The splits are:

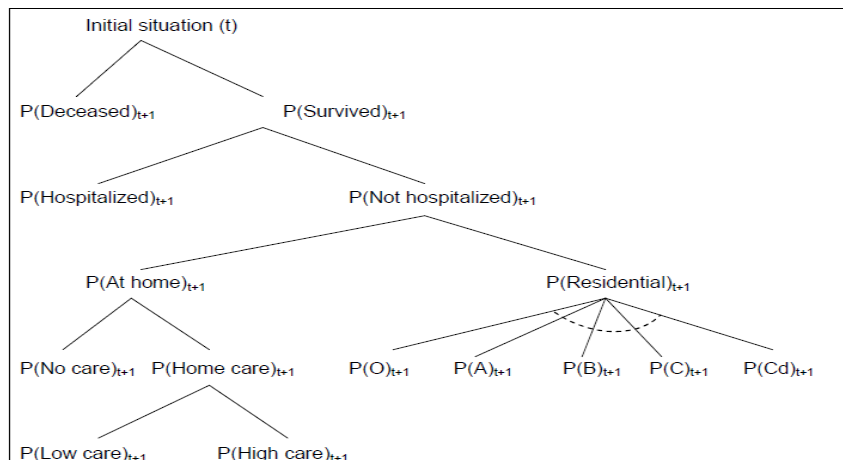
- Antwerpen: Antwerpen & Mechelen; Turnhout
- Vlaams-Brabant: Halle-Vilvoorde; Leuven
- West-Vlaanderen: WV-Kust (arrondissements bordering on the coast); WV-Binnen (arrondissements not on the coast)
- Oost-Vlaanderen: Gent & Aalst; other arrondissements
- Hainaut: Charleroi, Mons & Soignies; other arrondissements
- Namur: Namur; other arrondissements

These splits separate arrondissements that are more urbanized from those which are less so.

7.6.1. Estimation strategy

The very large sample size, the use of weights and the fact that transitions are not statistically independent led using a series of binary and multinomial logistic regressions ordered in a hierarchical way, as indicated in Figure 1.

Figure 1. The hierarchical structure of the transition probability model.



Transition probabilities across a period of one year are calculated starting from the first quarter of each year. The five year part of Table 2 refers to the period 2004 quarter 1 – 2009 quarter 1. Each column of the table shows, for a certain origin state indicated at the top of the column, the proportions of persons that go to various destination states, which are in the rows of the table (after a quarter, a year, and five years, respectively).

The situation of “no care” (i.e. no long-term care) is a rather stable situation; even after five years, nearly two-thirds of the persons in this category are still there. The most common exit category is death. Hospitalization was coded if there was a stay in hospital of more than 20 days which included the last day of the quarter. Transition probabilities into home care or residential care are rather low. Stability is much less in any of the other LTC situations. Once persons enter care, their risk of dying becomes much stronger. Persons using home care, especially if it is rather intensive, have a higher chance of moving into residential care than those with no care.

When the origin state is home care, the destination state is more often MRS/RVT-Cd than any of the other residential LTC situations.

There is substantial movement, in both directions, between the LTC situations of home care low and home care high. When in residential care, the probabilities of moving to a higher level of care are substantial, although this is less so for the lowest level (MRPA/ROB-O) than for the other ones. The probabilities of moving to a lower level are much smaller, and the chances of exiting (other than through death) are quite small. Transitions to “no care” may not be real, but artefacts of the variable construction. It is striking that the probability of being hospitalized is rather low for persons in residential care and decreasing with the level of care. Those using home care are most likely to be hospitalized. After an hospitalization of at least 20 days, many people move or return to residential care.

Table 2. Transitions in LTC situations after a quarter, one year and five years, EPS data, 2004-09.

Quarter	No care	Home care low	Home care high	Resid. care level O	Resid. care level A	Resid. care level B*	Resid. care level C*	Resid. care level Cd*	Hospitalization	Total
No care	97.8	5.8	3.6	0.9	0.5	0.4	0.2	0.1	34.2	84.9
Home care low	0.7	85.2	4.3	0.2	0.5	0.4	0.3	0.1	10.5	5.2
Home care high	0.1	2.3	80.6	0.0	0.1	0.2	0.5	0.2	5.6	1.5
Resid. care level O	0.1	0.2	0.1	87.3	4.0	1.3	0.4	0.1	1.9	1.2
Resid. care level A	0.0	0.5	0.3	4.6	79.7	3.7	1.4	0.3	2.6	1.1
Resid. care level B*	0.1	0.8	1.0	2.6	7.4	78.8	3.2	1.5	4.6	1.4
Resid. care level C*	0.0	0.2	0.8	0.8	1.8	3.0	78.6	1.0	3.0	0.7
Resid. care level Cd*	0.0	0.3	1.2	0.5	1.5	6.2	5.8	85.8	4.1	1.8
Hospitalization	0.6	2.4	2.9	1.1	1.3	1.2	1.2	0.8	24.7	1.0
Deceased	0.6	2.0	5.3	2.0	3.4	4.8	8.3	10.1	8.8	1.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% in origin category	86.1%	5.2%	1.5%	1.3%	1.1%	1.4%	0.8%	1.8%	1.0%	100.0%
4 quarters	No care	Home care low	Home care high	Resid. care level O	Resid. care level A	Resid. care level B*	Resid. care level C*	Resid. care level Cd*	Hospitalization	Total
No care	93.4	7.4	4.4	1.6	0.6	0.5	0.2	0.2	31.8	81.2
Home care low	1.9	66.8	5.9	0.3	0.4	0.4	0.2	0.0	9.5	5.3
Home care high	0.4	5.6	57.6	0.1	0.1	0.1	0.3	0.2	4.8	1.5
Resid. care level O	0.2	0.8	0.2	65.7	7.0	2.3	0.7	0.1	2.7	1.2
Resid. care level A	0.2	1.7	0.7	10.6	49.9	5.8	2.2	0.5	3.2	1.1
Resid. care level B*	0.3	2.6	2.3	6.4	15.8	48.5	5.0	1.9	5.0	1.4
Resid. care level C*	0.1	1.0	2.2	2.0	4.4	6.0	48.7	1.4	3.0	0.7
Resid. care level Cd*	0.2	1.5	3.1	1.9	4.7	15.2	12.6	60.2	4.8	1.8
Hospitalization	0.7	2.5	2.1	1.0	1.0	0.9	0.8	0.5	12.9	0.9
Deceased	2.7	10.3	21.4	10.5	16.2	20.3	29.4	35.0	22.4	4.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% in origin category	86.1%	5.1%	1.5%	1.3%	1.1%	1.4%	0.8%	1.8%	1.0%	100.0%
5 years (2004/1 - 2009/1)	No care	Home care low	Home care high	Resid. care level O	Resid. care level A	Resid. care level B*	Resid. care level C*	Resid. care level Cd*	Hospitalization	Total
No care	73.1	4.9	2.6	0.8	0.1	0.5	0.1	0.0	18.4	64.0
Home care low	4.8	24.2	2.0	0.6	0.1	0.3	0.0	0.0	5.8	5.4
Home care high	1.2	5.9	14.8	0.0	0.0	0.1	0.0	0.2	2.4	1.5
Resid. care level O	0.8	1.3	0.2	21.7	4.1	0.6	0.0	0.0	1.4	1.1
Resid. care level A	0.8	2.5	1.3	8.7	11.0	2.1	0.2	0.2	1.7	1.1
Resid. care level B*	1.0	4.7	2.1	7.5	9.4	8.2	2.0	0.7	3.5	1.5
Resid. care level C*	0.5	2.4	2.7	3.8	3.4	3.9	7.1	1.0	2.5	0.8
Resid. care level Cd*	1.1	4.7	4.2	5.0	7.5	14.1	8.5	12.2	4.3	1.8
Hospitalization	0.8	0.9	0.5	0.5	0.2	0.4	0.3	0.0	4.8	0.8
Deceased	16.1	48.6	69.9	51.5	64.2	69.9	81.8	85.8	55.2	22.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% in origin category	86.9%	4.7%	1.3%	1.3%	1.0%	1.2%	0.8%	1.8%	1.1%	100.0%

Note: * both homes for the elderly (MRPA/ROB) and nursing homes (MRS/RVT)

For all persons, disability is the stronger predictor of admission in a residential institution.

Persons in the age groups above 85 years are much more likely to be institutionalized than persons aged below 85, but this is mainly due to their higher risk of disability. Perhaps surprisingly, women are slightly *less* likely than men to move into residential care, controlling for age, disability and household situation. Among persons in home care at a high level or who were hospitalized, the effect of age is smaller, and generally not significant. Disability increases the chances of moving into residential care quite strongly for those currently not getting care, and also for persons who were in hospital. Persons living with a partner or with a child are less likely to enter residential care.

There are important differences between provinces regarding the chances for institutionalisation, which might be related to variation in the supply of residential care.

For older persons moving to or living in residential care, a higher probability of disability makes it more likely to make a change to higher levels of LTC. For the same population, the transition back to their own home is hardly or not associated with any of the variables in the model.

8. PROJECTED EVOLUTION IN RESIDENTIAL STRUCTURES

The overall projected evolution in residential care will be first presented for the base scenario and later for alternative scenarios, based on different hypotheses about the future evolutions in morbidity, household situation and the availability of informal care, and the evolving use of formal home care.

It is important to emphasize that projections concern *the demand* for residential care, in the sense of the *future use* of residential care, provided any possible supply constraints on future use are neither more nor less binding than today. Obviously, if in the coming years supply of residential care does not follow increasing demand, the projections will not become reality.



8.1. Overall evolution, base scenario

8.1.1. Characteristics of the base scenario

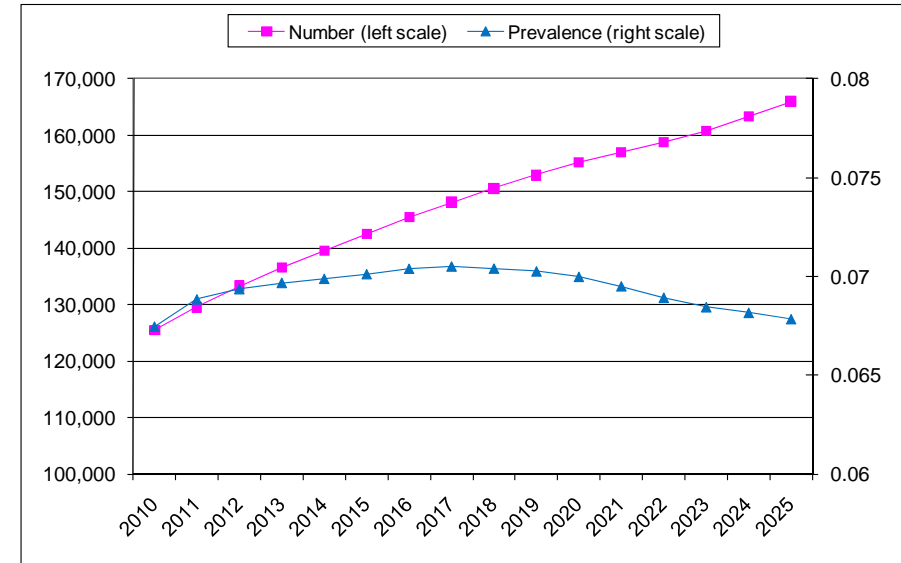
The base scenario has the following characteristics:

- it uses population projections made by the Belgian Federal Planning Bureau (FPB) and the statistics office (ADSEI);
- prevalence of five chronic conditions (COPD, dementia, diabetes, hip fracture, Parkinson's disease) by age, sex and province remains unchanged, which implies that the prevalence of disability itself by age, sex and province is also constant across the projection period;
- the projected trends in household situation were taken into account (adapted from Poulain, UCL, 2011);
- all numbers are adjusted to take account of the fact that a substantial number of beds in residential care in Belgium are occupied by persons who are not covered by the Belgian public health insurance (mainly foreigners). The assumption is that the proportion of these persons relative to the overall number of users will remain constant across the projection period.

8.1.2. Results of the base scenario

The projected number of older persons in residential care rises from 125 500 in 2010 to 166 000 in 2025, which is an increase of 32% (Figure 2). This rise is almost completely driven by the ageing of the population. The prevalence of being in residential care (i.e. the number of persons in residential care divided by the total number of persons aged 65 or over) is nearly stable, first rising slightly to a maximum of 7.1% in 2017 and then falling during the projection period, so that in 2025 it is practically at the same level (6.8%) as in 2010 (6.7%). The slight drop in the prevalence rate after 2019 is due to the fact that the relatively smaller cohorts born around the 2nd World War then start to reach the ages where use of residential care is most prevalent.

Figure 2. Projected prevalence and number of older persons in residential care, Belgium 2010-2025, base scenario.



However, the composition of persons in residential care by care level will not drastically change over time. There is a small increase in the percentage in the most intensive level Cd from 28.8% in 2010 to 30.0% in 2025, which occurs mainly during the first half of the projection period. The percentages in the other care levels remain virtually unchanged. The near-constancy of these proportions obviously follows from the assumption of a constant prevalence of the chronic conditions related to disability (and hence of disability itself).

The prevalence of residential care declines in many sex-age groups (Table 3). The small increase among men aged 65-79 and women aged 65-69 is due to a rise in the proportion of single persons in these age groups, especially among men. The increased longevity of men and women is responsible for the decline in the proportion of single persons and the rise in the proportion of persons with a partner in the groups aged 80 or more. The latter shift produces a decline in the prevalence of residential care in some of these age groups (men aged 85-95 and women aged 80-84). The finding that the decline does not occur in all age groups

is due to what happens among persons without a partner living with children or other household members. Finally, an important boost to the overall proportion in residential care is given by the substantial rise in the number of women aged 90 or more, among whom over half are institutionalized.



Table 3. Projected characteristics of sex-age groups, Belgium 2010-2025, base scenario

Sex	Age	Prevalence residential care		Single* %		With partner**%		% of total population 65+	
		2010	2025	2010	2025	2010	2025	2010	2025
M	65-69	0.8%	1.0%	17.6%	21.7%	77.3%	73.1%	12.0%	13.7%
M	70-74	1.5%	1.7%	17.6%	20.5%	70.8%	67.9%	11.1%	11.5%
M	75-79	2.4%	2.5%	20.4%	21.9%	73.9%	72.5%	9.3%	9.3%
M	80-84	5.9%	5.7%	26.8%	25.2%	67.8%	69.5%	6.0%	5.5%
M	85-89	12.4%	11.7%	40.0%	36.4%	51.4%	56.2%	3.0%	3.4%
M	90-95	18.7%	17.9%	40.0%	36.4%	50.1%	55.1%	0.6%	1.3%
M	95+	26.8%	26.6%	42.8%	39.6%	44.9%	49.7%	0.1%	0.3%
F	65-69	0.8%	0.9%	27.3%	29.0%	66.6%	65.0%	13.1%	14.6%
F	70-74	1.6%	1.6%	33.7%	32.6%	57.2%	58.8%	13.2%	12.7%
F	75-79	5.0%	4.6%	44.2%	39.6%	45.7%	51.2%	12.6%	11.1%
F	80-84	13.2%	12.4%	58.2%	53.9%	30.2%	35.4%	10.0%	7.4%
F	85-89	28.3%	28.3%	73.8%	73.2%	12.7%	16.4%	6.5%	5.5%
F	90-95	48.0%	48.2%	73.8%	73.2%	12.0%	15.8%	1.8%	2.8%
F	95+	63.0%	63.7%	75.4%	75.6%	9.7%	12.8%	0.7%	0.9%

* With partner includes persons with other household members in addition to the partner; single persons are persons with no other household member

The increase in the number of older persons in residential care is unevenly spread across provinces (Table 4). Very strong increases occur in a few provinces (e.g. Limburg), and limited increases of less than 25% in some others (e.g. Hainaut, Liège). On the other hand, a decrease is projected for Brussels. The reasons for these divergent developments are obviously demographic. In Limburg for example, less than 10% of all older persons

are aged over 85 at the moment, and these provinces will undergo the strongest ageing-within-ageing effect (i.e. an increase in the number of the oldest old). In the capital region of Brussels, the proportion of persons aged 85+ is now the highest among all provinces, and this proportion will in fact decline over the projection period.

Table 4. Projected numbers and prevalence in residential care, percent aged 85+ and percent disabled by (parts of) province, Belgium 2010-2025, base scenario.

	Prevalence of residential care		Number of persons in residential care		Increase in %	Age 85+		Disabled %*
	2010	2025	2010	2025	2025 / 2010	2010	2025	2010
Antwerpen-Mechelen	6.6%	6.5%	15 294	19 563	27.9%	12.9%	15.0%	6.4%
Turnhout	5.2%	5.5%	3 472	6 142	76.9%	9.7%	13.0%	6.0%
Brussels	8.2%	6.8%	12747	12 223	-4.1%	16.2%	14.2%	7.7%
Halle-Vilvoorde	6.1%	6.5%	6 118	8 843	44.5%	11.9%	14.7%	8.8%
Leuven	5.9%	6.0%	4 824	7 069	46.5%	12.4%	14.8%	9.1%
Nivelles	7.3%	6.8%	4 111	6 082	48.0%	13.1%	13.7%	10.1%
West-Vlaanderen-Kust	6.0%	6.2%	7 772	11 711	50.7%	12.1%	14.1%	9.4%
West-Vlaanderen-Binnen	7.7%	8.2%	7 461	10 494	40.7%	12.6%	16.2%	10.1%
Gent-Aalst	6.8%	7.0%	9 430	13 138	39.3%	12.4%	15.5%	6.3%
Oost-Vlaanderen-rest	8.2%	8.4%	9 065	12 766	40.8%	11.9%	14.7%	6.2%
Charleroi-Mons-Soignies	7.4%	6.4%	10 471	11 753	12.2%	13.4%	12.3%	9.5%
Hainaut-other	9.4%	8.5%	7 211	8 706	20.7%	14.4%	13.9%	10.0%
Liège	7.9%	7.1%	14 195	17 186	21.1%	12.8%	13.1%	5.9%
Limburg	4.3%	4.9%	5 571	10 390	86.5%	9.6%	13.0%	9.3%
Luxembourg	6.6%	5.9%	2 745	3 401	23.9%	12.9%	13.2%	6.7%
Namur-Namur	7.6%	6.8%	3 531	4 619	30.8%	13.1%	13.3%	6.0%
Namur-other	5.2%	4.8%	1 481	1 944	31.3%	13.0%	13.0%	5.6%
Belgium-total	6.4%	6.4%	125 500	166 000	32.3%	12.6%	14.1%	8.4%

Notes: All % (except column 6 "Increase ...") as % of all persons aged 65+. * Only shown for 2010 since by assumption disability by age, sex and province remains unchanged



8.2. Alternative scenarios

In order to show the sensitivity of the projection results with respect to alternative hypotheses, six alternative scenarios, three of which concern disability, two relate to informal care, and one about home care were explored. Three are more pessimistic than the base scenario and three are more optimistic. They are:

1. The prevalence of chronic conditions declines in line with the increased educational level of each new cohort of older persons.
2. The risk of disability by age and sex will decrease in future, in the sense that half of the projected increases in longevity are assumed to be spent free of disability (disability compression).
3. The prevalence of diabetes will increase by 5% annually during the projection period.
4. The household situation of older persons by age and sex group will not change during the projection period.
5. The number of children living with their older parents will be halved during the projection period.
6. Home care expands by 50% (beyond what is required by the ageing of the population).

8.2.1. Alternative scenarios on disability

Alternative 1: “Better education” involves a significant reduction in the prevalence of chronic conditions in Belgium during the projection period 2010-2025. Two observations support this scenario: first, the estimations using the HIS data indicated that the prevalence of most chronic conditions is smaller, within any age-and-sex group, among older persons with more than primary education; second, in every cohort, the proportion of persons with more than primary education is larger than in the previous cohort.

This implies that the educational level of older persons in future years will be higher than it is now. Moreover, this trend is reinforced by differential mortality, as those with better education live longer. The decreases in the overall prevalence of these chronic conditions are fairly small, though: e.g., from 11.9% in 2010 to 10.8% in 2025 for diabetes and 5.3% to 4.9% for dementia.

Alternative 2: “Disability compression” assumes that increases in longevity during the projection period are accompanied by a delayed onset of disability. For every year added to life expectancy (at age 65), disability rates are assumed to shift to a later age by half a year. This is the reference scenario of the Ageing Working Group of the EU’s Economic Policy Committee (European Commission, 2009).

Alternative 3: “Diabetes epidemic” is suggested by recently observed trends for Belgium (Instituut voor Farmaco-Epidemiologie van België/Institut Pharmaco-Epidémiologique Belge, 2007) and abroad (UK, Germany, Italy and France). Currently, it is impossible to obtain robust data about the trend in the prevalence of diabetes in Belgium. So, the prevalence is estimated through diabetes medication (in terms of Defined Daily Doses), knowing that not all diabetic patients take medication. We assume an overall increase in diabetes prevalence by 5% per year between 2010 and 2025, and this increase occurs uniformly in all sex-and-age groups. This means that the prevalence of diabetes will more than double during the projection period, up to 26% in 2025. By contrast to the previous two scenarios, this scenario implies an expansion of morbidity.

8.2.2. Alternative scenarios on household situation

Alternative 4: A “Pure demographic scenario” supposes that the household situation (the presence of a partner, children and/or other household members) within any sex-age group does not change over the projection period.

Alternative 5: The scenario “Fewer children” hypothesizes that fewer children will live in the same household as their parents. Concretely, within any sex-age group, the number of older persons living with their children will drop by half over the projection period. This scenario is included to show the sensitivity of the projection results to a change in the availability of informal care.

8.2.3. Alternative scenario on home care

Alternative 6: In order to provide an estimate of the possible impact of an expansion of home care, we assumed that the additional home care is equivalent to the care given by a partner, i.e. has the same impact on the probability to enter an institution. The simulated additional home care is targeted to single persons with a probability of disability of at least 5%; the results of a model of the transition to home care indicates that this is in fact

a threshold above which older persons are much more likely to start using home care. Fairly arbitrarily, we assumed an expansion of home care by 50%, in addition to the increase that is required already by the ageing of the population.

8.2.4. Results of the alternative scenarios

The “better education” scenario involves lower prevalence rates of chronic conditions, and a generally downward trend in disability. Disability is higher, and rising in most years, following the “diabetes epidemic” scenario. However, the differences between the scenarios are quite small since in 2025, disability prevalence is only 0.4% lower following the “better education” scenario than in the base scenario, and 0.7% lower according to the “morbidity compression” scenario, and in the “diabetes epidemic” it is only 0.4% higher. This is due to the dominant impact of age on the probability of being disabled. Following the “better education” scenario, there would be about 6 000 fewer older persons in residential care in 2025 than according to the base scenario, while the “morbidity compression” scenario would lead to nearly 14 000 fewer persons in residential care. The number would be about 3 000 higher following the “diabetes epidemic” scenario. Following the “pure demographic” scenario, the projected number of persons in residential care would be only slightly higher than in the base scenario; the difference amounts to about 4 600 in 2025. Finally, in the scenario implying a strong development of home care, the projected number of old people in residential care would be lower, estimated at 149 000 for 2025, or about 17 000 less than in the base scenario. Such results indicate that very large changes are required in the supply of home care in order to substantially reduce the projected growth in the number of persons in residential care.

In Figure 3, the alternative scenarios were compared to the base scenario. The corresponding numbers are reported in Table 5. The projected number varies from about 149 000 in the optimistic “home care” scenario, to about 170 000 in the pessimistic “fewer children” and “diabetes epidemic” scenario. Assuming that differences between scenarios are additive, in a worst-case scenario, with “fewer children”, (otherwise) “unchanged living situations” and a “diabetes epidemic”, the number of persons in residential care could be as high as 177 400.

Figure 3. Projected trends in the number of older persons in residential care, Belgium 2010-2025, according to various scenarios.

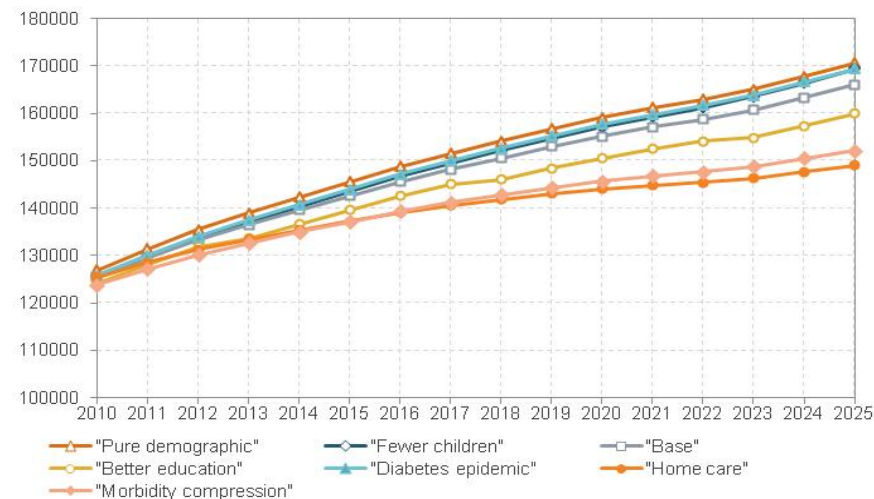




Table 5. Projected trends in the number of older persons in residential care, Belgium 2010-2025, according to various scenarios.

Year	Base	Pure demographic	Fewer children	Better education	Diabetes epidemic	Home care	Morbidity compression
2010	125 500	126 990	125 500	124 137	125 840	125 500	123 870
2011	129 558	131 464	129 712	128 156	130 090	128 554	127 199
2012	133 296	135 447	133 620	131 858	134 031	131 254	130 162
2013	136 547	138 965	137 047	133 666	137 497	133 431	132 712
2014	139 611	142 299	140 297	136 676	140 780	135 403	134 977
2015	142 558	145 527	143 436	139 580	143 953	137 239	137 118
2016	145 574	148 811	146 639	142 561	147 196	139 119	139 384
2017	148 167	151 551	149 445	145 126	150 014	140 584	141 205
2018	150 593	154 141	152 092	146 104	152 667	141 867	142 792
2019	152 957	156 702	154 694	148 420	155 258	143 074	144 333
2020	155 176	159 116	157 159	150 596	157 699	144 131	145 729
2021	157 063	161 176	159 284	152 463	159 785	144 883	146 783
2022	158 752	162 961	161 225	154 138	161 656	145 455	147 672
2023	160 778	165 112	163 528	154 852	163 858	146 315	148 827
2024	163 367	167 850	166 442	157 357	166 618	147 660	150 506
2025	166 030	170 666	169 442	159 927	169 421	149 038	152 210

9. OVERALL CONCLUSIONS

9.1. Residential care capacity requirements 2010-2025

The main driver of the future demand for residential care is, without any doubt, the expected demographic ageing of the Belgian population. The model developed in this study is based on estimated transition probabilities between care 'states', which depend on the age, gender, disability and availability of informal care of older persons. Under the assumption of constant prevalence of chronic conditions that are associated with disability, these transition probabilities remain essentially constant over the projection period. The baseline projection results are therefore similar to those that would be obtained with a constant prevalence model in the absence of major policy interventions. This result seems plausible in the sense that a substantial deviation from the past and current LTC use patterns would require very strong shifts in future disability prevalence, informal care availability or other factors that may affect LTC use. There is little objective information to support such radical shifts, but we have explored alternative scenarios that provide some guidance to the sensitivity of the results to changes in the non-demographic determinants of LTC use. One also has to take into account that a number of beds are occupied by persons aged below 65 which are not included in the projections.

The projections are based on a "constant policy" assumption in the sense that the regulatory environment and price regime that prevailed during the observation period is implicitly kept constant over the projection horizon, and the available capacity of residential care, as well as home care, is expanded in line with projected future use. Similarly, financial incentives such as NIHDI payments of residential and home nursing care fees, and lodging and board fees paid by the nursing home residents, are assumed to remain fixed in real terms. In general, we assume that the relevant relative prices of LTC services do not change appreciably over the projection period.

The study projects a strong rise of the number of users of residential care from about 125 500 currently (aged 65 or older), to about 166 000 in 2025 (including foreigners not covered by the Belgian public health insurance), an increase of about 40 500.

Given that the number of beds in homes for the elderly, nursing homes and coma beds in 2011 equalled 129 732, it is clear that the supply of residential care has to be expanded considerably. Considering the base scenario and the alternative scenarios based on the evolution of morbidity, functional limitations, availability of informal caregivers (base scenario and alternatives 1 to 5), 27 000 (scenario 2) to 45 000 (scenario 4) supplementary beds have to be created. In annual terms, the increase amounts to between 1 800 and 3 000 extra beds per year (3 500 if we consider the combination of the most pessimistic scenarios). To put this result into perspective, it is considerably more than the average yearly increase of about 790 beds observed between 2000 and 2011.

On the other hand, the number of reimbursed days for residential care rose by 1.5% on average per year during the period 2000 – 2009.

9.2. Geographical variation

The increase is unevenly spread across provinces or parts of provinces. Very strong increases occur in a few provinces, and limited increases of less than 25% in some others. On the other hand, a decrease is projected for Brussels.

These varying growth rates in the number of persons using residential care are driven by the uneven tempo of the ageing of the population across the provinces of Belgium. It must be stressed that in these projections, current differences across provinces in the likelihood of entering residential care, given age, disability and living situation, are preserved across the projection period.

9.3. Sensitivity to alternative assumptions about disability and living situation

Apart from sex and age, other important determinants of the use of residential care are disability (i.e. limitations in Activities of Daily Living) and the availability of informal care.

As regards disability, the results indicate that if the prevalence of five important chronic conditions (COPD, dementia, diabetes, hip fracture and Parkinson's disease) would go down in line with the higher education level of future cohorts of older persons, this would have only a limited effect on the projected number of users of residential care. If increased longevity would be accompanied by compression of morbidity, i.e. a shift of the



onset of disability to later ages, the increase in the projected number of persons in residential care would be significantly lower.

This study could only consider the availability of informal care within the household as determined by living situation, i.e. the presence of a partner, children or other persons. It was shown that projected developments in the living situations of older persons, in particular an increase in the proportion of very old women that are married, have a downward but rather small impact on the projected number of persons in residential care. It is hard to predict the extent to which potential informal care (from within or without the household) will actually be provided; few observers expect that the willingness to provide informal care will increase substantially. One should also keep in mind that current practices of informal care may involve a huge social cost, as the mental and physical health of informal carers may be negatively affected by having to care for dependent relatives. The burden of living with a demented husband, wife or parent can hardly be overestimated.

Under the most favourable scenario, the expected number of residential care users is projected to be about 149 000, which we consider the absolute minimum of required capacity. Under the most pessimistic scenario, as many as 177 000 users are projected in 2025.

In conclusion, it is highly unlikely that realistic scenarios regarding the future development of disability and the supply of informal care would lead to a trend in the use of residential care that is substantially lower than the one which is projected in this study.

9.4. Expanding home care instead?

Are there alternative ways to meet the increased demand for residential care? An obvious measure would be to increase the supply of home care. The mechanics of the projection model make it impossible to project the consequences of an expansion of home care in a direct way. However, a suggestive finding is that if home care would be expanded by 50 percent (beyond the increase that is required already to keep up with the ageing population), and would provide care that is equivalent to that given by a partner, the projected number of users of residential care would still be

149 000. So, in this situation, 23 500 beds have to be created, for an annual increase of 1 600 beds.

The expected ageing of the population will not only push up residential care use, but will put substantial upward pressure on the demand for home care as well.

Both challenges will be difficult to meet even without additional pressure resulting from a policy to keep patients at home longer. Along the same lines, it could be argued that the current low-care residential population (about 23 000 in ROB/MRPA-O) forms a buffer stock of residential capacity that could be made available for patients with more severe disability in the future. Again, this can only be achieved if suitable living arrangements can be provided for these older persons, either at home or in other semi-residential facilities (service flats, assisted living facilities, ...).

9.5. The projections in long-term perspective

It is important to be aware that 2025 will not see the end of the expansion of residential care for older persons, or LTC generally. Figures 4 and 5 show that the number of persons aged 85 or over will start to rise considerably only after 2030, when the earliest members of the baby-boom generation will have reached that age. Persons in that age group are the dominant users of LTC.

Figure 4. Projected number of older persons in Belgium, 2000-2060, by age bracket, men.

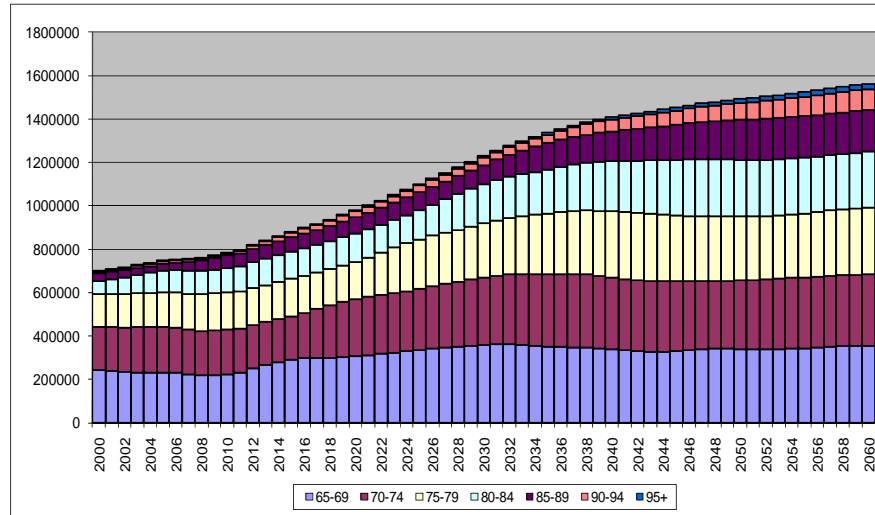
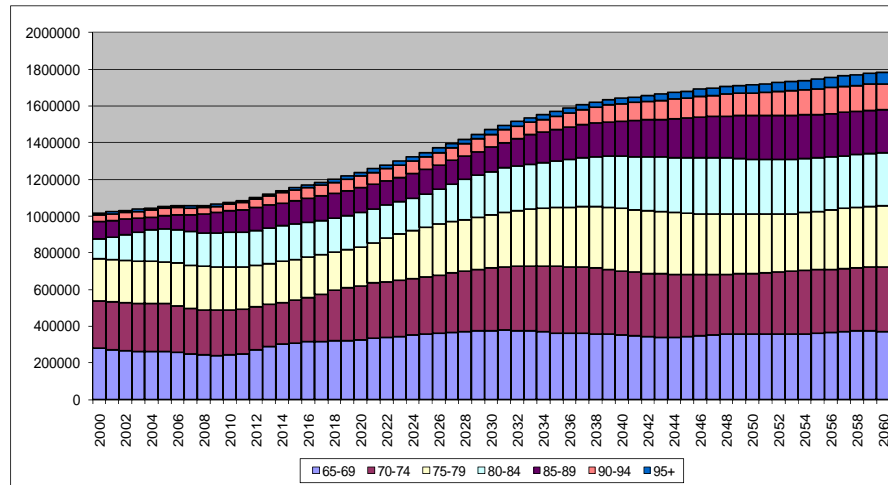


Figure 5. Projected number of older persons in Belgium, 2000-2060, by age bracket, women.



In fact, as far as LTC is concerned, the coming fifteen to twenty years should be regarded as a kind of grace period within the overall process of the ageing of the population, during which demand will only grow moderately, and which should be used to prepare for the much stronger increase which is likely to occur after 2025.

9.6. Stakeholder meeting

At the end of the research process, a stakeholder meeting was organized on the 10th of October 2011 with representatives of the following groups: policymakers at federal and regional levels, federations of cities and municipalities (Fédération des CPAS de l'Union des Villes et Communes / Vereniging van Steden en Gemeenten), healthcare professional organizations (hospitals, homes for the elderly and nursing homes, home care), service providers, sickness funds, FPS Public Health and NIHD. Overall, 17 stakeholders participated. The main objectives pursued by this stakeholder meeting were to enhance the transparency of the research process and the results obtained in terms of projection models (base model and alternative models) and to facilitate the acceptance of the policy recommendations that will be formulated. Stakeholders asked that the projection models be used in the future to test specific policies that could affect transition probabilities of LTC use, and hence the required expansion of the residential sector. However, new policy actions aiming to shift the current trends from using residential facilities to enhance home care will also have economical and societal consequences, that have to be taken into account.



Title:	Residential care for older persons in Belgium: Projections 2011 – 2025 - Synthesis.
Authors:	Karel Van den Bosch (Federal Planning Bureau), Peter Willemé (Federal Planning Bureau), Joanna Geerts (Federal Planning Bureau), Jef Breda (Universiteit Antwerpen), Stephanie Peeters (Universiteit Antwerpen), Stefaan Van De Sande (KCE), France Vrijens (KCE), Carine Van de Voorde (KCE), Sabine Stordeur (KCE)
Reviewers:	Raf Mertens (KCE), Jean-Pierre Closon (KCE), Kristel De Gauquier (KCE), Sabine Stordeur (KCE), Cécile Dubois (KCE)
External experts:	Daniel Crabbe (INAMI/RIZIV), Patrick Deboosere (Vrije Universiteit Brussel), Thérèse Jacobs (Emeritus, Universiteit Antwerpen), Jean Macq (Université catholique de Louvain), Michel Poulain (Université catholique de Louvain), Erik Schokkaert (Katholieke universiteit Leuven), Isabelle Van der Brempt (SPF Santé Publique / FOD Publieke Gezondheid)
External Validators:	Patrick Festy (Institut National d'Etudes Démographiques, France), Pierre Pestieau (Université de Liège, Belgium), Isolde Woittiez (Sociaal en Cultureel Planbureau, Nederland)
Conflict of Interest:	None declared
Layout :	Ine Verhulst, Sophie Vaes

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Publication date :	November 10 th 2011
Domain :	Health Services Research (HSR)



MeSH : Forecasting, Health services for the aged, Frail elderly, Demography, Models, Statistics
NLM Classification : WX 162
Language: English
Format: Adobe® PDF™ (A4)
Legal Depot D/2011/10273/67

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How to refer to this document?

Van den Bosch K, Willemé P, Geerts J, Breda J, Peeters S, Van de Sande S, Vrijens F, Van de Voorde C, Stordeur S. Residential care for older persons in Belgium: projections 2011 – 2025 - Synthesis. Health Services Research (HSR). Brussels : Belgian Health Care Knowledge Centre (KCE). 2011. KCE Reports 167C. D/2011/10.273/67

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