

## The mixed economy of long-term care in England, Germany, Italy, and Spain

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## **The Mixed Economy of Long-Term Care in England, Germany, Italy, and Spain**

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## **Summary**

This paper is based on a European Commission-funded study of future long-term care expenditure in Germany, Italy, Spain and the United Kingdom. It investigates how sensitive long-term care expenditure is to assumptions about demographic trends, future dependency rates, care arrangements, and real inflation. Macro-simulation projection models for each country reflecting the national characteristics of the care system were used to make comparable projections based on a set of common assumptions. This central case was then used as a point of comparison in order to explore the sensitivity of the models to alternative scenarios about key determinants of future expenditure. The proportion of GDP spent on long-term care is projected to more than double between 2000 and 2050 in each country under the central case. However, projections are highly sensitive to changes in the above assumptions.

## **Zusammenfassung**

Der Beitrag beruht auf einer EU-finanzierten Studie zur zukünftigen Entwicklung der Ausgaben für Langzeitpflege in Deutschland, Italien, Spanien und dem Vereinigten Königreich. Untersucht wird die Sensitivität der Ausgabenentwicklung hinsichtlich unterschiedlicher Annahmen zur demographischen Entwicklung, zur Pflegebedürftigkeit, zur Pflegeform und zu den Kosten der Pflege. Mittels nationaler Makrosimulationsmodelle, die die länderspezifischen Pflegesysteme berücksichtigen, wird ein auf gemeinsamen Annahmen basierendes Grundmodell berechnet, das den Referenzpunkt der nachfolgenden Sensitivitätsanalyse darstellt. Im Ergebnis zeigt sich in allen Untersuchungsländern, dass sich der Anteil des BIP, der für Pflegeleistungen aufgewandt wird, von 2000 bis 2050 mehr als verdoppelt. Allerdings sind diese Ergebnisse sehr sensitiv in bezug auf Veränderungen der genannten Annahmen.

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## Introduction

Long-term care services are crucial to the welfare of older people. As the numbers of older people rise throughout Europe, the importance of these services in terms of numbers of clients and expenditures can be expected to grow. The study of long term care services, including their financing, is an important means to promote better understanding of key issues and ultimately better outcomes.

There has been recent debate in several countries about the funding of long-term care. This is in the context of concerns about the future affordability of long-term care, as well as health care, pensions and other services, over the coming decades. These concerns arise from consideration of demographic trends, potentially declining family support for frail older people, and potentially rising expectations among older people. In this context, the European Union's Economic Policy Committee (EPC) conducted a study of the impact of ageing on future public expenditure on pensions, health and long-term care and how it would affect the fiscal sustainability of public finances (Economic Policy Committee 2001). The methodology used by the EPC consisted in applying the current age-specific expenditure profiles to projected future numbers of people. This approach has the advantage that it has low data requirements and that, given a common definition of what is included in the definition of long-term care expenditure, it produces easily comparable results. However, the approach offers limited scope to investigate the sensitivity of the projections to factors other than demography change.<sup>1</sup>

Trying to improve on that, the authors have conducted a new European Study of Long-Term Care Expenditure investigating the key factors that are likely to affect future expenditure on long-term care services in Germany, Spain, Italy and the United Kingdom (see Comas-Herrera/Wittenberg 2003 for details). Apart from a description of national care systems, the major aim was to investigate how sensitive long-term care projections are to assumptions about future trends in different factors, using comparable projection models. The main factors investigated include demographic changes, trends in functional dependency, future availability of informal care, the structure of formal care services and patterns of provision, and the future unit costs of services.

In order to set the background, chapter 1 of this paper contains a very short description of the long-term care systems for Germany, Spain, Italy and the UK. Chapter 2 describes the projection models and presents the base projections for each country. Chapter 3 investigates the sensitivity of the projections to different assumptions, while chapter 4 tries to draw some conclusions.

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<sup>1</sup> The Organisation for Economic Co-operation and Development (OECD) has also made projections of future long-term care expenditure, using a similar approach to the EPC but investigating the potential impact of changes in dependency rates (Jacobzone et al. 2000). Apart from that, however, no sensitivity analyses were made.

## 1 Central Elements of the Long-Term Care systems

The systems of long-term care for older people differ substantially between the different countries. So does the role informal and formal care. This has important consequences for the development and interpretation of projections of long-term care expenditure for each country. In the following, major features of each system are highlighted.

### 1.1 Germany<sup>2</sup>

In Germany “long-term care” refers to care given to those people who are – as a consequence of illness or disability – unable to perform activities of daily life independently for an expected period of at least half a year. Since on the one hand professional care-giving is financed both publicly and privately, and on the other hand family care is also subsidised publicly, care-giving and funding have to be separated. Long-term care is delivered informally by families and friends – mainly spouses, daughters and step-daughters – as well as formally by public and private (profit and non-profit) professional care providers. Professional care is provided in private households (i.e. home care); day and night care centres and nursing homes for older people. Long-term care is also provided in nursing homes for the disabled, although, in Germany, these institutions mainly aim at the integration of younger disabled people into working life.

Until the introduction of Long-Term Care Insurance (LTCI) in 1994, there was no comprehensive public system for financing long-term care. Care services – when utilised – were financed out of pocket with only means-tested social assistance as the last resort for those who had exhausted their assets and could not afford the necessary professional care. In effect, approximately 80% of the people with dependency in nursing homes relied on social assistance.<sup>3</sup> The LTCI Act of 1994 established public long-term care insurance and mandatory private long-term care insurance covering almost the whole population. Members of the public health insurance system became members of public LTCI, and members of private health insurance funds are obliged to become members of private mandatory LTCI. As a result about 89% of the population is now covered by public, and 9% by private, LTCI. For 2% of the population (police, firemen, etc.) specific systems exist.<sup>4</sup>

The social insurance scheme involves national eligibility criteria, which, if met, entitle the individual to choose between different types of services or cash benefits. There are three dependency levels that determine the level of benefits. The scheme is financed through social insurance contributions paid by employees and employers. There is no means test for benefits under the scheme, but there is means-tested social assistance to finance the costs of care over and above the benefits. The definition of long-term care under the LTCI Act in

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<sup>2</sup> For a more detailed description see Rothgang 2003a.

<sup>3</sup> Rothgang 1997: 215ff. See also Pabst and Rothgang 2000 for the situation before LTCI was introduced.

<sup>4</sup> For civil servants (“Beamte”) special additional systems (“Beihilfe”) remain in place.

Germany is somewhat narrower than that in other countries. In order to qualify for long-term care benefits, individuals must require help with at least two activities of daily living, for more than 90 minutes a day, over a period of six months. People with lower levels of dependency are not covered by long-term care insurance.

Since all insurance benefits are capped, private co-payment remains important and means-tested social assistance still plays a vital role, particularly in nursing home care. At the state level the “Länder” (i.e. the 16 federal states, with different legislation), subsidise the building and modernisation of nursing homes thus reducing private co-payments and social assistance expenditure.

The “Länder” have responsibility for financing investments in LTC service provision. Regulations vary greatly between the 16 federal states. Some states directly finance investments, for example in nursing homes, while others only provide subsidies for dependent older people living in nursing homes who rely or would otherwise rely on social assistance. In order to help East Germany to “catch up”, however, there is a special program which saw an investment of about 500 million Euro a year between 1996 and 2003. The central government covers 80% of this amount if the respective region provides the remaining 20% share.

## 1.2 Spain<sup>5</sup>

Long-term care in Spain is understood as the help with domestic and personal care tasks given to people who are unable to perform those tasks by themselves. The provision and financing of long term care has been a very recent policy concern in Spain, probably as a result of its relatively recent ageing process, compared to other developed countries.

From the provision of care perspective, one of the key characteristics of the system is the quasi-federal structure of the welfare system. Health and social care have been a regional responsibility since the development of the constitutional provisions on social care rights. Therefore, it should be acknowledged that in reality there is not such thing as a “Spanish long-term care system”, but instead there is a system of regional long-term care services. This feature, also present in the health system, has many implications for policy design and makes the description of recent developments more complex. Furthermore, unlike the health system, the long-term care system is by far less developed.

Reform proposals to increase the public sector involvement in funding long-term care, are now a matter of extensive policy debate, in the context of the issues raised by population ageing. The current policy debates involve discussion on how to improve the integration between health and social care and how best to finance long-term care. Discussions date back to the late nineties, but there is no specific law regulating the financing and the provision of long-term care as yet, although a new law is expected by the mid 2003. Social protection for

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<sup>5</sup> For a more detailed description see Costa-Font / Patxot 2003.



long-term care is only explicitly regulated in the 1978 Spanish Constitution under the so-called “sufficiency principle at old age (art 50)”.

As in other European countries, the family is the main provider of long-term care services. Nearly 70% of Spanish older people with dependency receive exclusively family care, mainly provided by women and children. In fact, nearly 5% of the population – 83% of which are female – are caregivers, while scarcely 3% of older people receive social services.

However, the patterns of care in Spain are expected to change significantly due to the ageing process and social change. The process of ageing in Spain has been driven by an increase in life expectancy and by a reduction in fertility rate, which is still very low (an average of 1.2 children) (Costa 2001). Also, and parallel to the fall in fertility, patterns of social change show an increase in female labour participation in the younger cohorts that will presumably continue in the next decades.<sup>6</sup> On the other hand, we might expect a reduction in the number of potential informal caregivers in the near future, which could lead to the expansion of the demand for formal long-term care services. All of these changes are expected to interact in the future provision of care to older people, and in particular, may produce a transition from a ‘family based’ model to a ‘community based model’.

Health care services are provided by the National Health Service (NHS) and are free of charge except for pharmaceuticals, orthopaedics and dental care. In contrast, social care is subject to a means-test.

As mentioned above, the responsibility for health care provision and regulation has been devolved to all 17 autonomous region-states that enjoy, from 2002, full health care responsibilities. As for health care, the regulation of social care is also a regional responsibility. Social care is mostly provided by local authorities, but private (although mostly non-profit) organisations also have an important role. As a result, regional differences are significant in social care, both in terms of how health and social care are integrated and in terms of the ‘individual entitlement’ to long-term care. Access to publicly funded long-term care is based on an assessment of needs and resources.

### 1.3 Italy<sup>7</sup>

In Italy, public long-term care (LTC) for older people comprises three main sources of formal assistance: community care, residential care and cash allowances. The Italian National Health Service („Servizio Sanitario Nazionale“ = SSN) plans and manages, through its Local Health Authorities, the health care services provided within home – so called integrated domiciliary care or „Assistenza Domiciliare Integrata“ (= ADI) – and residential settings. Personal social services, in other words domestic and personal care tasks provided within home („Servizi di Assistenza Domiciliare“ = SAD) and residential settings, are traditionally

<sup>6</sup> At the moment Spain has very low female labour participation rate with respect to the rest of the EU countries. But, by looking at the age profiles, an increasing tendency comes apparent.

<sup>7</sup> For a more detailed description see Gori et al. 2003.

both regulated and managed at a local level by Municipalities. LTC is delivered both by public and contracted private providers of health and personal social care. Health services provided within the SSN are free of charge whereas social care is means-tested and foresees users' charges. National and local taxation are the main financing sources of public LTC.

In terms of expenditure, LTC is included within the Italian social protection system, and it represents 23.1% of the Gross Domestic Product (GDP), and 50% on total public expenditure (Saniteia estimates on Istat national accounts data).

The Italian LTC has been characterised by the significant growth of another formal service in the last decade: private home care for frail older people. It is used by 2% of all the Italian families and 4.2% of households with a member aged 65 and over.

Most elderly people living at home rely mainly on informal carers who help with domestic and personal care tasks. 47.2% of families with a 65 years old member receive care from relatives (Istat 2001); 11.7% from neighbours, friends and volunteers (Istat 2000).

#### **1.4 United Kingdom<sup>8</sup>**

Long-term care in the United Kingdom (UK) is usually taken to mean help with domestic tasks, such as shopping and preparing meals, assistance with personal care tasks, such as dressing and bathing, and nursing care. Most long-term care for older people living at home is currently provided by informal carers (Pickard et al. 2000). Formal services are provided by a range of agencies including local authority social services, community health services and independent (for- and non-profit) sector residential care homes, nursing homes, home care and day care services. Long-term care services are financed by the National Health Service (NHS), local authorities, charities, and by older people themselves.

In the UK, as in Italy and Spain, health services provided under the National Health Service (NHS) are free at the point of delivery, irrespective of the financial means of the user. Social services arranged by local authorities attract user charges depending on the user's financial means. The means test takes account of the person's income and assets. The income and assets of spouses, children and other relatives are not taken into account, though spouses may be asked to make a contribution.

Access to publicly funded services is mainly through an assessment of care needs coordinated by the local authority social services department. Assessment and care management aims to match people's needs to the services available, with an emphasis on targeting services to the more disabled. People can also approach directly independent sector home help providers or care homes, but there are no public subsidies (other than a contribution to nursing home fees, funded by the NHS).

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<sup>8</sup> For a more detailed description see Comas-Herrera et al. 2003.

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There has been considerable debate in the UK about how long-term care should be funded. This concerns mainly the key issue of how far long-term care services should be publicly funded and how far they should be funded by private individuals, and the related issue of which services should be free at the point of delivery and which should be means-tested. The Government set up a Royal Commission, a high level group, to review the financing of long-term care and make recommendations about its future financing. A key recommendation of the Royal Commission (Royal Commission on Long-term Care 1999) was that the nursing and personal care components of the fees of care homes and home-based personal care should be met by the state, without a means test, and financed out of general taxation. Means testing would remain for the accommodation and ordinary living costs ('hotel' costs) covered by residential fees and for help with domestic tasks. The UK Government accepted many of the Royal Commission's recommendations but only agreed to remove the means test for nursing care in nursing homes in England (Secretary of State for Health 2000). However, the Scottish Executive decided that it would make both nursing care and personal care free of charge, for residential care and home care. The National Assembly for Wales and the Northern Ireland Assembly have decided to fund only nursing costs free of charge.

## **2 The Long-Term Care projection models and the major results from base case projections**

In this chapter the major results from the base case projection are presented (2.3). Before, however, the projection models (2.1) and the central assumptions on which the projections are based (2.2) are discussed.

### **2.1 Overview of the models**

The aims, coverage and structure of the four models used in this study differ. As well as representing different long-term care systems, the models have had different original purposes and origins. For example, while the UK model aimed to represent the whole long-term care sector for older people, as a means to inform the debate about what should be funded by the state and what by individuals, the German model originally aimed to represent the German social insurance system for long-term care, with the purpose of calculating the size of the contributions required in the future. For the purpose of the study the necessary adjustments to the German model have been made, as far as data allowed for it. The Italian, and to some extent the Spanish, model was developed specially for this project. The availability of data required for the models in these two countries, however, was limited, partly as the result of the substantial decentralisation of the long-term care systems.

The models used for this report are cell-based or macrosimulation models that have been developed to make projections of likely demand for long-term care for older people and future expenditure under a number of assumptions. The common structure to all four models

involves, broadly, three parts: the estimation of the future numbers of dependent<sup>9</sup> older people, the estimation of the volume of services they will require, and the calculation of the expenditure that those services would represent.

The first part of the models classifies the future numbers of older people projected for each country into groups according to age, gender, dependency and, in some models, other characteristics. The second part of the models applies, to the future numbers of dependent people, the probability of receiving different types of services. The services covered can be classified, broadly, into three groups: informal care, formal services provided to people who live in their own home, and institutional care. The third part of the models calculates the expenditure required to pay for those services, by applying unit costs to each of them.

All four models cover a range of long-term care services for people aged 65 or more. The models cover, as far as possible, both the public and the private sectors (in terms of provision and funding). They include informal care by family and friends, services provided to people who live in their own homes, and services provided to those living in institutions. However, opportunity costs for private care by family and friends are not taken into account.

Cash allowances have only been included when there is a specific choice between cash and services, as in the German system. The rationale for this is that in Germany, since the value of services on offer is higher than the cash allowance, people are unlikely to use their cash allowances to purchase formal care. Disability benefits in the UK and Italy, however, are often used as payments for private care (and to meet public sector charges) and are not alternatives to care. Their inclusion in total expenditure would produce double counting.

It should be stressed that these models do not make forecasts about the future. They make projections on the basis of specific assumptions about future trends. The approach involves simulating the impact on demand of specified changes in demand drivers, such as demographic pressures, changes in household composition, or specified changes in patterns of care, such as more support for informal carers. It does not involve forecasting future policies or future patterns of care.

## 2.2 Central assumptions

A common core set of assumptions is used to provide a plausible central base case projection that can be used to compare the likely impact of demographic and other pressures between countries. It also serves as a reference case against which the effect of changes in the different assumptions can be investigated. The box below summarises the set of assumptions that were chosen to make comparisons of the central projections for each country.

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<sup>9</sup> Throughout this project, dependency (used as a short hand for functional dependency) is defined with reference to the ability to perform activities of daily living (ADLs) and/or instrumental activities of daily living (IADLs).

## CENTRAL BASE CASE ASSUMPTIONS

### Numbers of older people and their characteristics

- *Older population by age and gender changes in line with Eurostat 1999-based population projections. These are country-specific, but based on a common methodology.*
- *Prevalence rates of dependency by age and gender remain unchanged.*
- *The proportion of older people by age and gender living in each household type remains constant.<sup>10</sup>*

### Demand for services

- *The proportion of older people receiving informal care, formal community care services and residential and nursing home care remains constant for each sub-group by age, gender and dependency.*

### Supply of services

- *Demand will be no more constrained by supply in the future than in the base year.*
- *The supply of formal care will adjust to match changes in demand.<sup>11</sup>*

### Expenditure and economic context

- *The unit costs of care rise in line with the EPC's assumption for the growth in productivity in each country, while GDP also rises in line with the EPC's assumptions. These assumptions are country-specific, but based on a common methodology.*

## 2.3 Base case projections

Table 1 presents a summary of the projections obtained for each country, using the projection models and the central base case assumptions described above. Some caution is required when cross-comparing the projections for service recipients and expenditure in view of the differences between the models, and differences in the definition of “dependency” in particular. Figures are more meaningful in a longitudinal perspective.

The table shows that, of the four countries, the greatest rise in the projected numbers of old and very old people between 2000 and 2050 is for Spain. The number of people aged 85 and over in Spain is projected to be nearly three times higher in 2050 than in 2000. In the UK the number of people aged 85 and over is projected to increase by a factor of two and a half. The projected increases in the numbers of people aged 85 and over in Germany and Italy are somewhere in between.

Table 1 also shows that the numbers of dependent older people are expected to roughly double between 2000 and 2050 in Spain and Italy, with a somewhat lower increase in the UK and higher increase in Germany. Projected increases in the future numbers of older people do not translate directly into similar projected increases in the numbers of dependent older people. This difference in the rates of growth of older people and the rates of growth of the numbers of dependent older people is due partly to differences in the age-specific dependency rates for each country, partly to differences in the definitions of dependency used

<sup>10</sup> This assumption only operates explicitly in the UK model, but it is implicit in the other three models.

<sup>11</sup> The models assume that the real rise in wages and other payments for care will ensure that supply is sufficient. Changes to assumptions about unit costs are made as part of the sensitivity analysis.

in each of the models, and partly to the availability of data allowing for differentiation within the very old.

*Table 1: Projected increase in numbers of dependent older people, service recipients and expenditure between 2000 and 2050 under the central base case*

	Germany	Spain	Italy	United Kingdom
% increase between 2000 and 2050				
Numbers aged 65 and over	64%	76%	56%	67%
Numbers aged 85 and over	168%	194%	168%	152%
Numbers with dependency <sup>12</sup>	121%	102%	107%	87%
Recipients of informal care only	119%	100%	109%	72%
Recipients of home-based care	119%	99%	119%	92%
Recipients of institutional care	127%	120%	81%	111%
Total expenditure	437%	509%	378%	392%
Total expenditure as % of GDP	168%	149%	138%	112%
Total exp. as % of GDP in 2050	3.32	1.62	2.36	2.89

Source: projections using the models.

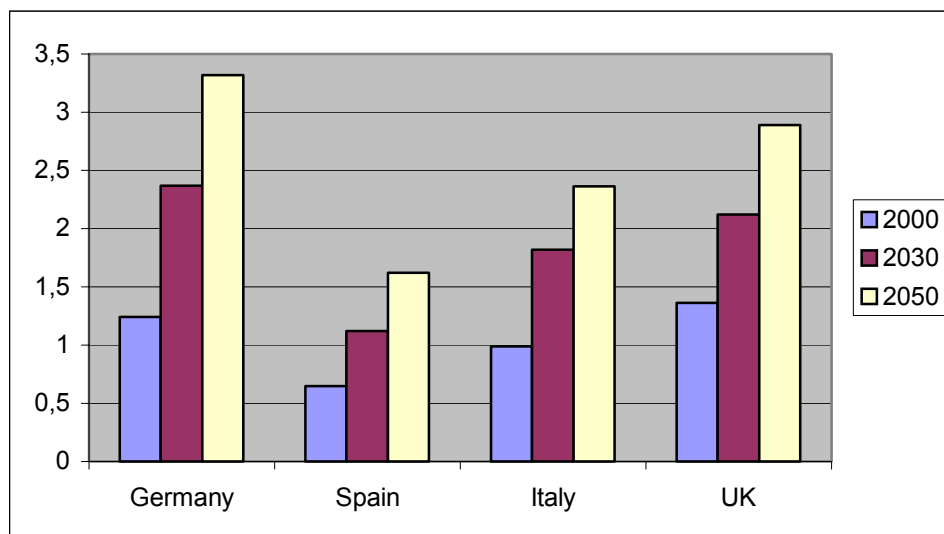
The projected rates of growth in the volume of services demanded are mostly similar to the projected rises in numbers of dependent older people. There are some differences, mainly for institutional care. These variations reflect mainly the way in which the probability of receiving services rises with age (for a given level of dependency).

Of the four countries, the one that would see the largest rise between 2000 and 2050 in projected long-term care expenditure in absolute terms would be Spain, followed by Germany, the United Kingdom and Italy. As a percentage of GDP, however, projected long-term care expenditure would rise faster in Germany (168%), followed by Spain (149%), Italy (138%) and the United Kingdom (112%).<sup>13</sup> Figure 1 shows graphically these central base case projections for rises in long-term care expenditure as a proportion of GDP. It demonstrates that by Germany will replace the U.K. as the country with the highest share of long-term care expenditure on long-term care.

<sup>12</sup> For cross-sectional comparisons these figures should be treated with caution as they are based on different measures of dependency.

<sup>13</sup> The difference between absolute and relative expenditure in long-term care is determined by the size of the difference between the projected rate of growth of the real unit costs of care and the growth in GDP (0.4% for Germany and Italy, 0.3% for Spain and 0.1% for the UK). The differences between those two figures are based on assumptions used in the EPC report (2001) about the rates of decline in the working population in those countries.

Figure 1: *Projected long-term care expenditure as a proportion of GDP in Germany, Spain, Italy and the United Kingdom, under central base case assumptions.*



### 3 Sensitivity of the projections to different assumptions

In the following the sensitivity of the projections to changes in the assumptions made about the future macroeconomic environment (3.1), numbers of older people (3.2), dependency rates (3.3), availability of informal care (3.4), and formal care patterns (3.5) are explored.

#### 3.1 Sensitivity to macroeconomic assumptions

The sustainability of long-term care expenditure does not depend on its absolute value, but on its value relative to the economy. A widely used way of showing this relative value is to show how much long-term care expenditure represents as a percentage of future economic output, i.e. Gross Domestic Product (GDP). This indicator is also used in this study. Consequently, apart from assumptions about future changes in the real unit costs of care projections also need to incorporate assumptions about GDP.

In the base case projections it is assumed that the real unit costs of care will rise in line with the future rises in productivity as assumed by the EPC and that GDP will rise in line with the EPC assumptions as well. According to the EPC, productivity will rise faster than GDP in all four countries, due to a decline in the projected number of workers. As the difference between productivity and GDP growth varies between countries, in order to be able to compare the sensitivity of the models to different variables as demography, dependency, and care arrangements, a “comparative base case” was additionally used, assuming zero real rises in unit costs and in GDP. This “comparative base case” is used as a reference scenario in section 3.2 to 3.5.

The rationale for the central base case assumption that the real unit costs of care will rise in line with the future rises in productivity is the idea of product prices growing in line with wages and the latter rising in line with productivity. In long-term care provision the relationship between unit costs and earnings of staff is particularly high. Home care and day care are clearly highly labour-intensive. Residential care is also labour intensive, with staff costs accounting for the majority of overall costs. For example, data from a UK study shows that, in public sector homes, staff costs accounted for 85% of the total unit cost (Netten et al. 1998). Similarly, a study in Germany found that staff costs accounted for between 70% and 90% of the total unit cost of nursing homes (Wolke 2001). This suggests that it would be plausible to assume that the real unit costs of care will rise in line with average earnings of care staff, or perhaps by somewhat less allowing for non-staff costs.

There is, however, scope for debate about how the earnings of care staff are likely to rise in relation to average earnings generally. There may be shortages of care staff, as the numbers of younger people potentially working as carers falls relative to the numbers of older people who would potentially require care (given no other changes in the factors that affect demand for long-term care). This has been simulated, for Germany, by Rothgang (2002). There is also evidence that shortages of care staff are already a reality in the United Kingdom (Henwood, 2001). Staff shortage could be a reason for wage rises in long-term care above average wage rises. On the other hand, less than average rises in wages could result from a process of dequalification in long-term care, which is expected by some experts (Voges 2003).

There are other factors apart from trends in the average earnings of care staff that could impact on the future unit costs of care. One potential factor is efficiency of service provision. If the efficiency of care provision rises, this would have a downward impact on rises in unit costs. A key issue is whether there is much scope for improvement in the technical efficiency<sup>14</sup> of care, since care is highly labour-intensive, and such services generally suffer from the “cost disease” identified by Baumol (1967) and Baumol and Oates (1972).

Taking into account these considerations, sensitivity analysis on the macroeconomic assumptions was carried out by testing the effect of using assumptions for real rises in unit costs per year of 0.5% points above and 0.5% points below the central case assumption. The central base case assumption on GDP growth was not varied in the sensitivity analysis. A rise in unit costs of 0.5% per year faster than the EPC productivity assumption would represent a possible future scenario in which the earnings of people employed in the delivery of long-term care rose faster than earnings in the rest of the economy e.g. in reaction to possible staff shortages. The reverse would apply to the other assumption, which could represent a scenario in which qualified nursing staff is gradually substituted by less qualified personal. Table 2 summarises the results of the sensitivity analysis.

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<sup>14</sup> The limited scope for improved technical efficiency of services needs to be distinguished from the much greater potential scope for improved cost-effectiveness through matching services more closely to needs and improving the targeting of services, as shown e.g. by Davies, Fernandez and Nomer (2000).



Table 2: *Projected growth in long-term care expenditure between 2000 and 2050 under different assumptions about real rises in unit costs of care*

	Germany	Spain	Italy	United Kingdom
<i>Central base case</i>				
GDP growth rate, per year	1.4%	1.8%	1.4%	1.7%
Unit costs growth rate, per year	1.8%	2.1%	1.8%	1.8%
% growth in exp. as % of GDP 2000-2050	168.1%	149.4%	138.3%	111.9%
% growth in absolute expenditure 2000-2050	437.2%	508.6%	377.6%	392.2%
Expenditure as % of GDP, 2050	3.32	1.62	2.36	2.89
<i>Unit costs rise 0.5% faster than EPC assumptions</i>				
GDP growth rate, per year	1.4%	1.8%	1.4%	1.7%
Unit costs growth rate, per year	2.3%	2.6%	2.3%	2.3%
% growth in exp. as % of GDP 2000-2050	242.5%	218.4%	204.5%	170.6%
% growth in absolute expenditure 2000-2050	586.3%	676.9%	510.2%	528.7%
Expenditure as % of GDP, 2050	4.24	2.06	3.02	3.69
<i>Unit costs rise 0.5% more slowly than EPC productivity assumptions</i>				
GDP growth rate, per year	1.4%	1.8%	1.4%	1.7%
Unit costs growth rate, per year	1.3%	1.6%	1.3%	1.3%
% growth in exp. as % of GDP 2000-2050	109.6%	95.1%	86.3%	65.6%
% growth in absolute expenditure 2000-2050	320.0%	376.1%	273.4%	284.7%
Expenditure as % of GDP, 2050	2.59	1.26	1.86	2.26
<i>Comparative base case for use in sensitivity analysis, with 0% growth in both GDP and unit costs</i>				
GDP growth rate, per year	0%	0%	0%	0%
Unit costs growth rate, per year	0%	0%	0%	0%
% growth in exp. as % of GDP 2000-2050	120.2%	115.3%	95.8%	101.7%
% growth in absolute expenditure 2000-2050	120.2%	115.3%	95.8%	101.7%
Expenditure as % of GDP, 2050	2.72	1.39	1.94	2.75

Source: model estimates.

Long-term care expenditure projections are clearly very sensitive to assumptions about future rises in the real unit costs of care, and long-term care expenditure as a percentage of GDP is highly sensitive to assumptions about the differential between assumed growth rates in unit costs and assumed growth in GDP.

If real unit costs of care and GDP grow at the same rate (comparative base case), demanded resources for long-term care are projected to roughly double (as a proportion of GDP) between 2000 and 2050. This would be the projected impact of demographic pressures without any allowance for rising real costs of care. If, however, real unit costs grow more rapidly than GDP (as in the base case for all countries), demand for long-term care is projected

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to rise more substantially (as a proportion of GDP). If unit costs grow more rapidly than productivity, LTC expenditure as percentage of GDP is going to more than triple for all countries with the exception of the United Kingdom, while a growth of unit costs below productivity yields growth rates below the comparative base case.

### **3.2 Sensitivity to future numbers of older people**

Projections of future numbers of older people are not at all sensitive to assumptions on fertility and hardly sensitive to assumptions on migration (Rothgang 2003b). They are, however, sensitive to assumptions about future mortality rates and life expectancy. Past population projections have sometimes underestimated future numbers of older people through under-estimating improvements in mortality rates (see Shaw 1994 for the U.K.). It is, therefore, useful to analyse how assumptions on mortality and life expectancy influence population projections and to introduce a degree of uncertainty into population projections.

The models used, as a base case, the Eurostat 1999-based central population projections. This was to assist comparability between the projections for the different countries. The sensitivity analysis tested both the official national population projections and Eurostat's variant population projections. While in the United Kingdom and Spain the central Eurostat projections are similar to the national official projections, there are substantial differences between the Eurostat projections and the national projections for Germany and, especially, for Italy. The Eurostat high and low variant population projections offer a substantial range of variation. The high scenario combines high migration rates, high fertility rates and high life expectancy assumptions, while the low scenario is characterised by low migration, fertility and life expectancy assumptions.

Table 3 shows the impact on the projected numbers of older people, the number of dependent people and long-term care expenditure of using those alternative population projections. The table shows that the choice of population projections used in the models has a substantial impact on projected future long-term care expenditure. In Italy, in particular, the use of the national official population projections instead of the Eurostat projection has a major impact on the model's projection of long-term care expenditure. In Germany, differences between Eurostat and national population projections do not translate that much into expenditure as the age bands under consideration in table 3 are too broad to directly tell how the number of dependent persons will develop.

*Table 3: Projected increase in the numbers of people with dependency and long-term care expenditure between 2000 and 2050, under different population projections*

	Germany	Spain	Italy	United Kingdom
Comparative base case (central Eurostat projection)				
Growth in numbers aged 65+	64%	76%	56%	67%
Growth in numbers aged 85+	168%	194%	168%	152%
Growth in exp. as % of GDP	120%	115%	96%	102%
Expenditure as % of GDP, 2050	2.72	1.39	1.94	2.75
High Eurostat population projections				
Growth in numbers aged 65+	84%	100%	78%	93%
Growth in numbers aged 85+	221%	317%	274%	266%
Growth in exp. as % of GDP	161%	161%	179%	154%
Expenditure as % of GDP, 2050	3.23	1.69	2.27	3.46
Low Eurostat population projections				
Growth in numbers aged 65+	42%	55%	39%	47%
Growth in numbers aged 85+	97%	90%	101%	83%
Growth in exp. as % of GDP	76%	74%	109%	67%
Expenditure as % of GDP, 2050	2.18	1.13	1.70	2.27
National official population projections				
Growth in numbers aged 65+	39%	71%	73%	71%
Growth in numbers aged 85+	133%	180%	244%	175%
Growth in exp. as % of GDP	109%	110%	174%	106%
Expenditure as % of GDP, 2050	2.66	1.37	2.23	2.86

Source: projections using the models.

### 3.3 Sensitivity to dependency assumptions

Dependency is a crucial determinant of demand for long-term care as it is dependency rather than age that determines need. Throughout this project, dependency is defined with reference to the ability to perform activities of daily living (ADLs) and/or instrumental activities of daily living (IADLs). While ADLs are generally personal care tasks and IADLs are generally domestic tasks, the definitions used in the models vary, reflecting real differences between the countries. The definitions used in each of the models vary in terms of the activities of daily living considered, the degree of ability required and how this ability is assessed. There are also differences in the number of dependency categories.

Overall, the definition of dependency in the German model is narrower than in the other countries, while the definition used in the UK model appears to be the broadest. Given these

substantial differences in the definition of dependency in the models, comparison between countries with regards to dependency rates should be treated with caution.

Projections of future numbers of dependent older people and future demand for long-term care require assumptions about future dependency rates. Particularly, as population projections in all four countries assume decreasing mortality rates and increasing life expectancy, a crucial question is whether dependency rates will fall over time as mortality rates fall or will remain constant or possibly even rise.

This question is closely linked but not identical with the question on further trends in morbidity, since “dependency” is a consequence of morbidity and disability.<sup>15</sup> While it is true that dependency is caused by ill health, it is not always the case that ill health leads to loss of independence in activities of daily living. Not all health conditions have dependency consequences and, given the same illness, factors such as personal characteristics, and access to rehabilitation, aids and adaptations will determine whether a person becomes dependent or not.<sup>16</sup> For the purpose of making projections of long-term care, the relevant trends are not trends in morbidity but trends in dependency. Illness is a prerequisite for dependency; nevertheless trends in morbidity are informative for the discussion of trends in dependency.

A range of views have been propounded on the future development of morbidity (see e.g. Deutscher Bundestag 1994, p.495-498; Cambois and Robine 1996: 11f. for an overview). Fries (1980, 1984, 1991), in particular, assumes that age-specific morbidity will decline as life expectancy grows.<sup>17</sup> This generates a rise in healthy life expectancy, that is expectation of life in good health. As a result the ratio of years spent in bad health to years spent in good health declines. If the absolute number of years spent in bad health is constant, Fries (1991: 160) speaks about a “shift to the right” of the morbidity curve. If the absolute number of years spent in bad health declines he talks about a compression of morbidity. Verbrugge (1984), on the other hand, assumes that most of the additional years of life will be spent in poor health. Thus an expansion of morbidity results, as age-specific mortality rates decline while age-specific morbidity rates remain more or less unchanged. As a kind of compromise Kane et al. (1990) proposed the concept of “bi-modality” assuming that age-specific morbidity decreases for a majority of the older population, but not for all of them. Then as life expectancy increases, the period of life in which there is a risk of dependency is longer and as a result there is an increasing share of older people in poor health.

While the debate about future patterns of morbidity is far from settled, there is at least some empirical evidence about past trends. Various epidemiological studies show a decreasing

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<sup>15</sup> The German LTCI Act (for example) defines “dependency” as a caused by illness or disability.

<sup>16</sup> A useful framework to understand the “disablement process” has been developed by Verbrugge and Jette (1994).

<sup>17</sup> In his original paper Fries (1980) assumes that the length of life, i.e. the maximum life span, is fixed and the further elimination of premature death will lead to a “rectangularization” of the mortality curve. Postponement of chronic illness leads to a rectangularization of the mortality curve as well. In later papers (see Fries 1991) he then discusses scenarios for future morbidity and longevity.

age-specific prevalence of chronic diseases (Dinkel 1999; Singer and Manton 1998).<sup>18</sup> Studies on self-perceived health status also point towards decreasing age-specific morbidity (see Brückner 1997; Klein 1999; Klein and Unger 1999; Buttler et al. 1999 for Germany, and Doblhammer and Kytir 2001 for Austria). Evidence for England and Wales – from the studies by Bebbington et al. (1996 and 2000) and by Kelly et al (2000) – show that health expectancy in terms of years lived in self-reported good or fair health and, health expectancy in terms of years lived free from self-reported limiting long-standing illness have been rising but not as fast as total life expectancy. Dinkel (1999) also concludes that healthy life expectancy in Germany has been increasing. Using data from the German Socio-Economic Panel and the US Panel on Income Dynamics to perform event-history analysis for different cohorts, Klein and Unger (2002) demonstrate a substantial improvement in active life expectancy in Germany.

Trends in morbidity are informative about the expected future health of older people, but, as discussed above, it is important not to make direct inferences about trends in dependency using trends in morbidity. Unfortunately, there is limited data available about trends in dependency. A study in the UK found little evidence of improvement in age-specific long-standing limiting self-reported illness for the period 1976 to 1998, while, for the same period, it found improvements in the expectation of life with ability to perform activities of daily living<sup>19</sup> (Bebbington et al. 2000). In the US, Manton et al. (1997) found that there was evidence of a decline in the prevalence of dependency in terms of ability to perform activities of daily living for older people between 1982 and 1994. For Germany, the analysis by Klein and Unger (1999 and 2002) found a decrease on age-specific dependency. Data on trends in dependency for Italy, and Spain are not currently available.

The uncertainty that follows from this calls for sensitivity analyses. Table 4 shows the impact on the projected future numbers of dependent older people and future long-term care expenditure of two alternative assumptions about trends in dependency. In these scenarios, the link between improved life expectancy and delayed dependency are explored. In the first scenario, dependency rates are delayed by the same number of years as life expectancy at birth are assumed to increase in the Eurostat population projections.<sup>20</sup> In the second scenario, dependency rates are delayed by half the number of years by which life expectancy at birth increases.

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<sup>18</sup> This overall picture looks different for specific diseases.

<sup>19</sup> However, the expectation of life without ADLs did not improve as fast as life expectancy.

<sup>20</sup> The base year dependency rate for those aged 70, for example, is applied under the first scenario to those aged 72 in the year in which expected life expectancy is two years higher than base year life expectancy. Under the second scenario it is applied to those aged 71.

*Table 4: Projected increase in the numbers of people with dependency and long-term care expenditure between 2000 and 2050, under different assumptions about trends in dependency.*

	Germany	Spain	Italy	United Kingdom
<i>Comparative base case (constant dependency rates)</i>				
Growth in nos. with dependency	121%	102%	107%	87%
Growth in exp. as % of GDP	120%	115%	96%	102%
Expenditure as % of GDP, 2050	2.72	1.39	1.94	2.75
<i>1 year rise in life expectancy delays dependency by 1 year</i>				
Growth in nos. with dependency	34%	56%	-1%	35%
Growth in exp. as % of GDP	29%	64%	27%	45%
Expenditure as % of GDP, 2050	1.58	1.06	1.26	1.98
<i>1 year rise in life expectancy delays dependency by 0.5 years</i>				
Growth in nos. with dependency	73%	79%	41%	61%
Growth in exp. as % of GDP	72%	90%	54%	73%
Expenditure as % of GDP, 2050	2.11	1.23	1.53	2.36

Source: model estimates.

The impact of these two alternative dependency assumptions depends on the expected increase in life expectancy at birth in each country. The expected increase between 2000 and 2050 is projected by Eurostat to be 7.28 years for males and 4.94 years for women in Italy, compared to 5.50 years for males and 3.30 years for females in Spain. The projected rise in life expectancy in Germany and the United Kingdom lies somewhere in between. As a result, the impact of these assumptions on the future numbers of people with dependency and future long-term care expenditure varies between countries. The scenarios have greater impact in Germany and Italy than in Spain and the UK. Overall, however, the impact of changes in age-specific dependency rates are dramatic. In the first scenario the growth in the number of dependent persons is halved in Spain and completely vanishes in Italy, with Germany and the UK in between. This demonstrates the enormous role prevention and rehabilitation could play in cutting future expenditure.

### **3.4 Sensitivity to changes in the assumptions about informal care**

Informal care is the most important source of support for dependent older people at the present time in all four countries in the study. In all the countries, however, concerns have been expressed about the future availability of informal care. These concerns are based on a number of anticipated future trends that would suggest that informal care is likely to decline in all the countries in the long-term: There is evidence of downward trends in co-residence of older people with their children, upward trends in older people living alone, a declining

female care-giving potential and rising female employment rates. A reduction in informal care would have a major impact on demand for formal care and is therefore likely to be an important determinant of future expenditure on long-term care.

The precise definition of informal care used in the models varies somewhat between the countries. The definition of informal care used in the scenarios for all countries refers only to dependent older people who rely exclusively on informal care. Dependent older people who use formal services as well as informal care are excluded from the definition. This definition was adopted to maximise the comparability between the models, in the absence of data on informal care for some countries.

Although important in all the countries, informal care is likely to be more important in some countries participating in the study than in others. The existing literature would suggest that family support of older people is greater in the Southern European countries than in the Northern European countries (Hugman 1994). This has been particularly associated with the fact that multigenerational households continue to remain much more common in Southern than in Northern Europe. The existing literature would therefore suggest that informal care is likely to be more important in Spain and Italy, the Southern European countries in the study, than in Germany and the UK, the Northern European countries. Comparison between the countries, using information from the descriptions of the long-term care systems, provides some support for this.

Thus, evidence that informal care is more important in the Southern than the Northern European countries can be found by comparing information on Spain and the UK. In Spain, two thirds of all dependent older people rely on informal care only, whereas, in the UK, less than half rely exclusively on informal care. This suggests that informal care is much more important in the support of dependent older people in Spain than in the UK. However, there are also important differences among the Southern European countries and among the Northern European countries in the study. On the one hand, among the Southern European countries, it appears that reliance on informal care in Italy has been changing in recent years. The description of the long-term care system in Italy describes how, during the 1990s, there was an increasing recourse to paid work by households that include older people. This has primarily taken the form of the private purchase of home care for older people, financed in part by payments for care, such as the „indennità di accompagnamento“. The description of the long-term care system in Italy argues that it is now very common for older people and their families to purchase home help from untrained assistants, often from countries outside the EU. The effect of this has been to weaken reliance on family care and broaden reliance on the private care market.

On the other hand, there are also clear differences among the Northern countries in the study. The information supplied in the descriptions of the long-term care systems suggests that informal care is more important in the support of dependent older people in Germany than the UK. Thus, looking at older people experiencing problems with two or more Activities of Daily Living (ADLs), 43% rely only on informal care in Germany compared to 31% in the UK.

Given the anticipated trends in informal care in the coming years, a number of scenarios were developed which tested the sensitivity of the models to a decline in informal care. Three scenarios were commonly tested. The first two scenarios both assume a decline of 0.5% a year in the proportion of dependent older people receiving informal care. The first assumes that the people no longer receiving informal care will move into institutions. The second assumes that they will receive an average package of home care. The third scenario allows for a decline of 1% in the proportion of dependent older people receiving informal care, with half moving into institutions and half receiving home care.

*Table 5: Projected increase in numbers of older people receiving informal and formal care and increase in long-term care expenditure between 2000 and 2050, under different assumptions about informal care*

	Germany	Spain	Italy	United Kingdom
<i>Comparative base case</i>				
Numbers receiving informal care only	119%	100%	109%	72%
Numbers receiving home-based care	119%	99%	119%	92%
Numbers receiving institutional care	127%	120%	81%	111%
Growth in expenditure as % of GDP	120%	115%	96%	102%
Expenditure as % of GDP in 2050	2.72	1.39	1.94	2.75
<i>0.5% decrease in numbers receiving informal care, with increased institutionalisation</i>				
Numbers receiving informal care only	70%	82%	63%	60%
Numbers receiving institutional care	195%	260%	154%	147%
Growth in expenditure as % of GDP	148%	236%	158%	120%
Expenditure as % of GDP in 2050	3.07	2.18	2.55	2.99
<i>0.5% decrease in numbers receiving informal care only, with increased home-based formal care</i>				
Numbers receiving informal care only	70%	82%	63%	60%
Numbers receiving home-based care	226%	186%	161%	101%
Growth in expenditure as % of GDP	127%	134%	109%	107%
Expenditure as % of GDP in 2050	2.81	1.52	2.07	2.82
<i>1% decrease in numbers receiving informal care, with increased home-based care and institutionalisation</i>				
Numbers receiving informal care only	32%	67%	27%	51%
Numbers receiving home-based care	215%	176%	157%	100%
Numbers receiving institutional care	187%	245%	146%	143%
Growth in expenditure as % of GDP	162%	240%	163%	122%
Expenditure as % of GDP in 2050	3.24	2.20	2.60	3.03

Source: model estimates.



The results of these scenarios (Table 5) suggest that, in all four countries, the impact of a decline in informal care would depend on the type of formal care provided to those no longer receiving informal care. A decline in informal care accompanied by wider admissions to institutional care would have much greater financial consequences than a similar decline accompanied by wider receipt of average packages of home-based care. A uniform proportionate decline in informal care would, however, affect demand for formal care in some countries more than others. The impact would be greatest in Spain and least in the UK. This is because Spain currently relies far more heavily on informal care than the UK, which is the country with the lowest rate of informal care among the four countries in the study.

### **3.5 Sensitivity to changes in the assumptions about formal care**

The most important difference between the long-term care funding systems in the four countries at present is between the system in Germany and that in the other three countries. A central feature of the German Long Term Care Insurance scheme is that it provides a national system of benefits to older people based on their assessed dependency. The scheme is based on clear, nationally-applicable rules of entitlement. In the other countries in the study there is no national entitlement to long-term care based on an assessment of dependency, comparable to that which exists in Germany.

The study examined the effects on long-term care expenditure of a scenario in which a national entitlement to formal care, similar to that which exists in Germany, was extended to moderately/severely dependent older people in the other three countries in the study. The scenario also provided an opportunity for the German model to explore a potential change in older people's preferences by assuming that all severely dependent older people received professional care. The effect of the scenario was, in effect, to substitute formal for informal care, at least in part.

The results of the entitlement to care scenario (Table 6) suggest that, if all those with moderate to severe dependency were given an entitlement to an average package of home care, this would have a considerable impact on projected expenditure. The impact on expenditure would vary between the countries. Projected expenditure as a percentage of GDP in 2050 under this scenario would be 14% higher than under the base case in Germany, 40% higher in Spain, 30% higher in Italy and nearly 20% higher in the UK.

The scenario has the least effect in Germany, where those affected already receive benefits in the form of cash payments. The net increase in expenditure in Germany is the difference between the value of the cash benefit and the cost of the in-kind benefit. In the other countries, the effect is greater than in Germany because the scenario allocates home care to people who, under the base case, receive no formal care. The impact is highest in Spain, followed by Italy and the UK. This is because a higher proportion of dependent older people rely solely on informal care in Spain and Italy than in the UK.

Table 6: *Projected increase in demand for long-term care services and in long-term care expenditure between 2000 and 2050, under different assumptions about formal care*

	Germany	Spain	Italy	United Kingdom
<i>Comparative base case (no change in patterns of care)</i>				
Growth in home-based formal care	119%	99%	119%	92%
Growth in numbers receiving institutional care	127%	120%	81%	111%
Growth in expenditure as % of GDP	120%	115%	96%	102%
Expenditure as % of GDP, 2050	2.72	1.39	1.94	2.28
<i>Entitlement to formal care scenario</i>				
Growth in home-based formal care	605%	494%	333%	135%
Growth in numbers receiving institutional care	127%	120%	81%	111%
Growth in expenditure as % of GDP	151%	202%	155%	141%
Expenditure as % of GDP, 2050	3.10	1.96	2.53	3.28

Source: model estimates.

## 4 Conclusions

Conclusions relate to key results (4.1), key caveats (4.2), and implications for policy (4.3).

### 4.1 Key results

The proportion of GDP spent on long-term care is projected to more than double between 2000 and 2050 in each country under the central projection. This projection takes account of demographic pressures on the basis of Eurostat population projections. It also takes account of real rises in care costs and in GDP on the basis of EPC assumptions about productivity and economic growth in each country.

The sensitivity analysis carried out using the four models shows that projected future demand for long-term care services for older people is sensitive to assumptions about future numbers of older people and even more about future prevalence rates of dependency. Projected future expenditure on long-term care for older people is also sensitive to assumptions about future rises in the real unit costs of services, such as the cost of an hour's home care.

The four models produce projections of future long-term care expenditure based on a specified set of central assumptions. This set of assumptions seems plausible but is clearly not the only possible set. As the sensitivity analysis demonstrates, the models are sensitive to

changes in those assumptions. This means that the projections should not be regarded as forecasts of the future.

## **4.2 Key caveats**

The project used four different models, of which only the Italian model was constructed especially for this study. Caution needs to be exercised in comparing projections between countries, as the four models differ in some important respects, such as the definitions of dependency, the range of formal services covered and the treatment of informal care, mostly due to differences in the data available in each country. These differences in the models have an impact on the projections.

The expenditure projections produced by this study do not constitute the total costs of long-term care to society. That would require inclusion of the costs of a wider range of services to a wider range of public agencies and service users and, in particular, the opportunity costs of informal care. It should also be stressed that no allowance has been made here for changes in public expectations about the quality, range or level of care.

## **4.3 Implications for policy**

The results of the study show that, unless prevalence rates of dependency decline, the numbers of dependent older people requiring long-term care will rise significantly over the next 50 years. They also show that, if improved health care or other measures were to have the effect of reducing dependency rates, this would at least partially offset expected demographic pressures from rising numbers of older people. The implication is that there is a need to promote measures that are likely to reduce dependency in old age and to promote healthy ageing, i.e. prevention and rehabilitation.

Families and other informal carers provide much of the care for dependent older people living at home. Projections suggest that a decline in the supply of informal care provided to older people resulting in increased admissions to residential care could have considerable financial consequences. This highlights the importance of services to support informal carers.

The central projections, showing rising numbers of dependent older people, mean that substantial rises in formal services will be required. The development of non-residential services, such as home care and day care, will be especially important. Older people generally prefer to remain in their own homes as long as possible. If this preference is to be recognised, a substantial expansion of non-residential services will be required.

The models also project that the proportion of GDP required to fund long-term care services will rise significantly under the central projection between 2000 and 2050. This is not to suggest that these rises are unaffordable or that there is a looming demographic 'time-

bomb' or crisis of sustainability of long-term care expenditure. It does suggest, however, that efficiency will be important to limit to some extent real rises in unit costs, though the scope for growth in efficiency of long-term care services may be limited. It also suggests that the achievement of higher cost-effectiveness of long-term care will be important. This may require closer matching of services to needs.

The importance of the results of the sensitivity analysis as a whole lies in the fact that it is beyond the present state of knowledge to set probabilities for future trends in the factors examined here. Yet it is important for policy and planning purposes to demonstrate the extent of sensitivity of future long-term care expenditures to assumptions about these trends. The findings suggest that policy-makers need to plan for uncertainty in future demand for long-term care for dependent older people. Future mortality and prevalence rates and rises in unit care costs, which are inevitably uncertain, have substantial implications for future demand for long-term care and associated expenditure.

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