

## **SILVER\_02. Challenge Brief – PCP call for tenders**

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### **1. Introduction**

This brief contains information about the SILVER pre-commercial procurement (PCP) challenge, carried out by the Technology Strategy Board.

#### **1.1 Goal of the SILVER Challenge**

The main goal of the SILVER challenge is to develop new innovative robotic solutions that target assisting the elderly and those caring for them with personal activities of daily living. These solutions are not yet on the market, but can be developed and tested within the SILVER PCP period of 2-3 years. These robotics solutions will be able to take over all or part of the work of care givers.

Tenderers should aim at a market introduction of their new solution a maximum of 2-4 years after the end of the PCP. In 2020 the new solutions should make it possible to care for 10% more people with the same amount of staff. But this challenge is not only about costs and time saving, it is also about improving the quality of life of elderly citizens and help them contribute to society as they grow older.

In total 2,150,000 Euros is reserved for the PCP SILVER contracts.

#### **1.2 PCP**

PCP is a competition-like procurement method which enables public sector bodies to engage with innovative businesses and other interested organisations in development projects, to arrive at innovative solutions that address specific public sector challenges and needs. The new innovative solutions are created through a phased procurement of development contracts to reduce risk.

Research and development services will be paid for at market prices, thus providing business with a transparent, competitive and a reliable source of early-stage financing, and the opportunity to establish an early customer, for a new solution. Since PCP focus on specific identified needs, the chance of exploitation of developed solutions increases.

The PCP method is suited to tenderers of all sizes, including small and medium-sized ones, as the contracts are of relatively small value and operate on short timescales.

#### **1.3 Authority**

The Technology Strategy Board, established in North Star House, North Star Avenue B1, SN2 1JF Swindon – UNITED KINGDOM will act as the Authority that carries out the PCP procurement on behalf and in the name of a cross-border group of SILVER contracting authorities with parties from five European countries. More information about the Authority and the group of SILVER contracting authorities can be found in the SILVER\_01 Invitation to Tender document.

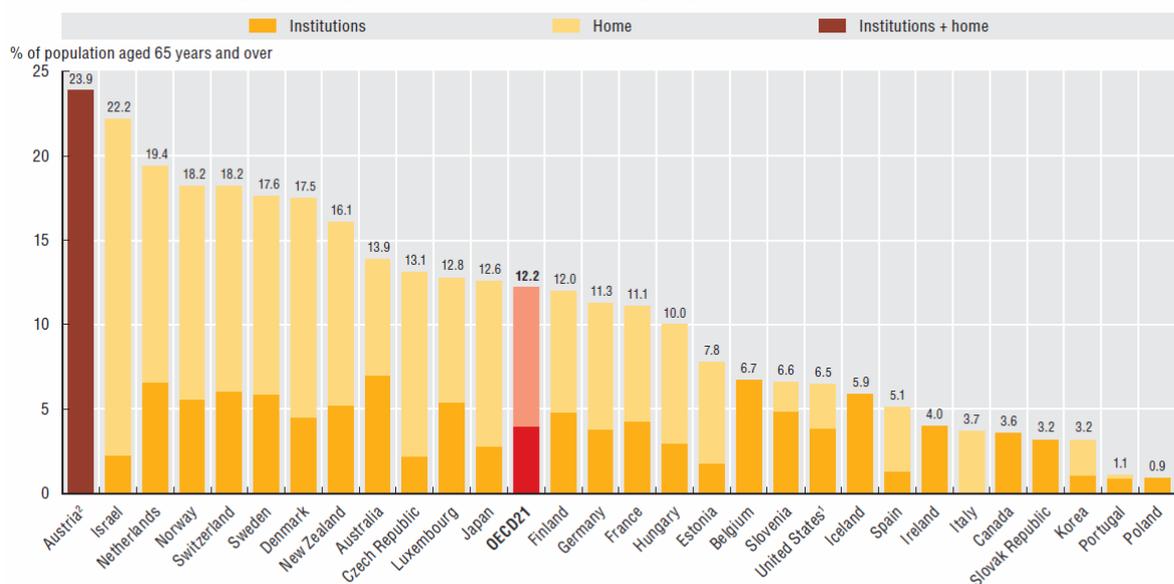
## 1.4 Background and preparation of the SILVER PCP

### Demographics and policy

Demographic ageing is one of the most serious challenges Europe is facing. According to recent projections, the number of Europeans aged 65 and over will almost double over the next 50 years, from 87 million in 2010 to 148 million in 2060. Also life expectancy for both males and females is still increasing. Nowadays female life expectancy after the age of 65 is 20.7 years and male life expectancy after the age of 65 is 17.2 years.

If this demographic transition is not tackled head-on, it will raise considerable concerns for the financial sustainability of health and care systems. Public spending on health already accounts for 7.8% of GDP in the EU, and by 2060, public expenditure on acute health care and long-term care is expected to increase by 3% of GDP due to ageing. The increasing pressure on public budgets, the steady decline in the number of health personnel and the growing demands from older people for care products and services ask for solutions.<sup>1</sup>

8.4.1 Population aged 65 years and over receiving long-term care, 2009 (or nearest year)



1. In the United States, data for home care recipients refer to 2007 and data for recipients in institutions refer to 2004.
2. In Austria, it is not possible to distinguish LTC recipients at home or in institutions. The data refer to people receiving an allowance for LTC, regardless of whether the care is provided at home or in institutions. Because of this, Austria is not included in the OECD average.

Source: OECD Health Data 2011.

<sup>1</sup> Data from July 2011, most recent data: Further Eurostat information, Database [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Sustainable\\_development\\_-\\_Demographic\\_changes](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Sustainable_development_-_Demographic_changes).

As the population ages there are clear increases in various conditions that are detrimental to quality of life. According to the 2011 WHO World Report on Disability, 30% of the population above 60 have some kind of disability and the degree is rising with higher age<sup>2</sup>

Most European countries are developing policies to have the elderly stay as long as possible in their own homes in combination with home care rather than having them live in nursing homes. This reduces the pressure on health systems and contributes less to the rise of the national care budgets, than people living in nursing homes or in other institutional care centres. Living in their own homes independently contributes to the quality of life of the elderly.

Information on the national, regional or local situation in the Authority and the group of SILVER contracting authorities is given in annex 1.

### **Needs assessment**

In all SILVER countries needs assessments have been carried out. The conclusion from these assessments was that eldercare is a highly complex area in which there are multiple potential target groups for each potential technology. The common needs of the different countries are best categorized and encompassed by the selected personal Activities of Daily Living (p-ADLs) in the SILVER call. These p-ADLs represent a real need of the public procurers and target areas in which all SILVER partners see a significant potential for technology in general and especially for robotics technology. The chosen ADLs both involve specific tasks and a substantial (albeit very diverse) group of elderly and their carers. The chosen ADLs are also, across all the participating countries, the most expensive areas in terms of costs for the public procurers.

### **Market consultation**

The SILVER consortium has carried out a market consultation in September and October 2012 with information requests as preparation for the SILVER PCP. 33 responses were received from 12 different countries. 1/3 of the respondents were from technological institutes and universities and 2/3 from companies. 85% of the respondents have expressed an interest in submitting a tender for the SILVER call.

The responses helped form a better description of the innovation SILVER is looking for and further define the definition of robotics used in the SILVER call documents.

## **2. SILVER Challenge: Care for 10% more elderly**

The SILVER challenge is to care for 10% more elderly with the same amount of staff in 2020 by having new robotics solutions that can take over all or part of the work of care givers. These robotics solutions should enable elderly – even when facing multiple physical and mental disabilities – to stay independently as long as possible and live in their own homes, if necessary in combination with assistance from home care staff.

In order to let older people live independently in their own homes, it is important to understand what kind of activities elderly people need assistance with. Current methods of supporting these individuals rely heavily on human intervention either from care professionals or from unpaid carers such as relatives. However, our society is moving

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<sup>2</sup> [http://whqlibdoc.who.int/publications/2011/9789240685215\\_eng.pdf](http://whqlibdoc.who.int/publications/2011/9789240685215_eng.pdf)

towards one where families are more dispersed and increasingly elderly people are living alone.

To stay independent it is important that the elderly receive tailored support that does not take over activities they are still able to do themselves, especially in situations where many would prefer to be independent from help from other humans. The more physical and mental activity is encouraged, the better this is for the health condition of the elderly.

If the assistive tasks or parts of these tasks could be done by a robotic solution this would not only save time for the care givers and facilitate the work of care givers, but – and this may be more important – would add to the quality of life of the care receivers as well. Being able to do personal activities of daily living at a time that suits the person and not having to wait for someone to assist, would make the elderly more self-reliant.

Experts will evaluate the tenders amongst others on the expected impact the proposal will have on time saving for home care staff and usability for the target group. The robotics solution should target assisting the elderly, though the robotics solution might be operated by the care giver instead of the care receiver. So the target group for the solution can be both care givers and care receivers.

Tenderers are advised to talk to local homecare service and to care givers for a better understanding of the homecare market, the needs of the elderly and the work that is done by care givers. Understanding of what kind of assistance and how this is given will help the tenderer to make a usable robotics solution that fits the needs of the elderly and will contribute to the SILVER challenge.

## Boundary conditions

The robotics solutions looked for use advanced state of the art technology and:

- enable more elderly people with disabilities to live independently in their homes without an increase – or preferably even a decrease – in resources needed from care giver organisations, nor without putting extra burdens on relatives and friends;
- will promote aging-in-place by making the elderly independent and thereby enabling them to stay in their own homes for as long as possible with a good quality of life
- are designed to assist individuals primarily in their own homes even though some of the solutions might be useful also in care facilities;
- are usable for the elderly, taking into account challenges that are common with rising age, e.g. mild disabilities both physical such as eye-sight, hearing, strength, balance, coordination and mobility and cognitive such as memory and learning capacity;
- do not stop activity the elderly are still able to do themselves;

Preferably these solutions should also:

- increase the quality of life of the elderly, and facilitate the work of care giver professionals, as well as families and friends,
- make a positive contribution to the general health condition of the elderly (alternatively, decline into ill health is delayed),
- aim at giving tailored support rather than taking over activities that the elderly are still able to do themselves
- encourage physical and mental activity by supporting activities that carry out activities with elderly rather than taking over activities fully, especially in situations where many elderly would prefer to be independent from help from other humans.

## Elderly

It is common that the elderly have multiple diagnoses that interlink. For example, many elderly suffer from a combination of conditions that increasingly common with rising age, i.e. mild disabilities both physical such as eye-sight, hearing, strength, balance, coordination and mobility and cognitive such as memory and learning capacity. Such conditions can have a very severe impact on the ability of an individual to continue their lives in an independent manner, as they impair both physical and cognitive skills.

Such conditions can have a very severe impact on the ability of an individual to continue their lives in an independent manner, as they impair both physical and cognitive skills.

To illustrate what difficulties elderly people encounter in their daily living we have described the following case:

CASE description: Anne is 79 years old and lives in an apartment in the suburbs of a large city. Since the death of her husband two years ago, she is alone. That is not always easy, because Anne notices that she is getting older.

Preparing meals, cleaning her home, everything becomes more difficult. She still does her shopping, with a rollator. Her health is declining. Anne has severe diseases and she has to take medicines at the right time. She needs support stockings. She will not give up independence and manages as well as she can. Recently she has bought a robotic vacuum cleaner to help her with the cleaning. Due to lack of strength in her arms and hands, she cannot put her stockings on and off herself. Homecare staff comes to help her every day with this.

When her daughter moves to another city, she needs more help from homecare. She receives a hot meal every day that she only has to heat in the microwave to cook. A few months later she also needs assistance with showering and dressing. More recently, medication has become a problem, since lately she has started to forget things. In the morning, the nurse helps and reminds her about her morning wash, getting dressed and making breakfast. The nurse also helps remind her to take her medicine on time. In the evening, the nurse sees to it that Anne has had dinner and ensures her evening medication has been taken. She also helps Anne to get dressed for the night.

## Business opportunities

The demographic changes and the pressure on the small group of care givers create opportunities for the development of new technological solutions for enabling and sustaining management of activities of daily living, such as getting dressed or maintaining personal hygiene; or instrumental activities of daily living like taking medication, doing grocery shopping, preparing a hot meal; or making up for physical limitations apparent in lifting objects.

## 3. Scope

The Authority is looking for new innovative robotics solutions that target assisting the elderly in order to assist them with personal activities of daily living (p-ADL). These solutions are not yet on the market, but can be developed and tested within the SILVER PCP period of 2-3 years. These robotics solutions will be able to take over all or part of the work of care givers.

This PCP challenge is about combining different technologies into a single system to deliver a robotic support for p-ADL tasks as mentioned before, to assist independent living of the elderly. The Authority is using the following definition for robotics:

**Robotics** for care is considered the domain of systems able to perform coordinated mechatronic actions (force or movement exertions) on the basis of processing of information acquired through sensor technology or through information and commands of operators, with the aim to support the functioning of impaired individuals, care and rehabilitation of elderly and patients and also to support individuals in prevention programmes.

Excluded are tenders focussing solely on development of basic robotics components; communications tools and solutions simply interacting through a display or alerting the outer world on certain conditions.

## Functional requirements

Tenderers should target robotics solutions assisting the elderly with one or more of the following activities related to self-care tasks. These activities are known in homecare as personal activities of daily living (ADL). The personal ADL below are not written in a prioritised order. To get an impression on how much time these activities cost for homecare staff we have added some time estimations in the following table.

<i>p-ADL</i>	<i>Description of ADL tasks</i>	<i>Example of ADL task</i>	<i>Time Indication*</i>	<i>Functional requirements for solution</i>
<b><i>Personal hygiene and grooming</i></b>	<ul style="list-style-type: none"> <li>• Wash face and hands</li> <li>• Take a bath/shower</li> <li>• Wash hair</li> <li>• Grooming</li> <li>• Comb the hair</li> </ul> <ul style="list-style-type: none"> <li>• Brush teeth</li> <li>• Shave</li> <li>• Do make-up</li> <li>• Manicure</li> <li>• Pedicure</li> </ul>	Providing a person with paralysed or stiff arms the possibility to have his/her face washed	15-45 minutes	Assisting a person unable to manage one or more of the mentioned tasks
<b><i>Eating and drinking</i></b>	<ul style="list-style-type: none"> <li>• Eat, i.e. bringing food to the mouth and eat</li> <li>• Drink, i.e. bringing the drink to the mouth and drink</li> <li>• Supplying oneself with and cutting the food</li> <li>• Preparing (cooking) food is not included</li> </ul>	Serving food on a plate and cutting it in small pieces for someone who can use only one hand	10-30 minutes	Assisting a person unable to manage one or more of the mentioned tasks
<b><i>Maintaining continence or the ability to use a restroom, incl. dressing and transfer</i></b>	<ul style="list-style-type: none"> <li>• Controlling bladder and/or bowel</li> <li>• Moving to and from toilet and getting clean after toilet visit</li> <li>• Arranging clothes and washing hands</li> <li>• Getting to the bath room in time</li> </ul>	Assisting someone with transfer to and from the toilet and during that process helping them to take off and put on clothes	10-40 minutes	Assisting a person unable to manage one or more of the mentioned tasks
<b><i>Taking medications as prescribed</i></b>	<ul style="list-style-type: none"> <li>• Dosing</li> <li>• Taking</li> <li>• Reminding</li> <li>• Documentation</li> </ul>	At predefined times alerting a citizen to take their medication and assisting that person in the actual physical action of taking the medication.	5-10 minutes	Assisting a person unable to manage one or more of the mentioned tasks

<i>p-ADL</i>	<i>Description of ADL tasks</i>	<i>Example of ADL task</i>	<i>Time Indication*</i>	<i>Functional requirements for solution</i>
<i>Functional transfers</i>	<ul style="list-style-type: none"> <li>• Moving in the bed, i.e. changing position, sitting up on in the bed and laying down in bed</li> <li>• Moving between bed and chair or between chairs</li> <li>• Moving between rooms at the same floor</li> <li>• Moving between different floors in the home</li> <li>• Transferring from seated to standing</li> </ul>	Assisting someone to rise from lying in bed to sitting on bedside and then assisting them to transfer to a wheelchair	5-15 minutes	Assisting a person unable to manage one or more of the mentioned tasks
<i>Dressing and undressing, including the ability to make appropriate clothing decisions</i>	<ul style="list-style-type: none"> <li>• Undressing</li> <li>• Dress upper body</li> <li>• Dress lower body</li> <li>• Putting on (support) stockings or leggings</li> <li>• Taking out appropriate clothes from wardrobe/drawer</li> </ul>	Assisting a person who cannot stand on their legs to put on trousers	5-30 minutes	Assisting a person unable to manage one or more of the mentioned tasks

\* this is an indication, assistance time varies per person and per visit



### Ethical aspects

Ethical issues may arise in some of the R&D pilots. Technologies can enhance and enable independence but they can have the potential to produce less positive outcomes. Ethical aspects may comprise: the loss of privacy or personal liberty and the feeling of loss of control. Tenderers are advised to take account of ethical aspects at an early stage.

In Phase 2 – when it is clear whether the participants will be elderly / healthy / able to give their consent or whether their personal data will be collected or tracking or observation of people will be involved – the ethical approach details together with participant recruitment criteria will be revisited. These will be reviewed and concluded on before the commencement of Phase 3. An external ethical advisory board will be established to provide guidance on ethical issues. In addition ethical responsibility will be taken by specialists guiding the testing, from the Authority and the group of SILVER contracting authorities, appointed by the Authority.

Issues concerning data protection will be given serious attention. All collection and use of personal data should be avoided to the extent possible.

## 4. Tender Process

Directions on how to enter this PCP competition can be found in the SILVER\_01 Invitation To Tender.

More information on this PCP can be found at [www.silverpcp.eu](http://www.silverpcp.eu).



## Annex 1 Facts and figures SILVER partners

Projection of the total population, persons aged 65 and over and persons aged 80 and over (in millions) in the countries of Authority and the group of SILVER contracting authorities and EU-25<sup>3</sup>

Country	2010			2020			2030		
	total	≥ 65	≥ 80	total	≥ 65	≥ 80	total	≥ 65	≥ 80
Denmark	5.5	0.9	0.2	5.7	1.1	0.3	5.9	1.3	0.4
Netherlands	16.6	2.6	0.7	17.2	3.4	0.8	17.6	4.3	1.3
Finland	5.4	0.9	0.3	5.6	1.3*	0.3	5.8*	1.5*	0.5
Sweden	9.4	1.7	0.5	10.1	2.1	0.5	10.6	2.4	0.8
UK	62.2	10.3	2.9	66.5	12.5	3.5	70.4	15.0	4.7
EU-25	472.8	82.9	22.7	486.8	99.5	28.7	495.8	118.9	35.6

\* figures provided by Forum Virium, Finland

### Denmark - City of Odense and the Region of Southern Denmark

The City of Odense is the biggest city in the Region of Southern Denmark (RSD). RSD is one of five regional health authorities, responsible for providing health care at hospitals and integrated care to patients in cooperation with municipalities. Among these Odense, who is responsible for providing homecare to elderly.

The City of Odense spends a quarter of the total care budget for elderly living at home on a group of 10% of the elderly who need care and practical assistance combined with normal training. Another category of 4% of the elderly receive 14% of the total budget. These elderly have difficulties in doing common tasks and they get full care: e.g. help putting stockings on and off, going to the toilet, preparing meals, personal hygiene, cleaning.

Nowadays only 1% of the elderly receive care and practical assistance combined with *dementia* training. This is 6% of the budget, but the number of people who need this kind of care is expected to grow in the future.

### Finland – the city of Oulu

The city of Oulu has more 141,000 habitants, 10% is 65 years or older, 4% is 75 years or older. 11% of the elderly receive home care. Of these care-receivers 33% needs help with personal care, 94% needs help with other activities of daily living.

### Finland – the city of Vantaa

The vision of Vantaa on services for the elderly and disabled is that an old or handicapped resident of Vantaa acts, has a freedom of choice and lives a meaningful life. Vantaa's target is that 92 % of the elderly of 75 years and older lives at home.

The city of Vantaa has 203,000 habitants, 13% is 65 years or older, 4,6% is 75 years or older. 7% of the elderly of 75 years or older receive regular home care (visits once a week or

<sup>3</sup> The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies, European Economy April 2011 [http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2011/pdf/ee-2011-4\\_en.pdf](http://ec.europa.eu/economy_finance/publications/european_economy/2011/pdf/ee-2011-4_en.pdf)



more often). Of all regular care-receivers 25% needs help with personal care, 90% needs help with other activities of daily living. Most time is spent on visits to help with medication, (un-)dressing, bathing and personal hygiene and feeding.

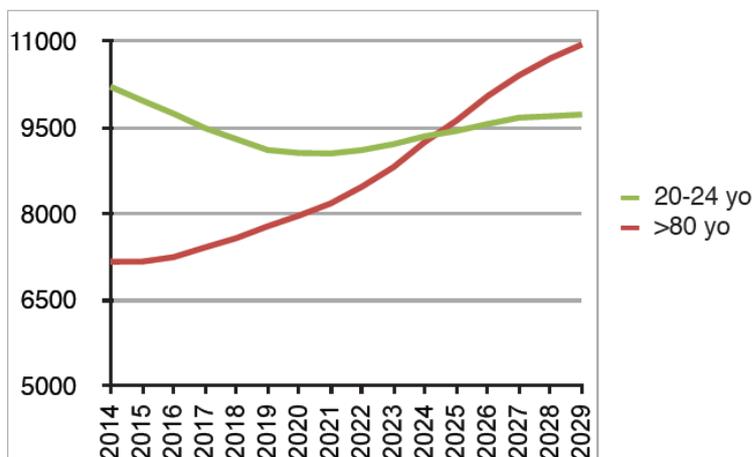
Problems the elderly face are memory disorders, poor muscle strength, balance disorders, incontinence and mobility problems. Memory disorders is the fastest increasing reason challenging living at home.

### Sweden – the city of Västerås

The city of Västerås has 138,000 habitants, 19% is 65 years or older, 5% is 80 years or older. 10% of the elderly receive home care. The costs for home care in the period 2010-2011 have increased with 11%.

Most time during home visits is spent on personal care and hygiene, meals and medical assistance. Dementia is one of the most common reasons for receiving home care and the one increasing fastest.

Population prognosis - The next diagram shows a prognosis for the number of inhabitants in Västerås in two different age groups: between 20 and 24 years (those who enter the workforce and can be enrolled for the elderly care) and those above 80 who are those that require the most home help service.



Coping with the drastically increasing number of individuals who are likely to require home care service while in the same time the available work force is at best constant is a great challenge to the elderly care in Västerås.

### The Netherlands

Today 2,6 million people in the Netherlands are 65 years or older. This number will increase to 4,5 million people in 2050 when 25% of the Netherlands population will be 65 years or older. By then 10% of the population (1,8 million people) will be 80 years or older. Nowadays approx. 5 % of the people of 65 years old receives homecare. Of the people over 80 years old approx. 40% receives homecare.<sup>4</sup>

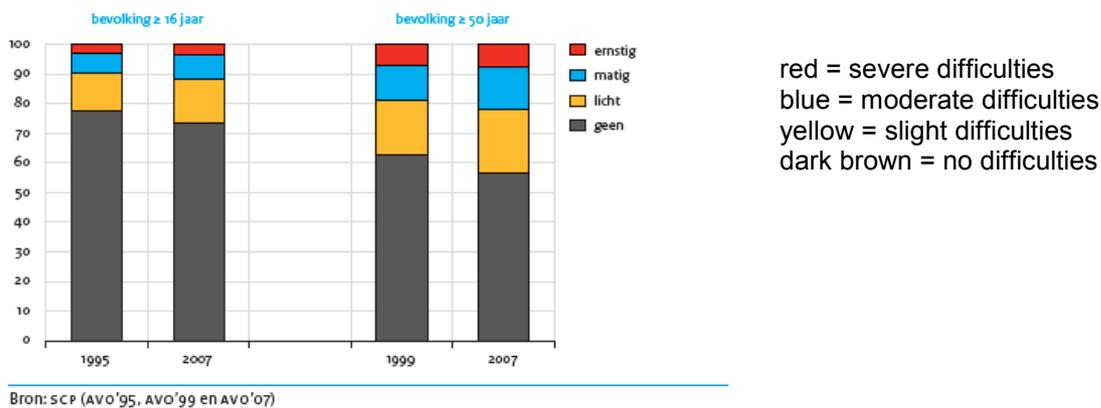
<sup>4</sup> <http://www.cbs.nl/nl-NL/menu/themas/gezondheid-welzijn/publicaties/artikelen/archief/2007/2007-2131-wm.htm>



## Difficulties with Activities of Daily Living for people living at home, 1995-2007 (in %)

Figuur 5.2

Moeite met ADL-activiteiten bij thuiswonende personen, 1995-2007 (in procenten)



Services available at home under the Exceptional Medical Expenses Act (AWBZ) include the following: assistance, personal care, nursing care and treatment. According to the ministry of Health, Welfare and Sports (VWS), 227,000 elderly clients used AWBZ care at home at the end of 2007. This was 9.4% of the 2.4 million elderly in the Netherlands.<sup>5</sup>

## UK<sup>6</sup>

There are around 1.8 million people with moderate to severe disabilities in the UK. Of these, 72% are aged 65 or over with the incidence of moderate to severe disability increasing rapidly with age from around 1% of those of working age to 50% of those over 85.

75% of social care is provided by friends and family (informal carers) while the remainder is provided by a wide range of formal care providers. These are funded largely by local authority social services departments. The table below shows how many older people are in receipt of the main formal care services. Note that these categories overlap. For example many who received home help also receive meals-on-wheels and/or attend day centres.

Measure	Number (m)
People over 65	9.5
People over 65 with mild disability (RW <sup>7</sup> scale 1 to 6)	3.1
People over 65 with moderate or severe disability (RW scale 7+)	1.3
People in residential care homes	0.4
People in sheltered housing	0.7
People receiving home help	0.3
People receiving meals on wheels	0.1
People attending day care centres	0.1

<sup>5</sup> The long-term care system for the elderly in the Netherlands, Ester Mot cs., ENEPRI Research report no. 90, June 2010. [http://www.ancien-longtermcare.eu/sites/default/files/LTCSYSstemInThe%20Netehrlands\\_RR90.pdf](http://www.ancien-longtermcare.eu/sites/default/files/LTCSYSstemInThe%20Netehrlands_RR90.pdf)

<sup>6</sup> Plum Final Report to Ofcom: Assisted living technologies for older and disabled people in 2030

<sup>7</sup> The Richayzen-Walsh scale which measure disability on a scale from zero (healthy) to 10 (severely disabled). Those requiring care from others are normally at 7+ on this scale.



Of the £109 billion spent on health care in the UK in 2006/7, around £34 billion was spent on the over 65's. Over 50% of this sum was spent on older people in their last year of life. Much of the money spent on the health care of older people is spent on managing long-term chronic conditions such as diabetes, chronic obstructive pulmonary disease (COPD), cardiovascular diseases and dementia.

By 2030 life expectancy will, on current trends, increase by 4.2 years but healthy life will increase by only 2.6 years. As a result demand for **social care** will increase by 44%. The ageing of the population is likely to increase requirements for **health care** rather less. The UK will also see a big increase in demand for the management of chronic conditions such as dementia, COPD, diabetes, heart problems, asthma, and depression.