



SOCIETAL CHANGE, CARE NEED AND LONG-TERM CARE WORKFORCE IN SELECTED EUROPEAN COUNTRIES

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This paper aims to show the impact of societal change on the demand and supply of long-term care workforce. As age is the major driver of the need for care the growth in the number of elderly and oldest old will increase the demand for long-term care workforce. Caregiving to the elderly is predominantly the task of the family in almost all European countries. However, the majority of European countries provide some kind of formal care either in institutions, at home or as cash benefits. The amount of provided publicly financed long-term care services and the required formal workforce spread widely across the European countries depending on the long-term care system and the financial resources. We selected five countries: Denmark, Germany, Italy, Poland and Slovakia which represent different long-term care systems and financial resources. In all studied countries the demand for long-term care workforce will increase significantly. Although also the informal caregiving potential aged 50+ is expected to increase, the increase in the demand for formal care workforce is projected to be higher than the supply. The current shortage of nursing and caring personnel will be strengthened. This requires an expansion of recruitment and retention strategies.



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SOCIETAL CHANGE, CARE NEED, AND LONG-TERM CARE WORKFORCE IN SELECTED EUROPEAN COUNTRIES

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1 Introduction

All European countries are facing the same development in the next decades: the baby boom generation will reach the oldest age groups and the share of the elderly in total population will increase significantly. Because age is the major driver of the need of long-term care the further demographic development will have an important impact on the demand for informal care giving as well as on long-term care services and its workforce. Help and personal care to the elderly is predominantly a task of family members in almost all European countries. Spouses, daughters, daughters in law and other family members are the main caregivers (EUROFAMCARE, 2006).). At the same time household compositions will change in the near future with more elderly living alone and declining abilities to provide a large amount of family care. The expected increase in the need for long-term care and the changes in household compositions intensified the discussion of an adequate (publicly financed) provision of formal care (Da Roit and Le Bihan, 2008). In the majority of European countries some kind of formal long-term care is available, either as institutional care, as home care services and/or as cash benefits. But the provided amount and basket of long-term care services depends strongly on the long-term care system, and differs widely across the Member States. Often, care giving tasks and services are split between the health care system and the social service system. Both, the amount of provided formal care services and the division of tasks influence the size and occupational structure of the long-term care workforce.

As persons in need of care prefer to stay at home for as long as possible, the availability of home care or cash benefits to organize adequate home care services is essential. These types of services are complementary to family care. Only if long-term care giving at home is not (longer) possible, persons in need of care have to move into a nursing home. The future need of long-term care workforce depends therefore not only on the

* Erika Schulz and Johannes Geyer are researchers at the German Institute of Economic Research (DIW) Berlin. The paper is based on the country reports of our partners, namely Golinowska, S., Kocot, E. and Sowa, A. (CASE) for Poland, Radvanský, M. and Lichner, I. (Ekonomický ústav SAV) for Slovakia and Coda Moscarola, F. (CeRP-CCA and University of Turin) for Italy. The country reports for Germany and Denmark were prepared by Schulz, E. (DIW). Dr. Erika Schulz, DIW Berlin, eschulz@diw.de, Dr. Johannes Geyer, DIW Berlin, jgeyer@diw.de.

demographic change and the change in impairments in activities of daily living (ADLs), but also on the availability of potential informal carer as well as the availability of and eligibility criteria for (publicly financed) formal care services. This report focuses on the impact of societal change on the need of formal care and the formal long-term care workforce.

In the past decades the impact of ageing on the sustainability of public finances became an important policy topic. The Economic Policy Committee (EPC) and the European Commission (EC) Directorate General Economic and Financial Affairs - (DG ECFIN) carried out studies showing the impact of ageing population on age-related public finances, in particular on public pension systems as well as on health and long-term care expenditures (EPC, 2001; EC EPC, 2006, EC EPC, 2009, EC EPC, 2012). Furthermore, within the research framework programmes the EC supported several projects dealing with the impact of ageing on pensions, health and long-term care (for example 'Ageing, health and retirement' (AGIR) (Mortensen, 2005; Schulz, 2004), 'Ageing, Health Status and Determinants of Health Expenditure' (AHEAD) (Bebbington and Shapiro, 2006), 'Health systems and long-term care for older people in Europe - Modelling the interfaces and links between prevention, rehabilitation, quality of services and informal care' (INTERLINKS) (Allen et al., 2011) or EUROFAMCARE (2006). The OECD carried out studies focussing on the long-term care systems and the available care services in OECD countries (for example OECD, 2005). The increasing needs for long-term care and the declining potential of informal caregivers intensified the discussion about the necessary formal long-term care workforce to substitute for informal care (Fujisana and Colombo, 2009; Colombo et al., 2011). The ANCIEN (Assessing the Need of care in European Nations) project, financed under the 7th framework programme and finalized in 2012, analysed the long-term care systems and policies in 21 European countries (Mot et al., 2012). These countries were clustered (Kraus et al., 2010) and for one country out of four clusters detailed analyses were carried out. The analyses of the impact of changing care need on the demand for formal and informal care as well as on the changes in long-term care workforce were based on a flow model (Geerts, 2011; Geerts, Willeme, Mot, 2012). The detailed analyses were carried out for the Netherlands, Germany, Spain and Poland.

This report aims to discuss the impact of societal change on the demand for and supply of formal care workforce taking into account the results of the aforementioned studies in particular the results of the ANCIEN project. We selected five EU-countries: Denmark, Germany, Italy, Poland and Slovakia. These represent European countries from the north (Denmark), the center (Germany), the south (Italy), and new Member States (Poland and Slovakia). The countries differ with respect to the share of nursing and care workforce in total employment, the expected change in population size and age-structure, the long-term care systems and the economic situation. The latter, due to differences in earnings potentials of nursing and care professionals, also influences the migration of care workers between European countries. In particular, both Poland and Slovakia reported significant migration outflows of nursing professions, while Germany is a net recipient. With the exception of CeRP (Italy) all partners were involved in the ANCIEN project.

Country specific analyses were carried out by experts of each country (with the exception of Denmark) using a common template for the research topics included in

the report and the same approach for long-term care workforce estimation. This report includes the results of the country reports.

The report is structured as follows: Section 2 provides an overview of the number of people in need of care and the realized care giving arrangements. Section 3 shows the current size and occupational structure of long-term care workforce. Section 4 discusses the factors influencing the future demand for long-term care workforce. In section 5 the changes in the supply of formal care workforce are discussed. Section 6 shows the results and discusses strategies to adapt supply to the growing demand.

2 Need of care and caregiving arrangements

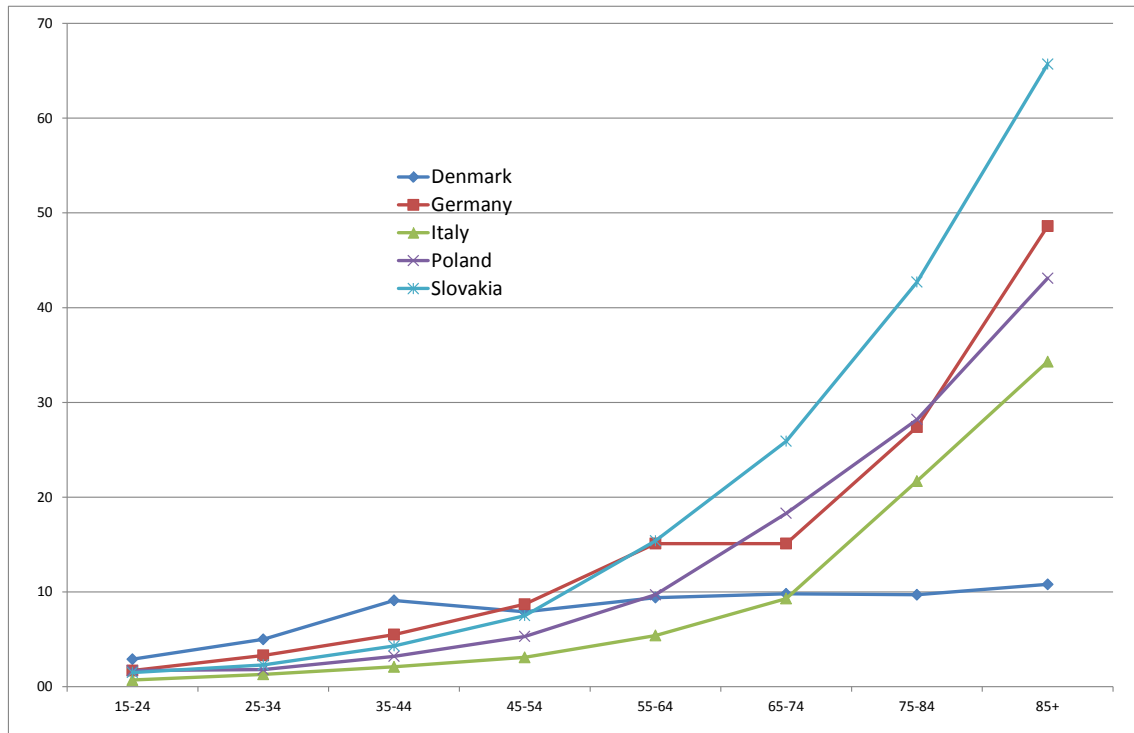
2.1 People in need of care

The demand for long-term care workforce depends on the number of people in need of care and the ability to perform every-day tasks by themselves. The estimation of the quantity of people in need of care is not straightforward. Information on care need is rare. According to the definition of the OECD people in need of care are persons ‘with a reduced degree of functional capacity, physical or cognitive, and who are consequently dependent for an extent period of time on help with basic activities of daily living (ADL), such as bathing, dressing, eating, getting in and out of bed or chair, moving around and using the bathroom. This is frequently provided in combination with basic medical care, prevention, rehabilitation or services of palliative care. Long-term care services also include lower-level care related to help with instrumental activities of daily living (IADL), such as help with housework, meals, shopping and transportation’ (Fujisawa and Colombo, 2009).

For European countries two surveys provide comparable information on dependency and impairments of the population in private households: the European Union Statistics on Income and Living Conditions (EU SILC) and the Survey of Health, Ageing and Retirement in Europe (SHARE). The EU SILC includes a question concerning the self-assessed impairments in daily activities. The question is “For at least the past 6 months, to what extent have you been limited because of a health problem in activities people usually do? Would you say you have been - severely limited, - limited but not severely or - not limited at all?” This is a self-perceived health question and does not distinguish culture, age, gender or the respondents own ambitions (EU SILC description). In the Ageing Report 2012 (EC EPC, 2012) these data are used as a proxy for dependency to calculate the future development of long-term care expenditure. Figure 1 shows the share of people reporting severe impairments in performing every-day tasks for our five studied countries. In general, the share of people with self-perceived impairments increases with age for males and females in all studied countries (Table 24 in appendix 1). Nevertheless, significant differences across countries exist. The highest dependency rates are reported in Slovakia, the lowest in Denmark. In Slovakia around two third of people aged 85+ reported severe impairments in ADL, in Denmark only around 11 %. In the other countries (Germany, Italy and Poland) dependency rates lie between these two extremes. The dependency rates are higher for females than for males in particular in the older age-groups. The

dependency rate in the highest age-group is influenced by the share of females in very old ages. Women are living longer (than men), but often not in good health.

Figure 1 Dependency rates in selected countries 2010*



*) Share of people with severe impairments in activities they usually do for at least 6 months.
Source: Eurostat, EU SILC; calculation of DIW Berlin.

Based on these dependency rates and the Eurostat population the number of dependent people in the five countries is calculated.¹ In 2010 in the five countries together around 14.3 million people reported to have severe impairments in daily activities, thereof 6.3 million males and 8 million females (Table 1). In Denmark around 370,000 were dependent, in Germany 7.9 million, in Italy 3.1 million, in Poland 2.5 million and in Slovakia 475,000. On average of the five studied countries is one third of the dependent population aged 75+; among men around a quarter and among women 37 %. Females are living longer, but often they suffer from impairments in daily living due to longstanding illnesses. Table 25 in appendix 1 provides an overview of dependent people by age-groups and gender in the five studied countries.

¹ The EU SILC survey is carried out in private households. As the probability to live in institutions increases with age, the prevalence rates in the older age-groups may be underestimated (EC EPC, 2012).

Table 1 Dependent people by age-groups and gender 2010

Age-groups	Denmark			Germany			Italy			Poland			Slovakia			All		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
	Total																	
	Age-structure in %																	
0-44	41	42	41	17	20	14	12	17	9	19	24	14	17	21	14	17	21	14
45-64	35	37	33	33	40	28	21	24	19	31	35	27	34	40	30	30	36	26
65-74	14	11	16	19	20	17	18	19	18	20	19	21	21	19	22	19	19	18
75+	11	10	11	31	20	41	48	40	53	30	21	37	29	20	34	34	24	42
	in 1000 persons																	
Total	371	169	202	7 847	3 587	4 260	3 143	1 255	1 889	2 490	1 128	1 362	475	183	291	14 326	6 322	8 004

Source: Eurostat, EU SILC; Huisman et al 2013; calculation of DIW Berlin.

The SHARE survey of people aged 50+ living in private households provide information on impairments in activities of daily living (ADL) and instrumental activities of daily living (IADL). The share of people with impairments in at least 1 ADL ranges for men from 8 % to 16 % and for women from 10 % to 22 %. Only a small share reported impairments solely in IADL, and a large share had no impairments at all. The SHARE results are shown in appendix 2.

2.2 Care settings – informal and formal care

2.2.1 Formal and informal care

We can observe a large variation of coping strategies of people reporting longstanding impairments in their activities: many rely on third-party help and care, other are able to cope with their impairments themselves. Depending on the long-term care system dependent people can receive publicly financed help and care from formal home care services or in institutions. However, in almost all countries dependent people receive a significant amount of help and care by family members with and without the (publicly or privately financed) help of formal care workforce (Riedel and Kraus, 2011). A part of dependent people copes with its situation by themselves using new technologies, privately financed helpers, and measures to adapt the home to the requirements of the impairments. If the partner is living in the same household, he or she often perform household chores that were usually done by the impaired partner. The changing division of responsibilities for these activities between partners is most often not considered as 'informal help and care'; it is taken as a matter of course. Thus, receiving 'no care' does not necessarily mean that there is no active help within the household.

Based on the information of EU SILC and the data on informal caregivers and formal care recipients collected by the OECD the number of dependents, the number of people receiving formal care at home and in institutions as well as the share of people relying on informal care is calculated. Table 2 shows the results. In Poland 96 % of the dependent people receive informal or no care, in Slovakia their share amounts to 75 %, whereas it lies around 69 % in Germany and Italy, and at 53 % in Denmark. The Ageing Report 2012 provides similar results based on information from their partner institutes (EC EPC, 2012).

Table 2 Dependent people and informal and formal care

	Number of dependent 2010	Formal care recipients		Relying solely on informal or no care	Thereof	
		at home 2010	in institutions 2010		Informal Carers 2006	No Care 2010
in 1000						
Denmark	371	128	44	199	19	180
Germany	7 847	1 677	753	5 416	3 256	2 161
Italy	3 143	597	386	2 160	4 035 **	0
Poland	2 490	2 *	88	2 399	1 214	1 185
Slovakia	475	83	33	358	57 ***	301
Total	14 326	2 489	1 306	10 532	8 580	3 826
*)2006;**) 2003; ***) 2010;						
Source: Eurostat, EU SILC; OECD Health Data; calculation of DIW Berlin.						

The number of dependent people who receive no care is lower when we take informal caregivers into account. With the exception of Slovakia information on informal caregivers is rare. For most countries we report data from 2006, for Italy only data from 2003 is available. The number of informal caregivers in Italy is higher than the number of dependent people. That can be explained by the accounting method: not only are the main caregivers accounted for, but all members of the family or friends who provide some kind of help and care. Thus, on average a dependent person receive help and care from more than one person. As the information on informal care relies on surveys with different questions and possibilities to answer these questions (only main caregivers versus all caregivers; only personal care versus all kind of help and care) the results are not fully comparable between the countries.

According to the data collected by the OECD, in Denmark 5 % of dependent people receive solely informal care and 48 % receive no care. Thus, a great share of dependent people is living independently in its own home. They are able to cope with their impairments themselves with or without the help of the partner. In Germany around 42 % receive solely informal care and another 28 % receive no care. In Italy, as mentioned above, all dependent people receive some kind of informal care or help. In Poland 49 % receive informal care and another 48 % receive no care. In Slovakia only 12 % receive informal care and 63 % receive no care. As mentioned above these figures have to be interpreted with caution, because the information stem from different calendar years and are based on different questionnaires. Our partners from Italy (Coda Moscarola, 2013) and Slovakia (Radvanky and Lichner, 2013) confirmed the data on formal care recipients mentioned by the OECD. However, the data for Italy do not include the relevant number of caretakers privately paid by families to assist the elderlies and disabled at home. In Slovakia the mentioned informal caregiver refer to the number of care allowance recipients. For Denmark the Statistical Office provides a higher number of formal home care recipients (around 177,000). In Germany the numbers of formal home care include also persons receiving cash benefits for self-organized care (almost provided by informal family caregiver). The data on formal care

recipients collected by our Polish partner are significantly higher than the data provided by the OECD: 140,000 recipients of institutional care and around 150,000 recipients of home care (Golinowska et al., 2013). But the figures provided by Golinowska et al. are based on a broader definition of persons in need of care, which is not identical to the definition of people in need of long-term care of the OECD. Despite the different sources of data, all figures show that significant differences in care arrangements across the studied countries exist. These differences in the division of care tasks between the state and the family can be explained by the long-term care system as well as the availability of and the access to publicly financed formal care services. The regulations for the studied countries are documented in appendix 3.

The five studied countries have different long-term care systems ranging from a comprehensive social assistance system in Denmark to a nearly non existing long-term care system in Poland. In general, in Poland and Slovakia the vast majority of care giving to the elderly is the responsibility of the family. Formal care giving is rare, and in Poland the available places in nursing homes are often privately financed. In Italy each municipality has his own LTC system with significant differences in the amount of provided services depending not at least on the financial situation of the municipality. The German LTC system provides services in kind or in cash only to people with at least substantial impairments in ADL as well as in IADL and requires in particular for institutional care high co-payments.

2.2.2 Informal caregivers

The available (publicly financed) long-term care services and the required co-payments have a significant influence on the amount of informal care provided by the family and other informal caregiver. In general informal care comprises all kinds of help (for example help with financial tasks, shopping) and personal care, but the definition of 'informal care' used for the analyses varies across surveys and studies. Vilaplana Prieto (2011), for example, used the Eurobarometer 67.3 survey examining the public opinion about health care and long-term care in Europe (Eurobarometer 2007). The Eurobarometer includes a question on help and care to people in need of. Vilaplana Prieto used a broad definition of 'informal caregiver' by including all kinds of help and care provided in the last ten years. As a results in Denmark 0.8 million people aged 25-64 years are informal caregiver, in Germany 9 million (22 %), in Italy 5.9 million, in Poland 5.3 million, and in Slovakia 0.7 million. Pickard (2011) used the same data, but she included only people (aged 15+) who provide help with one or more ADL or two and more ADL tasks. The number of informal caregivers is consequently lower. Around 14 % of people aged 15+ provide help in one or more ADL tasks and 7 % in two or more ADL tasks in Germany. The corresponding shares were 10.5 % and 7 % in Denmark, 12 % and 9 % in Italy, 17 % and around 14 % in Poland, and 14 % and 10 % in Slovakia. Women are more likely to provide informal care than men, and the probability to provide informal care increases with age. More than 50 % of informal caregiver is aged 45+; around 20 % are aged 65+.

The SHARE survey which includes only people aged 50+, includes specific questions on the provision of personal care to people inside and outside the household. Information on help and care provided to someone outside the household is distinguished between types of help and care provided, and how often help and care is provided. Information on provided care to someone inside the household relies on personal care provided on a regular basis for at least three months. The definition of informal care provided inside the household is also applied to help and care provided by caregiver outside the household. Thus, we focus on personal care provided on a regular (inside the household) or almost daily (outside the household) basis. The questionnaire asks about care provided in the last 12 months or since the last interview. Information is available since wave 1 for Denmark, Germany, Italy, and since wave 2 for Poland.

The share of informal caregivers inside and outside the household depends on the living arrangements and the available (publicly financed) formal care. The share of personal care provided inside the household in Denmark is significantly lower than in the other studied countries (Table 3). Denmark has a comprehensive social service system providing the so called permanent home help to people in need of help and care in the recipient's home irrespective from potentially available informal caregivers. In Italy and Poland - both with a less generous long-term care system - the share of people providing care to someone inside the household is twice as high as in Denmark. In Germany the share of people providing care inside the household is in-between, including also caregiving to people receiving cash benefits for self-organized informal care.

Table 3 Share of persons aged 50+ providing informal care to someone inside or outside the household

	Denmark			Germany			Italy			Poland		
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
Share of people aged 50+ providing												
regular personal care to someone inside the household	3.79	5.52	4.60	5.14	7.58	6.31	7.23	10.44	8.88	8.59	10.58	9.66
personal care to someone outside the household almost daily	(0,66)	1.35	1.03	1.36	3.85	2.72	2.89	6.07	4.64	1.26	3.42	2.49
Personal care to someone outside the household	3.67	8.36	6.17	4.02	7.74	6.06	6.13	12.26	9.50	2.43	5.06	3.93
all kind of help and care outside the household	48.80	42.96	45.69	38.09	30.59	33.98	23.16	23.93	23.58	20.26	18.09	19.02

Source: SHARE wave 1 and 2 (Poland wave 2 only); pooled data, weighted; calculation of DIW Berlin.

While the care provided inside the household refers to personal care provided on a regular basis, the care given to someone outside the household is surveyed for all kinds of help and personal care. In all studied countries a high share of people aged 50+ provides some help or care to someone outside the household. The share of people providing any kind of help and care is higher for males than for females. Males provide often help with financial tasks or doing repairs. In Denmark around 50 % of people aged 50+ provide some kind of help and care to someone outside the household. Focusing only on personal care changes the picture: In Poland 4 %, in

Denmark and Germany 6 % and in Italy around 10 % of people aged 50+ provide personal care to someone outside the household. This is a significant lower share as in the case where all types of help and care are included. The share of females providing personal care is twice as high as of males indicating that personal care is mainly the tasks of women.

If we go a step further and focus only on personal care provided on an almost daily basis, which is comparable with the care giving inside the household, again the share of caregivers is lower. In Denmark only 1 % provides personal care on a daily basis to someone outside the household, in Germany around 3 %, in Italy around 5 % and in Poland 2.5 %. The results for Poland have to be interpreted with caution due to the small sample size. However, the living arrangements have also an impact on the division of care giving inside and outside the household. In Poland the probability is high that dependent people who rely on intensive personal care are living together with their children, in particular if they are singles. The EUROFAMCARE report stated that 69 % of caregivers live with the person in need in the same household in Poland, but only 45 % in Italy and 37 % in Germany (EUROFAMCARE, 2006). In the Danish case, there is a clear division between family care and long-term care services provided by the communities. The home-based help mainly covers personal care and domestic tasks, whereas the family members help the dependent to remain socially active (Vilaplana Prieto, 2011). Pickard and King (2012) who analyzed informal personal care provision to older people based on SHARE data (wave 2) came to similar results. The share of informal caregiver to older people is calculated to be 4 % in Poland and around 5 % in Germany.

Table 4 shows the characteristics of informal caregivers. Around three quarter of people providing regular personal care to someone outside the household is females and a high share, ranging from 80 % in Poland to 90 % in Denmark, is aged 50-69 years. That means a high share of informal care is provided outside the household is done by people in working age. Care outside the household is given to a parent or to other members of the family. Inside the household care giving to the partner is common (ranging from 48 % in Poland to 85 % in Denmark). Thus, the share of females is lower and the age of caregiver is higher than in the case of caregiving outside the household.

Table 4 Characteristics of informal caregiver

	People providing personal care to someone							
	outside the household (almost daily)				inside the household (regularly)			
	share of caregiver aged 50-69	share of female caregiver	share caregiving to one parent	share caregiving to other family member*	share of caregiver aged 50-69	share of female caregiver	share caregiving to partner	share caregiving to other*
Denmark	90.03	72.17	29.49	13.81	61.29	56.42	84.52	5.13
Germany	83.80	77.46	43.86	16.49	59.59	57.65	62.63	21.31
Italy	83.48	72.02	33.54	25.56	60.27	60.64	49.92	28.25
Poland	80.02	78.22	31.63	38.80	63.21	59.13	47.63	23.60
*) Except child.								
Source: SHARE wave 1 and 2 (Poland wave 2 only); pooled data; weighted results; calculation of DIW Berlin.								

Unfortunately Slovakia is not included in the SHARE survey. A research project focussing on the characteristics of family carers aged 18-64 who receive care allowance for caring for dependent family members (at least 8 hours daily) in Slovakia provide some information (Bednarik, Brichtova and Repkova, 2011). Care allowance is means tested and the amount depends on the income of the people cared for. In 2010, 82 % of the 57,000 recipients of care allowances included in the survey were women, 18 % men. Most recipients were adult children (40 %) providing care to their parents, and 47 % were aged 51-64 years. 3 % provided care to more than one family member. Around half of the recipients were unemployed (47 %) at the beginning of care giving; only 2 % were employed beside their care giving activities. In Slovakia part-time employment is not common. In 2010 only around 4 % worked part-time. As the recipients of care allowance provide care for at least 8 hours a day and part-time jobs are rare, comparability of employment and care giving is rendered difficult. Radvanský and Lichner (2013) estimated that additionally around 112,000 persons provide informal care without receiving any kind of care allowances.

3 Long-term care workforce - current situation

3.1 International data

The European labour force survey (EU LFS) provides information on the (formal) labour force in residential care and social services without accommodation. Residential care includes nursing homes, institutional care for mental health and substance abuse, institutions for elderly and disabled as well as other residential care. Social work without accommodation includes activities to the elderly and disabled and other social work activities. The EU LFS accounts all persons active for at least 1 hour per week in the mentioned areas, independent from the source of finance (public or private). Thus also privately financed legal formal caregivers and helpers are included.

In 2011, in the EU27 around 4.5 million people were employed in residential care activities, thereof 1.4 million in nursing homes and 1.6 million in elderly homes and homes for the disabled. Social work was provided by 4.9 million employees, thereof 1.5 million engaged in social care for the elderly and disabled. The share of employment in residential care in total employment is 2.1 %. A share of 0.6 % of total employment is engaged in nursing homes. About 2.2 % of total employment is engaged in social work and 0.7 % in social activities for the elderly. Thus, in the EU 27 on average around 1.3 % of total employment (2.8 million people) is engaged in the main areas of long-term care, nursing homes and social care activities for the elderly.

In Denmark with a comprehensive social assistance system and the strict priority of home care the employment in social activities without accommodation is higher than in residential care, around 200,000 compared to 122,000 (Table 5). The share of residential care as well as of social work in total employment is the highest among the five studied countries and in the EU27. Around 4.5 % of all employed people are

working in residential care and 7.4 % in social work activities in Denmark, compared to 2.1 % (residential care) and 2.2 % (social work) on average in the EU27. Unfortunately no information for employment in nursing homes or social activities for the elderly is available for Denmark.

Table 5 Employment in residential care and social work activities in 2011

NACE Rev2 classification		Denmark	Germany	Italy	Poland	Slovakia	5 countries	EU27*
Employment in 1000 persons								
Q	Human health and social work	509	4854	1694	923	158	8138	20983
87	Residential care activities	122	1109	223	96	26	1575	4175
871	... nursing care activities	-	491	86	20	6	603	1381
872	... for mental health and substance abuse	-	19	29	7	5	60	425
873	... for elderly and disabled	-	520	90	28	10	647	1601
879	Other ...	-	80	18	41	5	143	768
88	Social work activities without accommodation	200	891	202	122	25	1440	4408
881	... for the elderly and disabled	-	311	74	43	20	449	1465
889	Other ...	-	580	128	79	5	792	2943
Share of female employment (%)								
Q	Human health and social work	80.9	76.8	68.6	81.8	83.6	76.0	77.9
87	Residential care activities	83.1	76.4	84.6	77.4	88.2	78.3	81.0
871	... nursing care activities	-	70.0	87.7	83.2	95.5	73.3	79.0
872	... for mental health and substance abuse	-	67.4	78.2	75.2	91.0	75.4	73.2
873	... for elderly and disabled	-	83.2	84.5	79.6	87.7	83.3	85.4
879	Other ...	-	73.1	81.2	73.3	77.9	74.3	79.6
88	Social work activities without accommodation	80.1	73.8	85.8	90.8	91.0	78.1	82.8
881	... for the elderly and disabled	-	81.9	85.3	90.1	90.7	83.6	83.6
889	Other ...	-	69.4	86.1	91.2	92.4	74.4	82.4
Share of elderly (55+) employment (%)								
Q	Human health and social work	19.6	16.5	17.8	15.1	16.2	16.8	17.1
87	Residential care activities	20.2	16.3	9.9	10.9	19.8	15.4	16.4
871	... nursing care activities	-	15.4	10.8	8.7	27.4	14.6	15.7
872	... for mental health and substance abuse	-	13.8	4.9	16.3	12.5	9.7	16.5
873	... for elderly and disabled	-	17.7	10.7	12.3	16.7	16.5	17.7
879	Other ...	-	13.5	9.1	10.2	23.0	12.4	15.2
88	Social work activities without accommodation	16.2	17.6	9.9	14.2	12.9	16.0	16.7
881	... for the elderly and disabled	-	15.5	12.1	17.8	14.1	15.1	17.3
889	Other ...	-	18.8	8.6	12.2	8.2	16.4	16.4
*) Only countries with detailed 3digits data.								
Source: Eurostat, EU LFS; Statistics Denmark; calculation of DIW Berlin.								

For the other countries information on employment on NACE2 3digit codes are available². In Germany, around 1.1 million people are engaged in residential care activities, thereof 491,000 in nursing homes and 520,000 in homes for the elderly and disabled. 891,000 are employed in social work activities, thereof 311,000 in activities for the elderly and disabled. Thereby 2.8 % of total employment is engaged in residential care activities and 1.2 % in nursing homes, which is a higher share than the EU average. 2.2 % of total employment is engaged in social work and 0.8 % in social work activities for the elderly and disabled, which is similar to the EU average.

² The data show small differences to the 2digit data mentioned before due to sample size problems.

In Italy, Poland and Slovakia the share of employment in residential care and social work in total employment is well below the EU average. In Italy 223,000 people are engaged in residential care, thereof 86,000 in nursing homes (0.4 % of total employment). The employment in social work amounts to 203,000 thereof in activities for elderly and disabled 74,000 (0.3 % of total employment). In Poland only 96,000 people are employed in residential care, thereof 20,000 in nursing homes (that is 0.1 % of total employment). The employment in social work activities is 123,000, in social activities for the elderly 43,000 (0.3 % of total employment). Poland shows the lowest share of nursing and social work activities for the elderly among the five studied countries. In Slovakia which has a similar population as Denmark only 27,000 people are employed in residential care (less than a quarter of the employment in Denmark), thereof 6,000 in nursing homes. In social work are 25,000 people employed, thereof 20,000 in activities for the elderly.

Age-groups and gender

Nursing care and social work are still the occupational fields of women. In 2011, in the EU on average 81 % of employees in residential care were females, in social work their share was 83 %. In nursing homes 79 % were females, and in social work for the elderly around 84 %. Whilst in all five studied countries female employment dominates, differences among the countries exist ranging from 70 % in nursing homes in Germany to 96 % in Slovakia. In social work activities the differences in the share of female employment are lower, ranging from 82 % in Germany to 91 % in Slovakia.

In the EU average the share of employment 55+ in nursing homes is 16 %, in social work for the elderly 17 %. In the five studied countries the share of elderly workers in nursing homes varies between around 9 % in Poland and 27 % in Slovakia, in social work for the elderly between 12 % in Italy and 18 % in Poland. Long-term care to the elderly is a physic and psychic hard work with bad working conditions, such as long working times, shift working, no career progression, not adequately appreciated jobs (Fujisawa and Colombo, 2013).

Occupations

The EU LFS provides also information on occupational structure of employed people in residential care and social work without accommodation. Data on occupations is not available for all personnel engaged in residential care or social work due to the sample size restrictions. Information refers to occupations with reliable data. Table 6 shows the occupational structure in the five studied countries. In residential care and social work three main occupational fields related to care giving can be observed: nursing and personal care occupations, social work occupations and teaching occupations.

Table 6 Employment in residential care and social work without accommodation by occupations in 2010

Occupations	ISCO88	Residential care					Social work without accommodation				
		Denmark	Germany	Italy	Poland	Slovakia	Denmark	Germany	Italy	Poland	Slovakia
		in 1000 persons									
Managers	120-131	0.691	3.208	0.850		0.313	2.143	8.575	2.233	3.454	
Business + administrative professionals	241, 247		1.028				1.441	6.003		2.052	
Finance, administrative and tax associate professionals	341-344	1.415	12.764	4.421	3.115	0.529	1.074	26.588	0.833	8.491	
Office and customer service clerks	411-422	2.342	19.946	0.688	1.281	0.274	1.449	37.409	3.370	6.825	
Health professionals (except nursing)	222			0.469	0.453					0.725	
Health associate professionals (except nursing)	322	3.450	10.058	38.837	5.938	0.359	2.723	7.559	17.851	3.726	
Nursing and midwifery professionals	223	0.306		0.311	9.686				0.644	1.943	
Nursing and midwifery associate professionals	323	2.166	61.707			4.161		87.874	0.569		
Personal care and related workers	513	73.571	130.764	101.984	9.161	7.456	102.314	133.798	41.800	24.861	21.307
Social work professionals	244		45.114	0.833	0.533	1.879	0.149	130.865	1.437	9.234	0.228
Social work associate professionals	346	1.878	316.216	23.235	16.510	0.232	3.554	142.334	16.225	27.767	
Housekeeping and restaurant services workers	512	3.256	102.003	11.108	3.969	1.726	2.283	32.104	6.442	1.160	
Domestic and related helpers, cleaners and launderers	913	4.898	47.556	14.311	10.207	3.815	4.698	28.093	14.538	3.775	0.233
Teaching professionals	232-235		0.467		13.338		1.662	4.365	1.133	4.347	
Teaching associate professionals	331-334	17.647	79.967	5.088	0.000	1.476	59.989	72.552	60.483		0.416
Building related workers (incl. gardeners)*			10.903	3.156	0.296	0.226		6.297			0.229
Machine operators, assemblers, drivers	826-832		15.014	0.628	1.645	0.401		18.449		1.356	
Other service workers (cleaners, porter)	914, 915	1.679	16.660	3.040	0.672		0.968	6.139	4.726		
Manufacturing labourers (incl. Agricultural)	931, 932		59.824					17.412			
Other**			0.818	0.182			0.192	2.394			
No answer	-		15.336					12.699			
total		113.299	949.353	209.141	76.804	22.848	184.640	781.511	172.282	99.716	22.413

*) ISCO codes 611, 712-714, 721-743.-**) ISCO codes 214, 311, 522.

Source: EU LFS, due to sample size problems only the employment in main occupational fields in sector Q87 and Q88 are included.

The share of nursing and personal care in residential care varies among the countries from 64 % in Denmark to 21 % in Germany and in social work from 95 % in Slovakia to 25 % in Italy. In Germany the geriatric nurses are accounted as social work occupations. Caregiving to children plays a significant role in social work activities in Denmark and Italy with a share of teaching occupations of around one third. As mentioned above, these figures have to be interpreted with caution due to the sample size problems.

The OECD collected data on nurses and personal carers engaged in long-term care activities. No data for Poland could be collected. For Italy data are available only for the year 2003 (Table 26 in appendix 1). In 2009, in Denmark around 79,000 nurses and personal carers are employed that is 8.9 persons per 100 population aged 65+; in Germany 642,000 (3.8 persons per 100 population 65+), in Italy 407,000 in 2003 (3.7 persons per 100 population 65+), and in Slovakia around 11,000 (1.7 persons per 100 population 65+). The differences in the availability of nurses and personal carer indicate the differences in the generosity of the long-term care systems among the studied countries.

3.2 Employment data from national sources

In addition to the international statistics the involved partners collected employment data from national sources. While the EU LFS data are based on a survey carried out in private households and thus on information of the employed persons concerning their occupation and the economic sector of their workplace, the national data are based on administrative data collected by Ministries, or other public organisations (Poland), municipalities (Denmark), directly from the providers of care (Germany) or the National Statistical Office (Italy, Slovakia). Caused by the different methods used for data collection the employment data differ in size and structure. However, both kinds of statistics provide useful information. National data which provide additional information to the international sources of the EU LFS or the OECD data are shown below.

Denmark

In Denmark the provision of long-term care services as one field of social activities is the responsibility of the municipalities. They employ nurses, social workers and other staff for the fields of social services like residential care or care to elderly, disabled, people with special needs and child care. The employees carry out different kinds of activities and it is not possible to identify the activities related to long-term care giving.

Table 7 Staff working with nursing and care in Denmark – full time equivalents

Occupations	2010	2011	2012
Total	97 683	94 503	91 590
Management	348	299	266
Nurse	7 626	7 801	7 797
Physiotherapist	407	423	427
Catering officer etc. (matron) (-2010)	3 250	0	0
Occupational therapist	580	583	576
Teacher (-2010)	3	0	0
Pedagogue, Teacher (2011-)	0	1 293	1 196
Pedagogue (-2010)	1 100	0	0
Psychologist	20	18	19
Social worker etc.	48	90	86
Administrative work (-2010)	1 800	0	0
Administration, Office and secretary work (2011-)	0	1 904	1 772
Office and secretary work (-2010)	1 284	0	0
Caretaker etc.	1 242	1 322	1 263
Pedagogue assistant etc. (-2010)	85	0	0
Social and health workers etc. (-2010)	47 331	0	0
Social and health workers, Pedagogue assistant etc (2011-)	0	57 379	54 576
Social and health care assistants etc.	28 085	16 489	17 191
Cleaning etc.	3 938	3 453	3 164
Assistant in kitchen etc. (-2010)	537	0	0
Catering officer etc. (matron) (2011-)	0	3 450	3 259
*) Staff in all measures for elderly, handicapped and juveniles with special problems, but no child care.			
Source: Statistics Denmark.			

Table 7 provides the number of employees working with nursing and care measured in full-time equivalents (FTE). The data are provided by the municipalities. The staff mainly active in measures for elderly, handicapped and juveniles with special needs are included. In total in 2010 around 98,000 FTE were employed. The number of FTE was lower in 2011 and 2012, e.g. due to changes in the accounting system. Around 75,000 FTE were social workers including personal carers, around 8,000 were nurses.

Germany

The long-term care statistics which is carried out every other year provides information on the vocational qualification and the fields of activity of employees in nursing homes and home care services in Germany. The data are collected directly from the providers of institutional or home care. In 2011 290,000 people were employed in home care services and 661,000 in nursing homes (Table 8). Nursing and caring occupations are still the fields of female employment. Around 85 % of employees are females; 88 % in home care services and 85 % in nursing homes.

Table 8 Long-term care workforce by vocational qualifications in Germany 2011

	Nursing homes			Home care services			Total		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total vocational qualifications	661 179	99 179	562 000	290 714	35 946	254 768	951 893	135 125	816 768
State-approved geriatric nurse	148 568	24 069	124 499	59 736	8 726	51 010	208 304	32 795	175 509
State-approved geriatric nursing assistant	34 622	4 311	30 311	11 895	1 198	10 697	46 517	5 509	41 008
Nurse, male nurse	55 449	5 482	49 967	80 280	9 491	70 789	135 729	14 973	120 756
Nursing assistant	17 364	1 921	15 443	13 038	1 416	11 622	30 402	3 337	27 065
Pediatric nurse, pediatric male nurse	3 706	125	3 581	7 685	185	7 500	11 391	310	11 081
Remedial therapist	2 865	528	2 337	1 222	233	989	4 087	761	3 326
Remedial therapy assistant	523	78	445	244	47	197	767	125	642
Pedagogic therapist	393	63	330	95	14	81	488	77	411
Ergotherapist	7 616	775	6 841	453	54	399	8 069	829	7 240
Physiotherapist	974	164	810	236	37	199	1 210	201	1 009
Other training completed in a medical profession other than that of medical practitioner	3 708	457	3 251	3 909	234	3 675	7 617	691	6 926
Training completed as a social education worker or social worker	6 893	1 324	5 569	1 447	257	1 190	8 340	1 581	6 759
State-approved family care orderly or nurse	1 337	59	1 278	1 571	39	1 532	2 908	98	2 810
State-approved village (assistant) nursing staff	111	4	107	126	2	124	237	6	231
Degree in nursing science granted by a college or university	2 870	881	1 989	1 080	297	783	3 950	1 178	2 772
Other nursing profession	52 922	4 830	48 092	23 457	2 085	21 372	76 379	6 915	69 464
Trained housekeeper for the elderly	2 206	186	2 020	860	17	843	3 066	203	2 863
Other housekeeping qualification	30 682	3 731	26 951	6 332	268	6 064	37 014	3 999	33 015
Other vocational qualification	167 442	30 950	136 492	57 485	7 490	49 995	224 927	38 440	186 487
Without completed vocational qualification or still in training	120 928	19 241	101 687	19 563	3 856	15 707	140 491	23 097	117 394

Source: Federal Statistical Office of Germany, LTC statistics.

In Germany a special vocational qualification for caring the frail elderly exists. The geriatric nurses (3 years qualification) and the geriatric nursing assistants (1 year qualification) account for 183,000 employees in nursing homes and for 72,000 employees in home care services. Nurses and nursing assistant account for 73,000 (nursing homes) and 93,000 in home care services. Only a small part has a degree in nursing science (in total 4,000). In addition to nurses and personal carer people with

other qualifications are employed, in particular in housekeeping and building service activities.

In nursing and caring activities part-time employment is common. In home care services 70 % are working part-time, in nursing homes 61 % (Table 27 in appendix). In particular in housekeeping, social services, and assistant activities people working only several hours per week (working on a marginal employment contract) are widespread. Around 30 % of part-time workers in home care services have such work arrangements, and 15 % of part-time workers in nursing homes.

Under consideration of the different working hours of the staff the Table 28 and Table 29 in appendix 1 show the employment in full-time equivalents (FTE) in home care services and nursing homes by professions and fields of activity. In home care services basic care is the main activity field: 71 % of personnel are engaged in basic care (FTE). In housekeeping activities 10 % (FTE) are employed.

In nursing homes additional employees are required to run the homes, like building service sector, administration and other building related activities. In 2011 around 12,000 FTE were engaged in building service activities, 6,000 in other sectors and 27,000 in administration including management. 328,000 FTE were employed in care and nursing, that is 68 % of the total employment in nursing homes. 19,000 FTE were engaged in social care activities were and 16,000 in special measures for the people with mental disorders.

Italy

According to a survey of residential care facilities carried out by the Statistical Office of Italy (ISTAT) around 334,000 workers were engaged in residential care in 2010 (Table 9).

This number is substantially greater than the employment reported by the EU LFS, and includes also employment in homes for children, for persons with drug and alcohol problems and other institutions not directly linked to care giving to people in need of long-term care according to the OECD definition. Unfortunately the data do not allow to properly disentangling personnel engaged in long-term care from other employment. Thus, only the information on the occupational structure is used and applied to the LFS data.

There is no national statistics providing additional information on personnel of home care services.

In Italy many disabled in need rely on formal care at home. This help is provided by caretakers chosen and paid out-of-pocket directly by families. Caretakers are estimated to be at least 800,000 (Coda Moscarola, 2013). In this sector, the irregular work (out of the payroll) is widespread. Evidently we do not know much about irregular workers, but we can infer something about regular caretakers from the National Social Security System data (INPS, Osservatorio sui Lavoratori Domestici). According to the INPS data, the total number of regular domestic workers - that is workers that provide care to elderly or disabled (the so called caretakers or "Badanti") and workers employed for household chores, (the so called "colf") - in 2010 is 915,627. Most workers are women

(761,407 out of 915,000) and foreigners (746,984 out of 915,000). In domestic work, job spells are frequently shorter than one year (only 42 % of workers are observed working 50-52 weeks) and part-time (about 12 % works 40 hours or more). The distribution of workers by age class is bell shaped with few people younger than 19 and older than 65, around 45 % are between 30 and 45.

Table 9 Residential care workforce by profession in Italy 2010

	Istat		Eurostat
	number of workers in 1000	%	Estimated number of workers in 1000
Nurses	46	13.7	33
Physiotherapists and rehabilitation therapists	10	3.1	7
Social care workers and other personal care workers	146	43.7	104
Others	132	39.6	94
Total	334	100	239

Source: ISTAT (2012), Indagine sui Presidi residenziali socio assistenziali; Eurostat website, LFS, Last update: 30-10-2013.

Note: The category "others" includes: Management, Clerks , GPs, Specialists, Psychologists, Sociologists, Social Workers, Teachers and trainers, Professional Educators, Other educators, Pedagogues, Animators, Cultural mediators, Speech therapists, General service workers , Civil servants, Parental figures, Others.

Source: Coda Moscarola (2013).

Poland

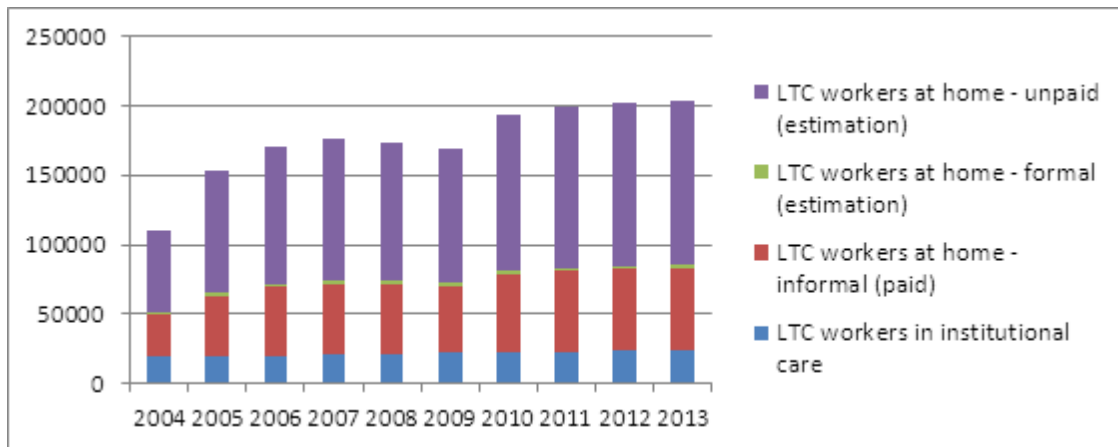
In Poland the Ministry of Labour and Social Policy, the Central Statistical Office and the Centre of Information Systems of Health Protection provide administrative data on nursing and care in the health care sector and in the social sector (Golinowska et al., 2013). The health sector provides home nursing care by professional family community nurses (in liaison with primary care physicians). Within the social assistance activities home care services are provided in the form of general and specialist care mostly for single elderly. Residential nursing care is provided by physicians, nurses and medical workers within the health care system. The social assistance system provides residential care in social care homes. In total 71,000 persons are employed in nursing and caring activities in residential care and some 19,000 in home (nursing) care activities (Table 10). These administrative data differ significantly from the data provided by the EU LFS.

Table 10 Personnel in residential care and social work in Poland

	2004	2009	2010	2011
	Residential care in health care sector			
Residential nursing care	9 933	16 626	16 691	18 958
thereof				
Physicians	810	1 610	1 929	2 469
Nurses	5 138	8 309	8 898	9 758
Psychologists	171	495	581	654
Educators	43	66	31	28
Physiotherapists	589	1 102	495	398
Medical workers	663	1 745	1 699	2 276
Social workers	239	324	249	279
Nursing assistant	2 280	2 975	2 809	3 096
	Residential care in social sector			
Total employment	32 044	35 899	36 693	36 982
thereof				
Medical and physiotherapist activities	8 717	7 308	7 119	7 214
Care and therapeutic activities	23 327	28 591	29 574	29 768
	Home nursing care in health sector			
Family community nurses	10 962	12 001	11 727	11 796
	Home care in social assistance sector			
Total employment	7 436	7 228	7 286	6 861
General care services	6 334	6 350	6 358	5 874
Specialized care services	1 102	878	928	987
Source: Golinowska et al. (2013).				

Slovakia

In Slovakia information on personnel engaged in long-term care is rare. As long-term care activities are splinted between the health care sector and the social care sector, no statistics showing the employment in long-term care activities exist. Radvansky and Palenik (2010) estimated that around 32,000 persons are employed in long-term care, 22,000 in institutional care and 10,000 in home based care. Radvansky and Lichner (2013) provide similar data for 2011: formal employment in institutions 22,900 and formal employees in home care around 2,500 (Figure 2). Additional around 58,000 informal caregiver received care allowances (allowance for assistance and allowance for personal care) for care giving to almost family members. The calculated employment in institutions is significant higher than the numbers provided by the EU LFS, around 6,000 employees in nursing homes due to the fact that also homes for the disabled or for people with drug abuse are included. Contrary the employment in home care services is significant lower than the numbers published by the EU LFS, 2,500 compared to 20,000.

Figure 2 Long-term care workers in Slovakia

Source: Radvansky and Lichner (2013).

4 Factors influencing future long-term care workforce need

4.1 Ageing populations and changes in dependency

4.1.1 Significant increase in the number of elderly and oldest old

All European countries will face an increase in the number and share of the elderly and in particular the oldest old. This trend can be traced back to a) the continuing increase in life expectancy and b) fertility rates which are well below the replacement level. The NEUJOBS demographic scenarios tough and friendly assume a further increase in life expectancy (LE) for males and females until 2030 (Huisman et al., 2013). The increase in LE at birth is caused by a reduction in mortality rates in the middle and in particular in the higher ages. The Netherlands Interdisciplinary Demographic Institute (NIDI) which has carried out the demographic scenarios provides the calculations of the LE at birth, at the age of 65, and at the age of 80 for the base year and the year 2025 (Van Der Gaag, internal provision of data). In 2010 the LE at 65 ranges for men between 14.5 years in Slovakia to 19.1 years in Italy and for women from 18.5 years in Slovakia to 22.7 years in Italy (Table 11). Men aged 80 years can expect to live another 6.7 years in Slovakia and 8.9 years in Italy. Females can expect to live another 7.9 years in Slovakia and 10.6 years in Italy. LE is assumed to increase for the elderly and oldest old in all countries in particular in the friendly scenario. Countries with a currently relatively low LE at 65 or 80 are expected to show a higher dynamic compared to countries with already high LE. In Italy LE at age 65 will increase by 0.9 (men) and 0.7 (women) years in the tough and 3.1 (men) and 2.6 (women) years in the friendly scenario. In Slovakia LE at age 65 will increase by 2.2 (men) and 2.1 (women) in the tough and 4.4 (men) and

4.1 (women) years in the friendly scenario. The increase in the other countries lies in-between. LE at age 80 is assumed to increase by around half a year in the tough and around 1.9 years in the friendly scenario, with the exception of Slovakia with an increase of more than one year in the tough and 2.6 (2.8) years in the friendly scenario.

Table 11 Life expectancy at birth, at age 65, and at age 80 in 2010 and 2025

	2010		2025 tough		2025 friendly		Changes 2025/2010 in years				
	Males	Females	Males	Females	Males	Females	tough		friendly		
							Males	Females	Males	Females	
	LE at birth										
Denmark	77.2	81.4	78.9	82.7	81.6	85.1	1.7	1.3	4.4	3.6	
Germany	78.0	83.0	79.6	84.1	82.4	86.5	1.6	1.1	4.4	3.5	
Italy	79.7	84.8	81.0	85.8	83.9	88.1	1.3	1.0	4.2	3.3	
Poland	72.1	80.7	74.2	82.1	77.5	84.4	2.1	1.4	5.4	3.7	
Slovakia	71.7	79.3	75.3	82.2	78.5	84.6	3.6	2.9	6.8	5.3	
	LE at age 65										
Denmark	17.4	20.1	18.5	21.1	20.5	22.9	1.1	1.0	3.1	2.8	
Germany	18.0	21.3	19.0	22.1	21.2	24.0	1.0	0.8	3.1	2.7	
Italy	19.1	22.7	19.9	23.4	22.2	25.3	0.9	0.7	3.1	2.6	
Poland	15.4	19.9	16.5	20.9	18.6	22.6	1.1	0.9	3.2	2.7	
Slovakia	14.5	18.5	16.7	20.6	18.9	22.6	2.2	2.1	4.4	4.1	
	LE at age 80										
Denmark	7.7	9.4	8.2	9.9	9.6	11.2	0.5	0.4	1.9	1.8	
Germany	8.2	9.5	8.6	10.0	10.1	11.4	0.5	0.5	1.9	1.9	
Italy	8.9	10.6	9.2	11.0	10.8	12.5	0.4	0.4	2.0	1.9	
Poland	7.3	8.9	7.6	9.4	9.1	10.8	0.4	0.5	1.8	1.8	
Slovakia	6.7	7.9	7.7	9.3	9.2	10.8	1.1	1.4	2.6	2.8	
Source: Huisman et al. (2013); Van Der Gaag (additional data).											

In addition to this trend is the increase in the share of elderly in total population influenced by the shrinking size of following generations due to low fertility rates. For example, the fertility rate of 1.4 which is realized in 2010 in our studied countries with the exception of Denmark means that the following generation is one third smaller than the current one (Table 30 in appendix 1). In the tough scenario the fertility rates are assumed not to change, in the friendly scenario an increase is assumed, however future fertility rates are still below the replacement level (2.1 children per women). Thus, it is assumed that all future generations will be smaller than their preceding generations.

In 2010, Germany had the oldest population. Every fifth person was at least 65 years old. Italy also had a high share of elderly people, around 20 % (Table 12). Lower shares can be observed in Denmark (16 %), Poland (14 %) and Slovakia (12 %). According to the population forecast the number and the share of elderly (65+) will increase significantly in particular in the friendly scenario with an assumed markedly increase in LE at birth. In 2025, in Germany every fourth person is expected to be at least 65 years old (friendly scenario). The proportion is only marginally lower in Italy (23 %). In Denmark and Poland every fifth person will be 65+, and in Slovakia around 18 %. The share of the elderly is expected to be only slightly lower in the tough scenario.

Table 12 Demographic development 2010 to 2025

	2010	2025		Changes 2025/2010		Changes 2025/2010	
		Friendly	Tough	Friendly	Tough	Friendly	Tough
	in 1000	in 1000		in 1000		in %	
	All age-groups						
Denmark	5 535	5 829	5 657	294	122	5.3	2.2
Germany	81 802	80 082	75 250	-1 721	-6 552	-2.1	-8.0
Italy	60 340	65 159	61 212	4 819	872	8.0	1.4
Poland	38 167	38 174	36 194	7	-1 973	0.0	-5.2
Slovakia	5 425	5 618	5 361	193	- 64	3.6	-1.2
Total	191 270	194 862	183 674	3 592	-7 596	1.9	-4.0
EU27	499 200	522 197	495 159	22 997	-4 041	4.6	-0.8
	Elderly (65 years old and older)						
Denmark	903	1 187	1 107	284	204	31.4	22.6
Germany	16 902	19 489	18 005	2 587	1 103	15.3	6.5
Italy	12 206	15 227	14 163	3 020	1 956	24.7	16.0
Poland	5 161	7 718	7 154	2 557	1 993	49.5	38.6
Slovakia	665	1 015	943	350	278	52.6	41.8
Total	35 838	44 636	41 372	8 798	5 535	24.5	15.4
EU27	86 886	112 211	104 328	25 325	17 442	29.1	20.1
	Oldest old (80 years old and older)						
Denmark	228	312	261	85	34	37.2	14.9
Germany	4 181	6 197	5 169	2 016	988	48.2	23.6
Italy	3 478	5 091	4 356	1 613	878	46.4	25.3
Poland	1 257	1 627	1 333	370	75	29.4	6.0
Slovakia	147	207	171	60	24	40.6	16.0
Total	9 291	13 435	11 290	4 144	1 999	44.6	21.5
EU27	23 284	32 587	27 489	9 303	4 205	40.0	18.1

Source: Huisman et al. (2013); calculation by DIW Berlin.

As the need of long-term care increases significantly from the age 75 onwards, the size and share of the oldest old, in general defined as people aged 80+, are of particular interest. In 2010, 9.3 million people in the five studied countries in total were aged 80+, thereof 228,000 in Denmark, 4.2 million in Germany, 3.5 million in Italy, 1.3 million in Poland, and 150,000 in Slovakia. The share in total population was highest in Italy (5.8 %) due to the high life expectancy of males and females. Until 2025, the number of the oldest old is expected to increase by 4.1 million (friendly) and 2 million (tough) in the five studied countries. The growth is highest in Germany (+48 % in the friendly scenario) followed by Italy (46 %). In Slovakia the number of oldest old will increase by 40 %, in Denmark by 37 %, and in Poland by 29 %. In the tough scenario the increase in

the number of oldest old is significantly lower ranging from 25 % in Italy to 6 % in Poland.

4.1.2 Changes in dependency

The continuing increase in LE in the past on the one hand and the increase in the number of dependent people in particular among the elderly and oldest old on the other hand have stirred the discussion on the relationship between these two trends. The literature provides contradictory theoretical positions on this question. There are three hypotheses: Fries et al (1980, 1989) stated that the additional years are to a high share years in good health, thus the share of the life span in bad health will decline as the LE increases due to the postponed onset of chronic diseases. This hypothesis is called 'compression of morbidity'. In contrast, Gruenberg (1977) stated that the additional years are to a higher share years in bad health ('expansion of morbidity' hypothesis). The medical progress leads to an expansion of the life span due to reduction in mortality of several diseases, but the additional life span is not free of illnesses. Chronic diseases will expand. The third hypothesis stated by Manton (1982) assumes that the additional life years do not change the relation of years in good health and years in bad health ('dynamic equilibrium' hypothesis).

Several authors carried out studies to show the empirical relevance of the mentioned hypotheses (for example Lafortune et al., 2007, Robine et al., 1993, Manton et al., 1998). Robine et al., (2003) and the REVES (International Network on Health expectancy and disability Process) network provide an overview of international research and empirical results. But no clear trend across the studied countries could be shown. Some European countries showed evidence for a compression of morbidity while in other countries the data supported an expansion of morbidity (Robine et al., 2009). Studies for Germany showed in general a positive trend of healthy LE (Klein and Unger, 2002; Ziegler and Doblhammer-Reiter, 2007).

We decided to use constant dependency rates and constant rates of impairments in ADL to calculate the future development of people in need of care. As the EU SILC covers only people aged 16+, the dependency rate of people aged 16-19 is used for the total population aged under 20 to calculate the total number of dependent persons. Table 13 shows the development of dependent people based on the EU SILC data and the both demographic scenarios tough and friendly. As the share of people reporting severe impairments due to longstanding illnesses is held constant, the changes in dependent people show the pure demographic effect. The number of dependent people is expected to increase by 2.5 million in the friendly and by 1.2 million in the tough scenario in the five studied countries. Significant differences in the growth of dependent people can be seen among the five countries. The highest increase is expected for Slovakia with 19 % in the tough and 27 % in the friendly scenario. Due to the assumed high increase in LE for males and females the number of elderly will show a high dynamic that influences the growth in dependent people.

In Italy the number of dependent people is expected to increase by around 16% in the tough and 26 % in the friendly scenario. Coda Moscarola (2013) calculated an increase

in dependent people of 19 % (tough) and 32 % (friendly) based on the national survey on people with disability carried out in 2004/5. This survey used a different definition of disability and included also people in institutions.

Table 13 Development in the number of dependent people 2010 to 2025

	2010	2025		Changes between 2010 and 2025			
		tough	friendly	tough	friendly	tough	friendly
	in 1000 persons			in 1000 persons		in %	
	Total						
Denmark	371	383	396	11	24	3.1	6.6
Germany	7847	8178	8856	331	1009	4.2	12.9
Italy	3143	3640	3956	496	813	15.8	25.9
Poland	2490	2801	3016	312	527	12.5	21.2
Slovakia	475	564	603	90	128	18.9	27.0
Total	14326	15566	16827	1240	2501	8.7	17.5
	55+						
Denmark	157	181	190	23	33	14.9	20.7
Germany	5390	6270	6842	880	1452	16.3	26.9
Italy	2481	3019	3300	538	819	21.7	33.0
Poland	1735	2096	2281	361	546	20.8	31.5
Slovakia	337	426	459	89	123	26.5	36.5
Total	10100	11992	13073	1891	2972	18.7	29.4
	65+						
Denmark	90	110	118	20	28	22.6	31.8
Germany	3909	4316	4844	407	935	10.4	23.9
Italy	2085	2516	2787	431	702	20.7	33.7
Poland	1254	1679	1853	425	598	33.9	47.7
Slovakia	235	322	353	87	119	37.3	50.6
Total	7572	8943	9955	1370	2383	18.1	31.5

Source: Huisman et al. (2013); EU SILC; calculation of DIW Berlin.

Italy has the highest LE among the five studied countries, and it is assumed that this does not change. The gap in LE between Italy and the other countries is expected to decrease, but it will remain high for Poland and Slovakia. Thus, the increase in dependent people is driven by the rise in LE also in Italy. Poland is expected to have a high increase in dependent people of 13 % (tough) and 21 % (friendly scenario). Germany (4 % and 13 %) and Denmark (3 % and 7 %) show a less dramatic increase in dependent people.

The share of dependent elderly (65+) will increase in all studied countries. In 2010, the share of elderly dependent varies across the five studied countries from 24 % in Denmark to 66 % in Italy. In 2025, the share is expected to be highest in Italy (69 % tough and 70 % friendly), and lowest in Denmark. But in Poland and Slovakia a significant increase in the share of elderly is expected. In Poland the share of dependent elderly will rise by 10 and 11 %-points, in Slovakia by 8 and 9 %-points.

The SHARE results using the share of people aged 50+ with impairments in at least 1 ADL shows a similar development of dependent people. Again, Italy shows the highest dynamic (Slovakia is not included in SHARE), whilst Germany shows the lowest dynamic in the tough scenario and Poland in the friendly scenario. However, also the SHARE data indicate a significant increase in the number of dependent people under the assumption of constant disability rates.

Table 14 Changes in the number of people aged 50+ with impairments in at least 1 ADL

	2010	2025		Changes between 2010 and 2025			
		tough	friendly	tough	friendly	tough	friendly
		in 1000 persons				in %	
Denmark	180	208	225	28	46	15.74	25.56
Germany	4 161	4 701	5 177	540	1 016	12.98	24.43
Italy	2 956	3 533	3 868	577	912	19.52	30.86
Poland	2 445	2 777	2 991	332	546	13.57	22.33

Source: SHARE wave 1, 2, and 4; weighted and pooled data; Huisman et al. 2013; calculation of DIW Berlin.

4.2 Changes in informal care potential

The majority of informal caregivers are spouses/partners or daughters and daughters in law followed by sons/sons in law and other relatives. Friends and neighbours play only a marginal role in informal care giving in particular regarding personal care (Riedel and Kraus, 2011). The future development of informal caregivers is influenced by two trends: first, the changes in living arrangements with more singles in the middle age-groups and an increase in the oldest old living together due to the increase in LE; second, the increase in female labour force participation reducing the possibility to provide intensive informal care to elderly relatives (Vilaplana Prieto, 2011). In the appendix 4 the expected trend in changing living arrangements and in appendix 5 the impact of changing female labour force participation is discussed. The following parts summarises the results.

Changing living arrangements

The changes in living arrangements lead in general to a decline in the share of elderly households living with a partner or other persons in the same household. An exception is Slovakia with a decline in single person's households. As informal caregiving is more likely inside the household, the decline will reduce the potential of informal caregivers inside the household.

We calculated the changes in informal carer aged 50+ using constant probability rates of being a caregiver by age-groups and gender, but taking into account the changes in

living arrangements. The number of informal caregiver will increase significantly in all studied countries in both demographic scenarios. The highest increase in informal caregiver is expected for Italy with around 21% in the tough and 26 % in the friendly scenario (Table 15). Poland is expected to have the lowest increase in informal caregiver by around 5 % (tough) and 11 % (friendly scenario). The development of informal caregiver is in between these two countries in Denmark and Germany. In Denmark, Germany and Poland the dynamic is higher for informal carer inside the household than outside the household. The ageing of the population has a higher effect on the available informal care-force inside the household, because informal caregivers are mostly spouses in higher ages, whilst caregiver outside the household are in the majority aged 50-69 years. Italy shows the contrary situation: a higher dynamic in informal caregiver outside the household.

Table 15 Changes in informal caregiver aged 50+ taken changes in living arrangements into account

	2010	2025		Changes between 2010 and 2025			
		tough	friendly	tough	friendly	tough	friendly
in 1000 persons						in %	
Informal caregiver total							
Denmark	90	101	106	11	16	12.27	17.52
Germany	2 476	2 729	2 875	253	399	10.21	16.11
Italy	2 704	3 261	3 402	557	698	20.59	25.81
Poland	1 385	1 448	1 535	63	150	4.55	10.83
Informal caregiver outside the household							
Denmark	21	22	23	2	2	7.60	11.48
Germany	864	948	980	83	116	9.64	13.42
Italy	1 090	1 333	1 376	244	286	22.35	26.26
Poland	325	339	349	15	25	4.49	7.68
Informal caregiver inside the household							
Denmark	70	79	83	9	13	13.65	19.30
Germany	1 612	1 781	1 894	170	283	10.52	17.55
Italy	1 615	1 928	2 027	313	412	19.39	25.50
Poland	1 061	1 109	1 186	48	125	4.56	11.80

Source: SHARE wave 1, 2, and 4; weighted and pooled data; Huisman et al. 2013; calculation of DIW Berlin.

Slovakia is not included in the SHARE survey, thus no changes in living arrangement could be taken into account for estimating the future informal care supply. Radvansky and Lichner (2013) estimated the development of informal carer based on the demographic development in the both scenarios tough and friendly. According to this estimation the number of informal (unpaid) caregiver will increase from around 112,000 in 2010 to 134,000 (tough) and 143,000 (friendly) in 2025.

Increase in female labour participation

The largest group of informal caregivers are females in prime and old working age mainly aged 40-69 (Viitanen, 2005). As care giving is often a physically and mentally demanding full-time job the impact of care giving on the labour force participation of females has dominated the political debate on this issue in the last two decades. In view of the Europe 2020 target to increase the labour force participation rate of people aged 20 to 64 years to 75 % in 2020 the reconciliation of care giving to elderly and employment remains high on the agenda. The way in which people react in the case that the need of caregiving occurs depends on the intensity of caregiving, on the available long-term care services, in particular the measures supporting informal carer to combine care tasks and formal employment, but also on the situation on the labour market (Viitanen, 2005; Gabriele, Tanda and Tediosi, 2011; Crespo and Mira, 2010). In Denmark the literature indicates that increasing female labour force participation has negligible effect on care giving due to the generous long-term care system (Unger, 2013). As in Poland and Slovakia the formal long-term services are rare and restricted, care giving is still the responsibility of the family even if female labour participation increases (Vilaplana Prieto, 2013). Thus, no significant effect of increasing activity rates is assumed. In Germany past increases in female employment had a negative effect on care giving, but this depends also on the intensity of required caregiving. As no information on intensity of caregiving is available we could not take this into account. Only for Italy changes in caregiving activities due to increasing female employment is taken into account (Coda Moscarola, 2013).

4.3 Impact on the need of formal care and the long-term care workforce

The demographic development as well as the changes of available informal carer will have an impact on the required formal care and its workforce. In the following subsection we show the development of dependent people receiving formal care based on the current available services and their utilization. The difference to the number of dependent people shows the need of informal care or the number of dependent receiving no care under the current long-term care systems and their provided formal care. This is of course an approximation as normally formal and informal care are used jointly and informal care may be an imperfect substitute of formal care (Bonsang, 2008)

4.3.1 Changes in the number of people receiving formal care

The pure demographic effect on the number of people receiving (publicly financed or supported) formal long-term care services in institutions or at home is shown by combining the constant age-specific (if available) utilization rates of the base year with the population by age-groups and gender for the two NEUJOBS scenarios tough and

friendly. No changes in the long-term care system or in the available care services are assumed. The estimations were carried out for home care and institutional care. The country specific estimations are shown in appendix 6.

In all studied countries the number of recipients of formal care is expected to increase significantly (Table 16). In Denmark and Germany the increase is higher for institutional care than for home care, while in Poland the increase is higher for home care. In Germany and Slovakia a high share of recipients receive cash benefits for self-organized informal care (Germany) or care allowances provided to persons caring relatives (Slovakia). The recipients of cash benefits will increase to a lower degree than the recipients of benefits in kind. In Italy most severe disabled receive a universal cash benefit to cope with the care expenditure. In 2010 around 498,000 received this kind of benefit (Coda Moscarola, 2013).

Table 16 Recipients of formal (public financed) long-term care

	2010	2025		Changes between 2010 and 2025			
		tough	friendly	tough	friendly	tough	friendly
		in 1000 persons				in %	
Recipients of institutional care							
Denmark	42	48	57	6	15	15.00	35.00
Germany	743	875	1 036	132	293	17.77	39.43
Italy	354	447	513	94	159	26.47	44.94
Poland	140	161	177	21	37	15.00	26.43
Slovakia	37	43	46	6	9	16.22	24.32
Recipients of formal home care							
Denmark	177	208	234	31	57	17.52	32.00
Germany	576	671	785	95	209	16.49	36.28
Italy*	597	692	752	94	154	15.81	25.85
Poland	149	179	205	30	56	20.13	37.58
Slovakia	26	35	38	9	12	34.62	46.15
Recipients of cash benefits for informal care at home							
Germany	1 182	1299	1474	117	292	9.90	24.70
Slovakia**	57	67	72	10	15	17.54	26.32
Italy***	498						
*) Estimation using constant shares of people receiving home care in total dependent persons.-**) People receiving care by informal caregiver which receive care allowances.-***) Disabled receiving universal cash benefits to cope with care expenditures.							
Source: Schulz (2013); Coda Moscarola (2013); Golinowska et al. (2013); Radvansky and Lichner (2013); calculation of DIW Berlin.							

The results allow comparing the number of dependent people and the number of persons receiving formal or informal regular personal care or cash benefits (Table 17). Often dependent people receive simultaneously formal personal care and informal help and care by family members. Thus, the difference is only a crude indicator for the number of people who are expected to receive no formal care (under the current long-term care systems) or no regular informal personal care from caregivers aged 50+. These people rely on informal care provided on a not regular basis or provided by

people aged less than 50 years, on private financed (often illegal) formal care, or they receive no care at all. In 2010 the difference measured in percent of dependent ranged from 51 % in Slovakia to 17 % in Denmark. Similar to the results for the year 2010 shown in Table 2, in Italy all dependent people receive some kind of help and care. In 2025 these differences are lower but still high in the studied countries (expect Italy) in both demographic scenario, but higher in Poland.

Table 17 Dependent and estimated care giving arrangements in 2010 and 2025

	Dependent persons	Persons receiving formal care			Informal caregiver 50+			Difference		
		in institutions	at home		total	outside the household	inside	total	in relation to dependent	
			in kind	cash benefits						
in 1000										
2010										
Denmark	371	42	177		219	21	70	90	62	16.79
Germany	7 847	743	576	1 182	2 501	864	1 612	2 476	2 870	36.57
Italy*	3 143	354	597	498	1 449	1 090	1 615	2 704	-1 010	-32.13
Poland	2 490	140	149		289	325	1 061	1 385	815	32.75
Slovakia	475	37	26	57	120			112	243	51.15
Tough scenario										
Denmark	383	48	208		256	22	79	101	25	6.64
Germany	8 178	875	671	1 299	2 845	948	1 781	2 729	2 604	31.84
Italy*	3 640	447	692		1 139	1 333	1 928	3 261	- 761	-20.90
Poland	2 801	161	179		340	339	1 109	1 448	1 013	36.16
Slovakia	564	43	35	67	145			134	285	50.56
Friendly scenario										
Denmark	396	57	234		290	23	83	106	0	-0.06
Germany	8 856	1 036	785	1 474	3 295	980	1 894	2 875	2 686	30.33
Italy*	3 956	513	752		1 265	1 376	2 027	3 402	- 711	-17.98
Poland	3 016	177	205		382	349	1 186	1 535	1 099	36.43
Slovakia	603	46	38	72	156			143	303	50.32

*) In Italy most severe disabled persons receive a special transfer (universal cash benefit) to cope with the care expenditure which is often used to engage privat financed caretakers.

Source: Schulz (2013); Coda Moscarola (2013); Golinowska et al. (2013); Radvansky and Lichner (2013); calculation of DIW Berlin.

4.3.2 Changes in the demand for (public financed) formal care workforce

The estimation of people receiving formal care is based on the current utilization of home care and institutional care services. The needed personal can be calculated using constant ratios of recipients related to staff employed in institutional care and home care. The underlying assumption is, that the current amount of staff engaged in nursing care activities is adequate, that means no shortage of staff exists. The future amount of personnel needed can be estimated using two approaches: a) using the employment based on national statistics provided by our partners, and b) using the information of the EU LFS for the sub-sectors residential nursing care (Q871) and social work without accommodation for the elderly and disabled (Q881) (except Denmark were the information is missing). The approach a) can be applied for Denmark, Germany, Poland and Slovakia, whereas for Italy only data on employment in residential care is available. The country specific estimations based on national

employment data are shown in Table 31 to Table 35 in the appendix 1. An overview of the results provides Table 18.

In Denmark additional 24,000 (tough) and 45,000 (friendly) personnel is required to meet the increasing demand. The majority of required staff is social and health workers or assistants. In Germany around 165,000 (tough) and 366,000 (friendly) personnel is required. The majority are geriatric nurses, nurses and nursing assistants. In Poland 11,000 (tough) and 20,000 (friendly) additional personnel is required, and in Slovakia 6,000 (tough) and 8,000 (friendly). In Italy the demand for residential care personnel is expected to increase by 53,000 (tough) and 86,000 (friendly). In Italy additional private financed, but supported by the universal cash benefit for the disabled, 800,000 caretakers are employed. However, a great share of them is illegal employment (Coda Moscarola, 2013).

Table 18 Demand for formal long-term care personnel based on national employment data

	2010	2025		Changes between 2010 and 2025			
		tough	friendly	tough	friendly	tough	friendly
		in 1000 persons				in %	
Denmark	140	163	185	24	46	17.06	32.62
Germany	952	1 117	1 318	165	366	17.33	38.45
Italy*	334	387	420	53	86	15.87	25.75
Poland	72	84	93	11	20	15.77	28.08
Slovakia	25	31	33	6	8	21.83	30.56
*) Only staff in residential care.							
Source: Schulz (2013); Coda Moscarola (2013); Golinowska et al. (2013); Radvansky and Lichner (2013); calculation of DIW Berlin.							

The Table 19 shows the development of staff needed based on the EU LFS employment. The expected increase is only slightly different from the estimation based on national employment data. In particular for Italy the results of the EU LFS have to be interpreted with caution because they show significant difference to the data of the national statistical office.

Table 19 Demand for formal long-term care personnel based on EU LFS data

	2010	2025		Changes between 2010 and 2025			
		tough	friendly	tough	friendly	tough	friendly
		in 1000 persons*				in %	
Denmark	140	163	185	23	45	16.43	32.14
Germany	802	941	1 108	139	306	17.27	38.21
Italy	160	194	218	34	58	21.54	36.11
Poland	63	75	84	12	21	18.50	34.04
Slovakia	26	31	35	5	9	20.00	33.77
*) Personnel in Q871 (nursing homes) and Q881 (social care for the elderly and disabled without accommodation).							
Source: Schulz (2013); Coda Moscarola (2013); Golinowska et al. (2013); Radvansky and Lichner (2013); calculation of DIW Berlin.							

4.3.3 Discussion of demand results

As shown above, the calculation of the future demand for long-term care services indicates that under the current long-term care systems and the current division of care tasks between the state and the family, a significant increase in informal and formal care workforce is required. The projection of informal workforce takes into account further changes in living arrangements, and assumes that the increase in female labour force participation will have only a marginal effect on the provision of care. An exception is Italy. Coda Moscarola (2013) estimated that the increase in female activity rates to the national Euro2020 target of 67 % will reduce the informal caregivers by one third. This adds to the challenges for formal care provision or for privately organized formal care. In 2010 the privately financed care workforce is estimated to amount 800,000. The majority of them are irregularly employed. Also Lethbridge (2011) reported that in Italy the increasing demand for care is met through the temporary migration of some 700,000 home care workers from neighbouring countries in 2010. This is supported by the needs based allowance to pay for private services or for relatives. In 2008 around 9.5 % of persons aged 65+ received this type of universal benefit.

In Germany, around 200,000 temporary migrant workers, in the majority from Poland and other neighbouring Eastern European countries, are privately engaged as domestic workers, but providing also personal care (Schulz, 2012). The share of irregular workers is not known, but estimated to be high. In Poland and Slovakia the share of privately financed long-term care is also significant. In Poland the newly created private and for profit care facilities showed a high dynamic in the past. Currently 700 private facilities with high quality standards and payments amounting 2000 to 7000 Euro exist (Golinowska et al., 2013).

The estimation of the demand for formal care is based on the assumption that the current amount of formal care workforce is sufficient. That assumption is not strictly justified for the studied countries. A shortage of nurses and personal carers is reported. In Italy and Germany managed migration schemes lead to an increase in the number of foreign workers, but this temporary employment shows high turnover. The domestic

recruitment strategies of the countries showed low success in the past due to unfavourable working conditions and low salary (Colombo et al., 2011).

5 Changes in labour force supply

5.1 Development of overall labour force

In the NEUJOBS project the NEMESIS model (New Econometric Model of Evaluation by Sectorial Interdependency and Supply) constructed by the ERASME team (Boitier et al., 2013) is used to show some quantitative socio-economic and environmental results to reveal the main challenges for EU in the framework of the “socio-ecological transition” without policy intervention and according to the global context. The NEMESIS model is based on detailed sectorial models for each of the EU27. It provides results for the economic development, changes in industrial structures, labour supply and sectorial employment. The NEMESIS model also provides an estimation of the labour force in the five studied countries (Table 20). As the model is based on data from National Accounts, the labour force calculation uses the employment and unemployment figures from the National Accounts. In 2010 the labour force based on National Accounts showed a significant difference to the figures provided by the LFS in particular for Germany (1.7 million) and Italy (2 million). In Germany the difference can be traced back to the incomplete coverage of marginal employment in the LFS, in Italy it is reported that the National Accounts also include an estimation of illegal employment (Eurostat, 2013). As the privately financed domestic workers (*badanti*) are to a high share irregular worker, the illegal employment in long-term care is significant (Coda Moscarola, 2013). Thus, for Italy the National Account data seems to be a more valid database for the total labour force. The labour force in the National Accounts is lower than the figures from the LFS in Poland and Slovakia.

An advantage of the NEMESIS model is that the model provides an estimation of the total employment as well as the employment broken down by broad industries. For countries that provide input-output-tables also a down scaling by industries according the NACE2 classification was carried out. For all studied countries estimations of the total employment and the employment in the grouped sector “non-market services” are available. The non-market sector consists of the NACE2 industries O “Public administration and defense, compulsory social security”, P “Education”, Q86 “Human health services”, Q87+88 “residential care activities and social work activities without accommodation”, R90-92 “Creative, arts and entertainment activities, libraries, museums, cultural activities etc.”, R93 “Sports activities, amusement + recreation activities” and S94 “Activities of membership organizations”.

Table 20 NEMESIS results – labour force in 1000

	2010	2025		Changes 2025/2010		Changes 2025/2010		
	Base year	tough	friendly	tough	friendly	tough	friendly	
	in 1000						in %	
	based on employment and unemployment in the National Account systems							
Denmark	2 982	2 965	3 043	- 17	61	-0.57	2.05	
Germany	43 609	41 173	43 456	-2 436	- 153	-5.59	-0.35	
Italy	26 824	27 805	29 426	981	2 602	3.66	9.70	
Poland	17 580	17 493	18 349	- 87	769	-0.49	4.37	
Slovakia	2 518	2 521	2 636	3	118	0.12	4.69	
Total	93 513	91 957	96 910	-1 556	3 397	-1.66	3.63	

Source: D10.2 population projection (Version Oct 12); NEMESIS results March 13; calculation of DW Berlin.

For Germany a downscaling of NEMESIS sectors into NACE2 industries was carried out by the ERASME team using the National Accounts and the input-output-tables. Thus, information for Q86 “Human health activities” and Q87+88 “Residential care and social work” is available. For the other countries we carried out a kind of downscaling ourselves. We used the information from the National Accounts and from the LFS both based on the NACE2 classification and calculated the historic shares of Q86 and Q87+88 sectors in total employment as well as in the combined sector ‘non-market services’. We used constant shares to calculate the employment in 2025.

In 2010, the total employment amounted to 86 million in the five countries in total, thereof 22 million in the non-market sector and 7.3 million in sector Q (Table 21). According to the NEMESIS model, in the tough scenario the total employment is expected to decline in all countries, except Slovakia (Table 22). In total, in the five studied countries a reduction of 4.2 million employees is projected. In Denmark and Poland a contrary trend is expected for the “non-market services”. Germany, and Italy will have a decline also in that sector, Slovakia will realize an increase in employment. The employment in ‘residential care and social work’ is expected to decline in Germany and Italy, while Denmark and Poland show an increase and Slovakia shows no change in employment in ‘residential care and social work’. In Denmark, Germany and Poland it is expected that the importance of ‘residential care and social work’ employment in total employment will increase. In Slovakia the increase in total employment is higher than in ‘non-market services’. In Italy the decline ‘non-market services’ employment will be significant higher than in total economy.

Table 21 Employment by sectors - results of the NEMESIS model (in 1000)

Country	Employment (in 1000)				
	total	Non market services	Health care and social work (Q)*	Human health (Q86)*	Residential care and social work (Q87+88)*
2010					
Denmark	2 758	973	496	169	327
Germany	40 513	11 611	4 144	2 427	1 717
Italy	24 571	5 632	1 648	1 205	443
Poland	15 875	3 617	918	701	217
Slovakia	2 153	508	132	103	28
total	85 870	22 340	7 336	4 605	2 732
2025 tough scenario					
Denmark	2 757	1 037	529	180	348
Germany	37 054	11 366	3 788	2 118	1 670
Italy	24 248	4 633	1 355	991	364
Poland	15 344	3 975	1 008	770	238
Slovakia	2 236	512	133	104	28
total	81 639	21 523	6 813	4 164	2 650
2025 friendly scenario					
Denmark	2 865	1 099	560	191	369
Germany	40 674	13 631	4 635	2 558	2 077
Italy	26 720	5 614	1 642	1 201	441
Poland	16 685	4 633	1 175	897	278
Slovakia	2 404	603	156	123	33
total	89 348	25 580	8 168	4 971	3 198
*) Estimation of DIW Berlin with the exception of Germany.					
Source: Boitier, B., Lancesseur, N. and Zagamé, P. "Global scenarios for European socio-ecological transition", NEUJOBS Deliverable D9.2, 2013, for scenarios results; calculations of DIW Berlin.					

Table 22 Changes in employment between 2010 and 2025 - results of the NEMESIS model

Country	Employment (in 1000)				
	total	Non market services	Health care and social work (Q)*	Human health (Q86)*	Residential care and social work (Q87+88)*
Changes between 2010 and 2025 tough scenario					
Denmark	-1	64	33	11	22
Germany	-3 459	-246	-355	-309	-47
Italy	-323	-999	-292	-214	-79
Poland	-531	358	91	69	21
Slovakia	83	4	1	1	0
total	-4 231	-818	-523	-441	-82
Changes between 2010 and 2025 friendly scenario					
Denmark	107	126	64	22	42
Germany	161	2020	491	132	359
Italy	2 149	- 18	-5	-4	-1
Poland	810	1 016	258	197	61
Slovakia	251	96	25	19	5
total	3 478	3 239	832	366	466
*) Estimation of DIW Berlin with the exception of Germany.					
Source: Boitier, B., Lancesseur, N. and Zagamé, P. "Global scenarios for European socio-ecological transition", NEUJOBS Deliverable D9.2, 2013, for scenarios results; calculations of DIW Berlin.					

Employment in the friendly scenario shows a positive trend in total economy as well as in 'non-market services', except Italy (decline in non-market service employment). In 'residential care and social work' around 466,000 new jobs are expected under the friendly scenario in the five countries. The employment in 'residential care and social work' will be nearly constant in Italy. In Denmark an increase in 'residential care and social work' employment by 13%, in Germany by 21 %, in Poland by 28 %, and in Slovakia by 19 % is expected.

5.2 Discussion of labour supply results

With the exception of Germany, the NEMESIS model provides information only for the pooled sector 'non-market services'. Residential care and social work has a share of 12 % in the 'non-market services'. The development of the employment in residential care and social work depends on the long-term care policy and the financial situation

of the countries respectively the municipalities which are responsible for the provision of long-term care services in the social assistance scheme. But also the share of privately financed long-term care activities is expected to increase. With the exception of Italy a high dynamic of employment in non-market services is assumed. This dynamic requires an increase in the publicly financed resources for long-term care. In particular in Poland, but also in Slovakia, investments in the long-term care infrastructure are required (Golinowska et al., 2013).

6 Summary and discussion

This paper shows the impact of societal change on the demand and supply of long-term care workforce assuming constant utilization rates of long-term care services and constant care giving behaviour. No changes in the existing long-term care systems, in particular the available services and the eligibility criteria for receiving long-term care benefits are assumed. Under these assumptions, care giving will be still the tasks of family members in almost all studied countries with the exception of Denmark in which the majority of personal care is provided by the communities. Thus, the long-term care workforce consists of formal and informal caregiver. Both dependent people and informal caregiver are expected to increase until 2025; however the need of formal care and its workforce will grow significantly, by around 17 % in the tough and 35 % in the friendly scenario. Although in Denmark, Poland, Slovakia and Germany (friendly) an increase in the workforce supply in residential care and social work is estimated the gap on the nursing and care market will widen. In Italy a decline in care workforce in both scenarios is expected, while the demand for formal workforce is estimated to increase in line with the development of dependent people by around 19 % (tough) and 31 % (friendly scenario) (Table 23). But also in the other studied countries shows the demand for care workforce a higher dynamic than the supply side.

The increasing need of care workers is a challenge for all studied countries. Currently a shortage of nursing and caring personnel is reported, and the recruitment strategies showed only low success in the past. Three fields of activity are discussed to meet the future care demand (Colombo et al., 2011, Lethbridge, 2011, Carreto et al., 2012):

- a) Measures to increase the informal care potential
- b) Recruitment of long-term care workers from abroad
- c) Measures to increase the domestic long-term care workforce

Ad a) Informal caregivers are expected to remain the main care workforce also in the future. Several strategies are discussed to support informal caregivers and to encourage more people to take over informal care or to increase their caregiving engagement. The SHARE data indicates that there is a significant share of family caregivers who provide personal care, but not on a regular basis. Measures to

encourage these caregivers to increase their caregiving activities may reduce the expected gap in nursing and care. Measures supporting informal carer are

- Care leave (in Germany family caregiver can reduce their working time for up to two years to care for their relatives)
- Financial support for family caregivers (Care allowance in Slovakia)
- Flexible working times, homework, online working places (better reconciliation of care and employment)
- Respite care, day care centres
- Training, counselling, coaching
- Support from advisory boards for example concerning psychological problems (in Germany online support is available, in Italy social care help-desks are introduced (Santo and Ceruzzi, 2010)),
- reducing the caregiving burden through ICT (CARICT project reported 52 successful ICT initiatives (Carretero et al., 2012))
- Encourage more males to be active in caregiving
- Support from professional caregivers (may be as a type of training to cope with caregiving tasks).

Table 23 Changes in the demand for long-term care workforce and in the supply of residential care and social work

	Tough scenario		Friendly scenario	
	demand*	supply**	demand*	supply**
Denmark	17.1%	6.6%	32.6%	12.9%
Germany	17.3%	-2.7%	38.5%	20.9%
Italy***	18.7%	-17.7%	31.2%	-0.3%
Poland	15.8%	9.9%	28.1%	28.1%
Slovakia	21.8%	0.9%	30.6%	18.8%
*) Demand for formal long-term care workforce based on national statistics. -**) Results of the NEMESIS model for the sector non-market services; Germany for residential care and social work.-***) Change in dependent people as a proxy for formal labour demand.				
Sources: Boitier et al., 2013; Schulz, 2013; Coda Moscarola, 2013; Golinowska et al., 2013; Radvansky and Lichner, 2013; calculation of DIW Berlin.				

Ad b) Migrant care workers play a significant role in Italy. Lethbridge (2011) estimated that around 700,000 migrants are engaged as caretakers. In Germany it is estimated that 200,000 persons from abroad are working as domestic workers, but take over also care tasks. The challenge is that a large proportion of migrant domestic workers or caretakers are irregularly employed. Regular work requires contributions to social security systems and taxes. Employers have to pay a regular salary, have to ensure that

the working hours do not exceed the regular maximum level. For both, the employer as well as the employees is irregular employment attractive. One measure to reduce irregular employment is the tax reduction for households employing caretakers for family members in Italy.

Ad c) Employees in long-term care facilities experience unfavourable working conditions, like working time at night, high time pressure, low competences, low salaries and low image of nursing professions (Colombo et al., 2011). The improvement of working conditions has a high priority for the recruitments and retention strategy of nursing homes and home care services. Relevant measures are:

- An increase in salaries: qualified nurses working in acute care facilities like hospitals have on average a higher salary than qualified nurses working in nursing homes. This leads to high turnover of qualified personnel in long-term care facilities. In Germany, for example, the average duration of nurses in hospitals is 8 years, in nursing homes only 5 years. An increase in earning may help to reduce high turnover.
- Flexible working times, but reduction in part-time work and marginal employment: In all countries part-time employment is common in nursing and caring activities. In particular low qualified personnel are often working in part-time or in marginal employment. Low wages combined with low amounts of monthly working hours lead to low earnings. Often employees do not voluntary work part-time. A shift to flexible working time arrangements is required.
- Using ICT to reduce caregiving burden: The introduction of ITC can reduce the caregiving burden as well as the time spend for documentation and 'paper work'. The CARICT project showed best practice examples (Carretero et al., 2012).
- More competences and reorganization of care tasks: Changes in the division of tasks for example between qualified nurses and personnel carers and nursing and caring assistance may help to improve the satisfaction of employees and may increase the productivity.
- Increase in the image of care professionals: May be public campaigns can help to increase the image of nursing and caring personnel.

The future development of formal care workforce depends not at least on the financial resources of the communities who are responsible for social care provision and the national and regional politics on long-term care. To cope with the ageing population strict priority to measures supporting family caregiver and measures to provide formal care supplementary or complementary to family has to be giving by politicians. In Germany a new definition of 'care need' is required. Currently, care personnel is under high time pressure in particular in home care services as they are reimbursed according to fixed amount of time (minutes) spend for specific care activities, for example combing. A new reimbursement system has been discussed for several years, but not jet introduced.

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Appendix 1: Tables and figures

Table 24 Share of people reporting severe impairments in daily living by sex and age-groups in 2010

Age-groups	Denmark	Germany	Italy	Poland	Slovakia
	Both sexes				
15-24	2.9	1.7	0.7	1.7	1.5
25-34	5.0	3.3	1.3	1.8	2.3
35-44	9.1	5.5	2.1	3.2	4.3
45-54	7.9	8.7	3.1	5.3	7.5
55-64	9.4	15.1	5.4	9.7	15.4
65-74	9.8	15.1	9.3	18.3	25.9
75-84	9.7	27.4	21.7	28.2	42.7
85+	10.8	48.6	34.3	43.1	65.7
Total	7.8	10.2	6.2	7.9	10.4
	Males				
15-24	2.8	2.1	0.9	1.6	1.3
25-34	3.7	2.9	1.2	2.2	2.5
35-44	8.6	5.6	2.1	4.4	4.1
45-54	7.3	9.1	2.8	5.7	7.6
55-64	9.5	17.3	5.0	10.6	14.4
65-74	7.2	16.0	8.3	18.9	22.2
75-84	12.0	24.1	20.6	27.7	34.9
85+	10.6	40.0	27.6	42.5	57.0
Total	7.1	10.1	5.0	7.5	8.3
	Females				
15-24	2.9	1.2	0.4	1.7	1.8
25-34	6.2	3.6	1.3	1.5	2.0
35-44	9.6	5.4	2.0	2.0	4.5
45-54	8.5	8.3	3.4	4.9	7.5
55-64	9.3	13.2	5.7	9.0	16.3
65-74	12.2	14.3	10.2	17.9	28.2
75-84	8.1	30.6	22.4	28.4	47.7
85+	11.0	54.1	37.5	43.3	70.4
Total	8.4	10.3	7.2	8.2	12.2
Source: Eurostat, EU SILC.					

Table 25 Dependent people by gender and age-groups 2010

Age-groups	Denmark	Germany	Italy	Poland	Slovakia	All
	in 1000 persons					
	Total					
0-24	48	337	96	186	25	691
25-44	106	981	297	277	54	1 715
45-64	128	2 620	666	773	161	4 348
65-74	51	1 453	578	504	98	2 683
75-84	27	1 515	956	544	98	3 140
85+	12	941	551	207	38	1 749
Total	371	7 847	3 143	2 490	475	14 326
	Males					
0-24	24	218	67	92	11	412
25-44	47	488	150	181	28	894
45-64	62	1 434	300	398	74	2 268
65-74	18	725	239	216	34	1 232
75-84	14	523	368	186	27	1 118
85+	4	198	132	54	9	397
Total	169	3 587	1 255	1 128	183	6 322
	Females					
0-24	24	119	28	94	14	279
25-44	59	493	147	96	26	821
45-64	66	1 186	367	374	87	2 080
65-74	33	728	339	287	64	1 450
75-84	13	992	589	357	71	2 022
85+	8	743	419	153	29	1 352
Total	202	4 260	1 889	1 362	291	8 004

Source: Eurostat, EU SILC; Huisman et al 2013; calculation of DIW Berlin.

Table 26 Formal long-term care workforce (nurses and personal carers)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
total (at home and in institutions)												
nurses and personal carers (in persons)												
Denmark	69616	72249	72544	73117	75206	77696	76698	76083	77334	79067	..	..
<u>Germany</u>	..	468665	..	511414	..	556095	..	594616	..	642110	..	683291
Italy	..	..	..	406669	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	19791	15048	11549	10439	10573	11049	10730	10920
nurses												
Denmark	24293	25534	26276	26725	28418	29530	29171	28399	29337	31050	..	..
<u>Germany</u>	..	135467	..	146047	..	158642	..	167684	..	169058	..	163317
Italy	..	..	..	23209	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	2780	2207	2524	2524	2438	2499	2649	2691
personal carers												
Denmark	45323	46715	46268	46392	46788	48166	47527	47684	47997	48017	..	..
<u>Germany</u>	..	333198	..	365367	..	397453	..	426932	..	473052	..	519974
Italy	..	..	..	383460	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	17011	12841	9025	7915	8135	8550	8081	8229
in institutions												
nurses and personal carers (in persons)												
Denmark	51285	52993	53843	56499	58071	60070	59663	55981	55089	..	..	..
<u>Germany</u>	..	331941	..	363088	..	394369	..	416177	..	438705	..	461825
Italy	..	106794	111510	117901	119240	125717	..	..	..	..	..	..
Slovak Republic	..	..	..	..	3717	3065	3419	3430	3366	3963	4330	4646
nurses												
Denmark	16709	17571	18328	19566	20463	21451	21302	19485	19385	..	..	..
<u>Germany</u>	..	69534	..	74166	..	79471	..	79734	..	76001	..	71062
Italy	..	20908	21906	23209	24001	24169	..	..	..	..	..	..
Slovak Republic	..	..	..	..	2780	2207	2524	2524	2438	2499	2649	2691
personal carers												
Denmark	34576	35422	35515	36933	37608	38619	38361	36496	35704	..	..	..
<u>Germany</u>	..	262407	..	288922	..	314898	..	336443	..	362704	..	390763
Italy	..	85886	89604	94692	95239	101548	..	..	..	..	..	..
Slovak Republic	..	..	..	..	937	858	895	906	928	1464	1681	1955
Share of formal long-term care workers in institutions in %												
nurses and personal carers (in persons)												
Denmark	73.67	73.35	74.22	77.27	77.22	77.31	77.79	73.58	71.24	..	..	..
<u>Germany</u>	..	70.83	..	71.00	..	70.92	..	69.99	..	68.32	..	67.59
Italy	..	..	..	28.99	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	18.78	20.37	29.60	32.86	31.84	35.87	40.35	42.55
nurses												
Denmark	68.78	68.81	69.75	73.21	72.01	72.64	73.02	68.61	66.08	..	..	..
<u>Germany</u>	..	51.33	..	50.78	..	50.09	..	47.55	..	44.96	..	43.51
Italy	..	..	..	100.00	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	100	100	100	100	100	100	100	100
personal carers												
Denmark	76.29	75.83	76.76	79.61	80.38	80.18	80.71	76.54	74.39	..	..	..
<u>Germany</u>	..	78.75	..	79.08	..	79.23	..	78.80	..	76.67	..	75.15
Italy	..	..	..	24.69	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	5.51	6.68	9.92	11.45	11.41	17.12	20.80	23.76

Source: OECD Health Data 2013.

Table 27 Employment in long-term care by term of work agreement in Germany 2011

	Home care service	Nursing homes	Total
Total employment contracts	290 714	661 179	951 893
Full-time	79 755	212 416	292 171
Total part-time	204 672	405 234	609 906
over 50%	100 514	241 000	341 514
50% and less, but not insignificant employment	42 487	101 863	144 350
insignificant employment	61 671	62 371	124 042
other employment contracts	6 287	43 529	49 816
Intern, student, trainee	5 326	37 158	42 484
Assistant in voluntary social year	460	3 628	4 088
Civilian service conscript	64	256	320
Assistant in voluntary civilian service	437	2 487	2 924
Source: Federal Statistical Office of Germany, LTC statistics.			

Table 28 Employment in home care services by profession and field of activity in Germany 2011 - Full-time equivalents

	Total fields of activity	Nursing care service management	Basic care	House-keeping	Administration, management	Other sectors
Total vocational qualifications	193 301	15776	137734	19511	10536	9744
State-approved geriatric nurse	45 469	4176	38555	332	899	1506
State-approved geriatric nursing assistant	8 452	134	7695	435	47	141
Nurse, male nurse	54 096	9910	39441	342	1991	2412
Nursing assistant	8 850	44	8031	589	81	104
Pediatric nurse, pediatric male nurse	5 057	796	3770	42	157	292
Remedial therapist	850	15	674	68	22	70
Remedial therapy assistant	163	0	136	11	3	14
Pedagogic therapist	60	0	41	2	8	8
Ergotherapist	319	1	188	15	5	110
Physiotherapist	148	1	94	12	13	29
Other training completed in a medical profession other than that of medical practitioner	2 396	24	1831	214	229	98
Training completed as a social education worker or social worker	999	32	325	65	314	263
State-approved family care orderly or nurse	1 117	8	822	220	14	54
State-approved village (assistant) nursing staff	77	3	35	30	3	5
Degree in nursing science granted by a college or university	921	463	137	24	251	46
Other nursing profession	15 454	49	12822	1783	156	644
Trained housekeeper for the elderly	554	3	170	355	11	16
Other housekeeping qualification	3 806	7	997	2621	57	124
Other vocational qualification	32 966	106	14487	9636	5949	2787
Without completed vocational qualification or still in training	11 548	4	7483	2715	326	1021

Source: Federal Statistical Office of Germany, LTC statistics.

Table 29 Employment in nursing homes by profession and field of activity in Germany 2011 – Full-time equivalents

	Total fields of activity	Care and nursing care	Social care	additional care and attendance (§ 87b SGB XI)	Housekeeping sector	Building services sector	Administration, management	Other sectors
Total vocational qualifications	479 547	327 544	18 431	15 820	73 065	11 942	27 170	5 579
State-approved geriatric nurse	123 713	118 968	1 321	446	157	31	2 524	267
State-approved geriatric nursing assistant	26 054	25 329	221	248	137	6	51	62
Nurse, male nurse	42 812	39 251	554	209	98	12	2 490	199
Nursing assistant	13 008	12 601	130	136	98	4	24	15
Pediatric nurse, pediatric male nurse	2 818	2 497	66	26	32	1	179	17
Remedial therapist	2 272	1 733	387	90	15	2	39	7
Remedial therapy assistant	373	279	60	21	6	1	4	2
Pedagogic therapist	291	100	148	12	2	0	26	4
Ergo therapist	5 911	1 054	4 100	583	18	6	20	130
Physiotherapist	696	287	224	33	6	2	13	132
Other training completed in a medical profession other than that of medical practitioner	2 633	1 687	301	129	117	45	316	38
Training completed as a social education worker or social worker	5 125	609	3 138	196	37	8	1 055	82
State-approved family care orderly or nurse	995	840	59	31	43	0	11	10
State-approved village (assistant) nursing staff	76	48	6	4	14	1	2	1
Degree in nursing science granted by a college or university	2 511	807	168	14	16	5	1 434	68
Other nursing profession	36 711	25 096	1 629	9 100	719	29	67	72
Trained housekeeper for the elderly	1 752	198	19	13	1 474	11	25	13
Other housekeeping qualification	22 398	1 742	138	101	19 775	311	187	143
Other vocational qualification	112 241	42 571	3 899	3 688	30 679	10 373	17 820	3 211
Without completed vocational qualification or still in training	77 155	51 847	1 863	740	19 622	1 094	883	1 106

Source: Federal Statistical Office of Germany, LTC statistics.

Table 30 Assumptions of population forecasts

	2010	2030		Changes 2030/2010	
		Friendly	Tough	Friendly	Tough
Fertility rates					
Denmark	1.87	1.94	1.87	0.07	0.00
Germany	1.39	1.70	1.39	0.31	0.00
Italy	1.41	1.71	1.41	0.30	0.00
Poland	1.38	1.69	1.38	0.31	0.00
Slovakia	1.40	1.70	1.40	0.30	0.00
Life expectancy at birth males					
Denmark	77.2	83.1	79.4	5.90	2.20
Germany	78.0	83.9	80.1	5.90	2.10
Italy	79.4	85.3	81.5	5.90	2.10
Poland	72.1	79.2	74.9	7.10	2.80
Slovakia	71.7	80.7	76.5	9.00	4.80
Life expectancy at birth females					
Denmark	81.4	86.3	83.2	4.90	1.80
Germany	83.0	87.6	84.6	4.60	1.60
Italy	84.6	89.2	86.1	4.60	1.50
Poland	80.7	85.7	82.6	5.00	1.90
Slovakia	79.3	86.4	83.4	7.10	4.10
Source: Huisman et al. (2013).					

Table 31 Changes in the staff working with nursing and care in Denmark

Occupations	2010	2025		Changes 2025/2010	
		tough	Friendly		
Total	139 547	163 292	184 956	23 745	45 409
Management	497	582	659	85	162
Nurse	10 894	12 747	14 438	1 854	3 545
Physiotherapist	581	680	771	99	189
Catering officer etc. (matron)	4 643	5 433	6 154	790	1 511
Occupational therapist	829	970	1 098	141	270
Teacher	4	4	5	1	1
Pedagogue	1 572	1 839	2 083	267	511
Psychologist	28	33	38	5	9
Social worker etc.	69	81	92	12	22
Administrative work	2 571	3 009	3 408	438	837
Office and secretary work	1 834	2 146	2 431	312	597
Caretaker etc.	1 775	2 077	2 352	302	577
Pedagogue assistant etc.	121	142	160	21	39
Social and health workers etc.	67 616	79 122	89 619	11 505	22 003
Social and health care assistants etc.	40 121	46 948	53 176	6 827	13 055
Cleaning etc.	5 625	6 582	7 456	957	1 830
Assistant in kitchen etc.	767	897	1 016	130	249
*) Staff in all measures for elderly, handicapped and juveniles with special problems, but no child care.					
Source: Statistics Denmark.					

Table 32 Changes in the demand for formal long-term care workforce by occupations in Germany

	Nursing homes			Home care services			Total			Changes 2025/2011	
	2011	2025	Friendly	2011	2025	Friendly	2011	2025	Friendly	Tough	Friendly
	in 1000										
Total vocational qualifications	661	778	922	291	339	397	952	1 117	1 318	166	366
State-approved geriatric nurse	149	175	207	60	70	81	208	245	289	36	80
State-approved geriatric nursing assistant	35	41	48	12	14	16	47	55	64	8	18
Nurse, male nurse	55	65	77	80	94	110	136	159	187	23	51
Nursing assistant	17	20	24	13	15	18	30	36	42	5	12
Pediatric nurse, pediatric male nurse	4	4	5	8	9	10	11	13	16	2	4
Remedial therapist	3	3	4	1	1	2	4	5	6	1	2
Remedial therapy assistant	1	1	1	0	0	0	1	1	1	0	0
Pedagogic therapist	0	0	1	0	0	0	0	1	1	0	0
Ergotherapist	8	9	11	0	1	1	8	9	11	1	3
Physiotherapist	1	1	1	0	0	0	1	1	2	0	0
Other training completed in a medical profession other than that of medical practitioner	4	4	5	4	5	5	8	9	11	1	3
Training completed as a social education worker or social worker	7	8	10	1	2	2	8	10	12	1	3
State-approved family care orderly or nurse	1	2	2	2	2	2	3	3	4	0	1
State-approved village (assistant) nursing staff	0	0	0	0	0	0	0	0	0	0	0
Degree in nursing science granted by a college or university	3	3	4	1	1	1	4	5	5	1	2
Other nursing profession	53	62	74	23	27	32	76	90	106	13	29
Trained housekeeper for the elderly	2	3	3	1	1	1	3	4	4	1	1
Other housekeeping qualification	31	36	43	6	7	9	37	44	51	6	14
Other vocational qualification	167	197	233	57	67	78	225	264	312	39	87
Without completed vocational qualification or still in training	121	142	169	20	23	27	140	165	195	25	55

Source: Federal Statistical Office of Germany, LTC statistics; estimation of DIW Berlin..

Table 33 Demand for workforce in (public financed) long-term care activities in Poland

	2010	2025		Changes 2025/2010				
		tough	friendly	tough	friendly	tough	friendly	
	in persons						in %	
Residential care in health care sector								
Residential nursing care	16 691	19 910	22 458	3 219	5 767	19.29	34.55	
thereof								
Physicians	1 929	2 301	2 595	372	666	19.28	34.53	
Nurses	8 898	10 614	11 972	1 716	3 074	19.29	34.55	
Psychologists	581	693	782	112	201	19.28	34.60	
Educators	31	37	42	6	11	19.35	35.48	
Physiotherapists	495	590	666	95	171	19.19	34.55	
Medical workers	1 699	2 027	2 286	328	587	19.31	34.55	
Social workers	249	297	335	48	86	19.28	34.54	
Nursing assistant	2 809	3 351	3 780	542	971	19.30	34.57	
Residential care in social sector								
Total employment	36 693	40 967	43 894	4 274	7 201	11.65	19.62	
thereof								
Medical and physiotherapist activities	7 119	7 948	8 516	829	1 397	11.64	19.62	
Care and therapeutic activities	29 574	33 019	35 378	3 445	5 804	11.65	19.63	
Home nursing care in health sector								
Family community nurses	11 727	14 070	16 159	2 343	4 432	19.98	37.79	
Home care in social assistance sector								
Total employment	7 286	8 741	10 040	1 455	2 754	19.97	37.80	
General care services	6 358	7 628	8 761	1 270	2 403	19.97	37.80	
Specialized care services	928	1 113	1 279	185	351	19.97	37.80	
Total employment								
Residential care	53 384	60 877	66 352	7 493	12 968	14.04	24.29	
Home care	19 013	22 811	26 199	3 798	7 186	19.98	37.80	

Source: Golinowska et al. (2013); calculation of DIW Berlin..

Table 34 Changes in the demand for formal long-term care workforce and informal workforce receiving care allowances in Slovakia

	2010	2025		Changes 2025/2010				
		tough	friendly	tough	friendly	tough	friendly	
	in persons						in %	
Total institutional care	22 921	27 484	29 403	4 563	6 482	19.91	28.28	
LTC workers at institutions other than hospitals	19 187	24 103	25 785	4 916	6 598	25.62	34.39	
LTC nurses at hospitals	3 734	3 381	3 618	- 353	- 116	-9.45	-3.11	
LTC workers at home - formal (estimation)	2 315	3 225	3 450	910	1 135	39.31	49.03	
Informal caregiver receiving care allowances	55 933	67 383	72 086	11 450	16 153	20.47	28.88	

Source: Radvansky and Lichner (2013); calculation of DIW Berlin.

Table 35 Occupational structure of formal and informal paid workforce in long-term care in Slovakia

	2010	2025		Changes 2025/2010			
		tough	friendly	tough	friendly	tough	friendly
	in persons				in %		
87 - Institutional							
Total	22 921	27 484	29 403	4 564	6 482	19.91	28.28
Other professionals	3 060	3 670	3 926	609	865	19.91	28.28
Nurses and health professionals	5 240	6 283	6 722	1 043	1 482	19.91	28.28
Social work professionals	255	306	327	51	72	19.91	28.28
Personal care workers	9 125	10 941	11 705	1 817	2 580	19.91	28.28
Other staff	3 463	4 153	4 443	690	979	19.91	28.28
Personal service workers	1 777	2 131	2 280	354	503	19.91	28.28
88 - Home							
Total	58 248	70 608	75 536	12 359	17 287	21.22	29.68
Other professionals	1 348	1 635	1 749	286	400	21.22	29.68
Nurses and health professionals	1 802	2 184	2 336	382	535	21.22	29.68
Social work professionals	1 095	1 327	1 420	232	325	21.22	29.68
Personal care workers	52 204	63 281	67 697	11 077	15 494	21.22	29.68
Other staff	1 799	2 181	2 333	382	534	21.22	29.68
Personal service workers	0	0	0	0	0	0.00	0.00

Source: Radvansky and Lichner (2013); calculation of DIW Berlin.

Appendix 2: Share of people with impairments in ADL and IADL

The SHARE survey of people aged 50+ living in private households provide information on impairments in activities of daily living (ADL) and instrumental activities of daily living (IADL). We used pooled data (wave 1, 2, and 4) to calculate the share of people reporting impairments in at least 1 ADL, people reporting only impairments in IADLs, and people reporting no impairments at all. Data for all waves are available for Germany, Denmark and Italy. For Poland data are available for wave 2 and 4. Unfortunately Slovakia is not included in the SHARE survey.

In general the SHARE survey shows similar results as the EU SILC survey: the share of people reporting impairments in ADL increases with age, and is in particular in the oldest age group higher for females than males (Table 36).

Table 36 People with and without impairments in ADL and IADL

Age-groups	Males				Females			
	Share in %							
	with at least 1 ADL	no ADL with at least 1 IADL	no ADL, no IADL	Total	with at least 1 ADL	no ADL with at least 1 IADL	no ADL, no IADL	Total
Denmark								
50-59	4.4	3.5	92.1	100	5.2	6.7	88.1	100
60-69	6.5	3.0	90.5	100	6.2	7.1	86.7	100
70-79	10.3	8.2	81.5	100	9.8	14.8	75.4	100
80+	25.9	16.1	58.0	100	30.0	22.2	47.8	100
50+	8.0	5.3	86.7	100	10.0	10.7	79.3	100
Germany								
50-59	7.6	(2,1)	90.2	100	4.4	4.1	91.5	100
60-69	8.5	4.7	86.8	100	8.4	6.6	85.0	100
70-79	10.8	5.9	83.3	100	15.8	13.1	71.1	100
80+	35.9	(7,6)	56.5	100	40.4	17.7	41.9	100
50+	10.9	4.3	84.7	100	13.9	9.2	76.9	100
Italy								
50-59	(3,4)	(1,3)	95.3	100	3.8	4.8	91.3	100
60-69	4.9	4.1	91.0	100	6.2	8.6	85.2	100
70-79	10.6	7.8	81.5	100	19.7	15.7	64.6	100
80+	29.1	16.7	54.2	100	46.9	22.0	31.0	100
50+	8.3	5.4	86.3	100	16.0	11.6	72.4	100
Poland								
50-59	11.0	(3,8)	85.2	100	9.5	4.0	86.4	100
60-69	16.5	5.3	78.3	100	17.6	10.2	72.2	100
70-79	21.2	12.1	66.6	100	30.5	16.5	53.0	100
80+	37.3	15.9	46.9	100	49.3	19.2	31.4	100
50+	16.8	6.7	76.5	100	21.8	10.7	67.5	100
Values in () are based on less than 30 observations.								
Source: SHARE wave 1, 2, and 4; weighted results (pooled data); calculation of DIW Berlin.								

The share of people aged 50+ reporting impairments in at least one ADL ranges for men from 8 % in Denmark to 17 % in Poland and for women from 10 % to 22 %. In Poland in particular the people aged 50-69 reported high shares of impairments compared to other countries. This can be partly traced back to illnesses like depression and to traffic accidents (Golinowska and Sowa, 2012).

The share of people reporting only impairments in IADL is relatively small ranging for men from 4.3 % in Germany to 6.7 % in Poland, and for women from 9.2 % in Germany to 11.6 % in Italy. The Share data show that the majority of people aged 50 to 79 living in private households have no impairments either in IADL or in ADL. People with impairments in at least one ADL are in need of care. The possibility to receive help and care by partners or other family members depends also on the living situation of the dependent. The SHARE survey provides information on the living arrangements differentiated by disability status. Table 37 shows the share of people living alone. Significant differences in the share of single elderly across the studied countries can be observed. Denmark realized the highest share of single households of males and females, and Poland the lowest. The share of people living alone increases with age in all countries with the exception of males in Poland (nearly constant share).

Surprisingly the share of people living alone is higher for persons reporting impairments in at least one ADL than for persons reporting no impairments at all. This phenomenon can be seen in all countries for females and males (except males aged 70+ in Italy and Poland). Dependent people living alone depend on care and help from people outside the household.

Dependent people living with a partner or with together with other persons have a high probability to be cared for by members of the household. The share of dependent living in a two-or-more-person-household is corresponding to the share for single persons in Table 37. In general, the share of dependent living with others declines with age. People prefer to stay in their home even if they lost their partner. An exception is males in Poland. Widowed dependent males are living more often together with their children than in other countries.

Table 37 Share of elderly living alone by disability status

Countries	Males				Females			
	with at least 1 ADL	no ADL with at least 1 IADL	no ADL, no IADL	Total	with at least 1 ADL	no ADL with at least 1 IADL	no ADL, no IADL	Total
	Share of people (50+) living alone in %							
Denmark	41,6	30,8	18,5	21,0	63,1	50,1	32,7	37,6
Germany	23,7	21,7	17,6	18,5	58,4	50,6	31,5	37,0
Italy	20,3	17,7	14,0	14,8	41,7	35,9	23,1	27,6
Poland	16,6	15,1	13,2	13,9	27,3	29,9	18,6	21,7
	Share of people aged 50-69 living alone in %							
Denmark	40,7	19,1	16,2	17,6	35,4	25,8	24,1	24,9
Germany	22,4	27,4	17,4	18,2	37,2	27,4	23,1	24,2
Italy	18,4	20,9	10,8	11,4	18,1	14,7	14,8	14,9
Poland	18,4	14,6	13,1	13,9	16,2	18,0	12,6	13,4
	Share of people aged 70+ living alone in %							
Denmark	42,5	40,7	26,2	30,2	79,5	68,2	55,2	62,0
Germany	25,0	14,8	18,2	19,2	66,6	63,2	50,0	56,1
Italy	21,2	16,1	22,3	21,5	46,9	46,5	43,0	44,8
Poland	14,0	15,6	13,8	14,1	34,6	38,6	38,4	37,0

Source: SHARE wave 1, 2, and 4; weighted results (pooled data); calculation of DIW Berlin.

Appendix 3: Long-term care systems and available public financed long-term care services

Denmark

In Denmark a comprehensive social care system exists, providing e.g. help and care for persons at home by community nurses or personal care givers. All residents who need help with housework or personal care - even if the help or care is needed only for one hour per week - are eligible to receive home care irrespective of age, income, wealth or the potential of informal care givers (Schulz 2010a). Home care has given explicit priority over care giving in institutions. In 2010 around 25 % of dependent people receive home care (Table 2). If care giving at home is not possible, persons are eligible to receive institutional care. As permanent home help is given strict priority over caregiving in nursing homes, no new nursing homes have been constructed since 1987 (Strandberg-Larsen et al., 2007). Thus, nursing homes are in the process of being phased out. Various forms of service-enriched housing are being developed in their place with the active support of the municipal and national governments. The goal is to create non-institutional but supportive living arrangements for the elderly with varying levels of functioning. Such housing is often located near and linked with existing nursing homes, sheltered accommodation, day-care homes or day centers and/or community centers to maximize the use of personnel and facilities, as well as to ensure convenient access to home help, home nursing and other community services (Brodsky et al. 2003). In 2010, in Denmark in accommodation suitable for the persons in need of care (nursing homes, service enriched housing, sheltered accommodations) around 47,000 beds exist, that is 51 beds per 1000 persons aged 65+ (Table 38). Around 12 % of the dependent received nursing care in such living arrangements.

Germany

In Germany the 1995 introduced long-term care insurance system provides benefits in kind and in cash to people with at least substantial impairments, but it covers only a part of the costs (Schulz 2010b). Eligible for benefits are people with impairments in at least two activities in one or more areas of daily living (personal hygiene, feeding, and mobility) for at least 45 minutes once a day (basic care) and additional help in IADLs (in total at least 90 minutes per day). The long-term care insurance predominantly provides assistance benefits for domiciliary care, in an effort to enable beneficiaries to remain in their home and their family context for as long as possible. The costs for home care services are covered depending on the level of impairments and the prior defined care basket. Additional cash benefits are provided to the people in need of care which enable them to organize help and personal care by themselves. In total, around 1.7 million people in need of care get benefits for home care either in kind or in cash. Often cash benefits are used to support informal care givers.

Benefits for nursing home residents include only the costs for personal care and help not the costs for board and lodging. Thus, co-payments for nursing homes are high. Residents can apply for social assistance benefits (means tested) if they are not able to finance the required co-payments. In Germany, 12,354 nursing homes exist with

around 876,000 beds that are 52 beds per 1000 persons aged 65+. In 2010, around 750,000 persons lived in nursing homes.

Italy

In Italy, public long-term care for older persons includes three main kinds of formal assistance: community care, residential care and cash benefits. The responsibility of care provision is divided between the health and social service sectors. Home health care as well as health care in institutions is the responsibility of the National Health Institute and free of charge. Social services - like community care and residential care - are the tasks of the municipalities and the provision of long-term care services is means tested (Tediosi and Gabriele 2010). There is no nationwide long-term care system in Italy, but several long-term care systems at local level. Thus, the access, the eligibility criteria, the availability and the kind of long-term care services as well as the financing of long-term care services differs markedly across the communities. In general, personal social services are underfunded and the quality and quantity of provided services vary significant across regions. According to the OECD Health data around 600,000 people receive formal home care (in kind and in cash) and 390,000 receive formal care in institutions. Coda Moscarola (2013) reported similar numbers of recipients of home and residential care: 394,000 recipients of home care and 597,000 recipients of institutional care in 2010. On average, 17 beds in nursing homes per 1000 population aged 65+ are available; on third of the capacity in Germany or Denmark. The number of beneficiaries at home includes also recipients of cash benefits. The disabled (100 %) and dependent (unable to perform tasks of daily living without permanent assistance) are eligible to receive cash benefits from a national cash benefit system. These benefits are not means tested, and the focus lies on disability, not on impairments in ADL or IADL. Some communities provide additional cash benefits for their dependent residents.

Poland

In Poland formal long-term care services are not well developed. Care activities for the disabled and dependent are divided between the health and social service sectors. Public institutional care in both the health and social sectors is provided only in marginal, dramatic situations of high levels of dependency and only for the poor and for persons with no relatives. Therefore, the public supply of institutional care is very limited (Golinowska 2010). The provision of care in social assistance homes is means tested and depends on the family situation of the applicants, for example living alone. The Barthel index is used for the assessment of dependency or need of care. Care is provided to people with an index of less than 40 points (100 points indicates independence in all 10 items of the Barthel index). That means only people with severe impairments are eligible to receive institutional care. This is also required for people applying for long-term care in facilities of the health care sector. According to the OECD health data in 2010 around 88,000 persons received institutional care. Around 90,000 beds for long-term care were available, that is 17 beds per 1000 persons aged 65+. This is a similar situation as in Italy. Golinowska et al. (2013) reported that around 47,000 people received residential care in care and nursing facilities of the health care sector and additional around 71,600 (including people with psychiatric disorders) were

residents in social assistance homes in 2010. That is a broader definition than the OECD definition of people in need of long-term care (impairments in ADL and IADL).

Home care is the responsibility of the local self-government and the eligibility criteria are the same as for institutional care. Thus, home care services are targeted to singles, dependent people in difficult economic situations receiving no care by relatives. Due to financial restrictions of the communities home care is not well developed. Only a limit number of dependent receive home care services. According to the OECD health data only around 2,000 persons received formal home care (public financed) in 2006. Golinowska et al. (2013) provide information on the number of recipients of general care services in the social assistance sector. In 2010 the number of this kind of recipients was 89,300. Additional the health care sector provides home nursing care to around 60,000 persons.

Slovakia

In Slovakia care and help for the disabled and dependent is divided between the health and the social service sector. The health sector provides medical care to the disabled, the social service sector provide institutional care, day care in institutions and home care for the dependent. The level of dependence of a patient is considered according to a six-grade scale. Act No. 448/2008 on social care defines 12 criteria (e.g. eating, drinking, sitting, walking, hygiene, washing, orientation, etc.) for which an individual score (of 0-10 points) is assessed on the performance of a particular personal activity (Radvansky and Palenik 2010). People with less than 105 points (out of 120) are classified as dependent. Additionally a social worker assesses the social and family resources. Both the medical and the social assessment together determine the need of care and the amount of provided care. The provision is means tested. Social care provision is the responsibility of municipalities, and institutional as well as home care services require co-payments, while health care services are free of charge. According to the OECD health data in 2010 around 33,000 beds in residential care are available, that is 49 beds per 1000 people aged 65+ that is only marginal lower than in Denmark or Germany. But in relation to the people in need of care only 7 % of dependent people receive institutional care in Slovakia. Radvansky and Palenik (2010) reported that the supply of institutional care is not sufficient, and waiting time can last several years. Home care services are provided to 83,000 persons, that is around 18 % of people reporting severe limitations in activities of daily living.

To sum up, the five studied countries have different long-term care systems ranging from a comfortable social assistance system in Denmark to a nearly non existing long-term care system in Poland. In general, in Poland and Slovakia the vast majority of care giving to the elderly is the responsibility of the family. Formal care giving is rare, and in Poland the available places in nursing homes are often private financed. In Italy each municipality has his own LTC system with significant differences in the amount of provided services depending not at least on the financial situation of the municipality. The German LTC system provides services in kind or in cash only to people with at least substantial impairments and requires in particular for institutional care high co-payments.

Table 38 Beds in residential long-term care

	2005	2006	2007	2008	2009	2010	2011
	in numbers						
Denmark	44 280	45 008	46 222	46 033	46 476	46 889	45 460
Germany	757 186	..	799 059	..	845 007	..	875 549
Italy	169 827	180 626	188 466	191 430	201 180	212 875	220 711
Poland	88 770	88 429	88 298	88 250	88 217	89 678	92 089
Slovakia	29 312	30 182	30 567	30 548	31 780	32 848	32 808
	per 1000 population aged 65+						
Denmark	54.1	54.3	54.8	53.3	52.3	51.1	47.8
Germany	48.5	..	48.7	..	50.3	..	52.1
Italy	14.8	15.4	15.9	15.9	16.6	17.4	17.8
Poland	17.6	17.4	17.2	17.2	17.1	17.3	17.5
Slovakia	46.6	47.4	47.5	47	48.2	48.9	47.9
Source: OECD Health Data 2013.							

Appendix 4: Changing living arrangements

The living arrangements of people changed in the past significantly:

- The share of single household increased markedly a) due to young people leaving the parental home and prefer to live (for the first years) alone, b) due to the increase in divorced people, and people still prefer to live alone in the middle age-groups, and c) increasing share of elderly living in their own home even if they are widowed, divorced or still living alone
- The share of 2 person household increased a) due to the share of couples without children (or after children have left the parental home), b) increase in single parent households (in the majority single parents have one child), and c) couples growing old together
- Contrary the share of more-generation-households declined.

In general these changes in living arrangements can be seen in all European countries, but not to the same degree. One example is Italy. In Italy, in general adult children are leaving the parental home at higher ages as in other European countries due to the situation on the housing market and the economic situation. Thus, households comprising parents and their adult and economically independent children are more common. In 2010, in Italy 12 % of people aged 65+ are living in 'other households' which includes parents living with their adult, independent children (Table 39). The share of 'other households' is even higher in Poland and Slovakia accounting for 28 % and 23 %. This may be influenced by the higher share of more-generation-households, in particular by elderly and dependent parents living in their children's home. An indicator is the with age increasing share of elderly living in 'other households'. In Poland 21% of people aged 65-69 are living in 'other households', but around 50% of people aged 85+. The same is true for Slovakia.

In contrast, in Denmark only 3 % of the elderly are living in 'other households'. On the one hand is the share of couple households significant higher as in Poland and Slovakia due to the higher life expectancy. On the other hand enables the generous social assistance system more people to stay at home even if they are living alone and are in need of care and help.

Table 39 Living arrangements of elderly (65+) by gender in 2010

	People aged 65+	Living arrangements			Males aged 65+	Living arrangements			Females aged 65+	Living arrangements		
		Single	Couple	Other		Single	Couple	Other		Single	Couple	Other
		Share in %				Share in %				Share in %		
Denmark	903	36.2	61.4	2.5	400	20.5	77.2	2.2	503	48.6	48.7	2.7
Germany	16 902	32.0	59.2	8.7	7 200	16.7	77.0	6.3	9 702	43.4	46.0	10.6
Italy	12 206	33.2	54.5	12.3	5 139	18.4	73.6	8.0	7 068	44.0	40.6	15.4
Poland	5 161	26.0	46.2	27.9	1 944	13.0	69.0	18.0	3 217	33.8	32.4	33.8
Slovakia	665	30.0	47.2	22.8	248	16.3	70.4	13.3	417	38.2	33.3	28.5

Source: Huisman et al. (2013); calculation of DIW Berlin.

The NEUJOBS demographic projections distinguish between following living arrangements: singles, children under the age of 15, children between 15 and 24 of age living in parental home and are economically dependent, single parents, couples with children, couples without children and other households. The living arrangements differ between the age-groups and gender, but they are also influenced by education levels. The projected changes in living arrangements are calculated using the changes in population by age, gender and education level. Other influencing factors, like changes in household building behaviour and changes in divorce behaviour, are not taken into account. Thus, the demographic development and the changes in education levels determine the changes in living arrangements.

According to this projection will the share of 'other households' decline in all studied countries and in both demographic scenarios (Table 40). But the development of the share of single households and people living with a partner will be different among the five countries.

- In Denmark a higher share of oldest old (80+) is expected to live alone. Among the young old the trend is non-uniform. For people aged 65 to 69 and 75 to 79 an increase in the share of partners living together is expected, whilst for people aged 70 to 74 an increase in the share of single households is calculated (Table 41).
- In Germany and Italy the share of single households will decline and the share of couple households will be corresponding increase. The increase in life expectancy of males and females will lead to more elderly couples growing old together. In particular in Germany the living arrangements in the past were influenced by the Second World War that led to a high share of widowed women.
- In Poland both the share of people living alone and the share of people living as a couple will increase due to the reduction in 'other households', for example adults children living with their parents.
- In Slovakia a high increase in the share of couples is calculated due to the high increase in life expectancy of males and females. The share of single households will decline with the exception of the oldest age-group (85+). This can be traced back to the increase in women living alone. Women have till a higher life expectancy as men.

Table 40 Changes in living arrangements of the elderly between 2010 and 2025

	Population	Structure of living arrangements			Population	Structure of living arrangements		
	aged 65+	Single	Couple	Other	aged 65+	Single	Couple	Other
	changes in persons	changes in %-points			changes in persons	changes in %-points		
	Tough scenario				Friendly scenario			
Denmark	204 100	0.42	-0.30	-0.12	283 833	1.04	-0.92	-0.12
Germany	1 103 064	0.52	-0.36	-0.17	2 587 458	1.14	-1.38	0.24
Italy	1 956 471	0.84	-0.83	-0.01	3 020 141	1.43	-1.56	0.12
Poland	1 992 687	0.95	3.97	-4.92	2 556 869	1.02	3.51	-4.53
Slovakia	278 341	-0.91	3.91	-3.00	349 803	-0.78	3.53	-2.75

Source: Huisman et al 2013; calculation of DIW Berlin.

Table 41 Changes in the number of elderly and their living arrangements by age-groups between 2010 and 2025

	Population			Living arrangements			Population			Living arrangements		
	Total			Single	Couple	Other	Total			Single	Couple	Other
	Persons			Share in %-points			Persons			Share in %-points		
Tough scenario						Friendly scenario						
Denmark												
65-69	16 260	-0.80	0.90	-0.10	22 540	-0.82	0.92	-0.10				
70-74	61 553	0.53	-0.55	0.02	70 189	0.42	-0.43	0.01				
75-79	92 378	-0.90	0.94	-0.03	106 361	-1.18	1.22	-0.04				
80-84	29 861	0.72	-0.75	0.03	45 917	0.05	-0.05	0.00				
85+	4 048	2.02	-2.10	0.07	38 826	0.60	-0.57	-0.04				
Sum	204 100	0.42	-0.30	-0.12	283 833	1.04	-0.92	-0.12				
Germany												
65-69	414 487	-0.07	0.40	-0.33	550 837	-0.12	0.44	-0.32				
70-74	-294 918	0.14	0.45	-0.59	-144 246	0.02	0.58	-0.59				
75-79	-4 912	-1.00	1.81	-0.81	164 833	-1.29	2.12	-0.83				
80-84	360 060	-0.62	1.57	-0.95	624 848	-1.22	2.26	-1.04				
85+	628 347	-1.61	2.85	-1.25	1 391 186	-2.26	3.76	-1.50				
Sum	1 103 064	0.52	-0.36	-0.17	2 587 458	1.14	-1.38	0.24				
Italy												
65-69	588 818	0.27	-0.24	-0.03	679 042	0.25	-0.22	-0.03				
70-74	178 651	0.57	-0.17	-0.40	280 996	0.49	-0.07	-0.42				
75-79	310 848	-0.02	0.53	-0.51	446 762	-0.27	0.84	-0.56				
80-84	43 049	-0.45	1.10	-0.65	206 209	-0.98	1.76	-0.78				
85+	835 106	-0.84	1.27	-0.42	1 407 132	-1.56	2.30	-0.74				
Sum	1 956 471	0.84	-0.83	-0.01	3 020 141	1.43	-1.56	0.12				
Poland												
65-69	1 041 540	1.29	1.70	-2.99	1 122 454	1.17	1.85	-3.02				
70-74	698 923	1.75	2.36	-4.11	792 644	1.51	2.70	-4.21				
75-79	176 843	2.36	2.53	-4.90	271 524	1.96	3.11	-5.07				
80-84	-156 545	3.74	1.12	-4.86	-75 146	3.07	2.19	-5.26				
85+	231 927	4.45	0.82	-5.27	445 393	3.94	1.90	-5.84				
Sum	1 992 687	0.95	3.97	-4.92	2 556 869	1.02	3.51	-4.53				
Slovakia												
65-69	109 021	-0.26	1.47	-1.21	119 199	-0.37	1.63	-1.27				
70-74	111 311	-0.42	3.75	-3.33	123 741	-0.63	4.05	-3.42				
75-79	34 429	-0.65	4.33	-3.69	47 050	-1.06	4.94	-3.88				
80-84	-2 726	-0.19	2.07	-1.89	9 955	-0.73	3.12	-2.39				
85+	26 306	2.22	0.75	-2.97	49 859	1.64	1.72	-3.35				
Sum	278 341	-0.91	3.91	-3.00	349 803	-0.78	3.53	-2.75				
Source: Huisman et al 2013; calculation of DIW Berlin.												

Appendix 5: Increasing female labour force participation

The largest group of informal care givers are females in prime and old working age mainly aged 40-69 (for example Viitanen, 2005). As care giving is often a physically and mentally hard full-time job the impact of care giving on the labour force participation of females dominated the discussion in the last two decades. In view of the Europa 2020 target to increase the labour force participation rate of people aged 20 to 64 years to 75 % in 2020 (Europe 2020 targets) the reconciliation of care giving to elderly and employment is still on the agenda. The way in which people react in the case that the need of caregiving occurs depends on the intensity of care giving, on the available long-term care services, in particular the measures supporting informal carer to combine care tasks and formal employment, but also on the situation on the labour market. Viitanen (2005) analysed the relationship between the dynamics of labour force participation and informal care to the elderly for women aged 20-59 across 13 European countries based on the European Community Household Panel (ECHP). The results indicate that informal care has a negative effect on female employment participation in most studied countries, but this is significant only for Germany and Italy. However, analysis of different sub-groups indicates that the impact is largest for middle-aged women as well as for single women in several EU countries. The study carried out by Gabriele, Tanda and Tediosi (2011) analyzing the labour market constraints due to caregiving to an adult using also the ECHP came to the result, that the extent of the effect of care giving on the labour force participation depends on the intensity of care giving and the co-residence with the people cared for. The heaviest burdens – characterized by higher informal-care intensity and co-habitation with the assisted person – hamper the caregiver from participation in the labour market as desired’.

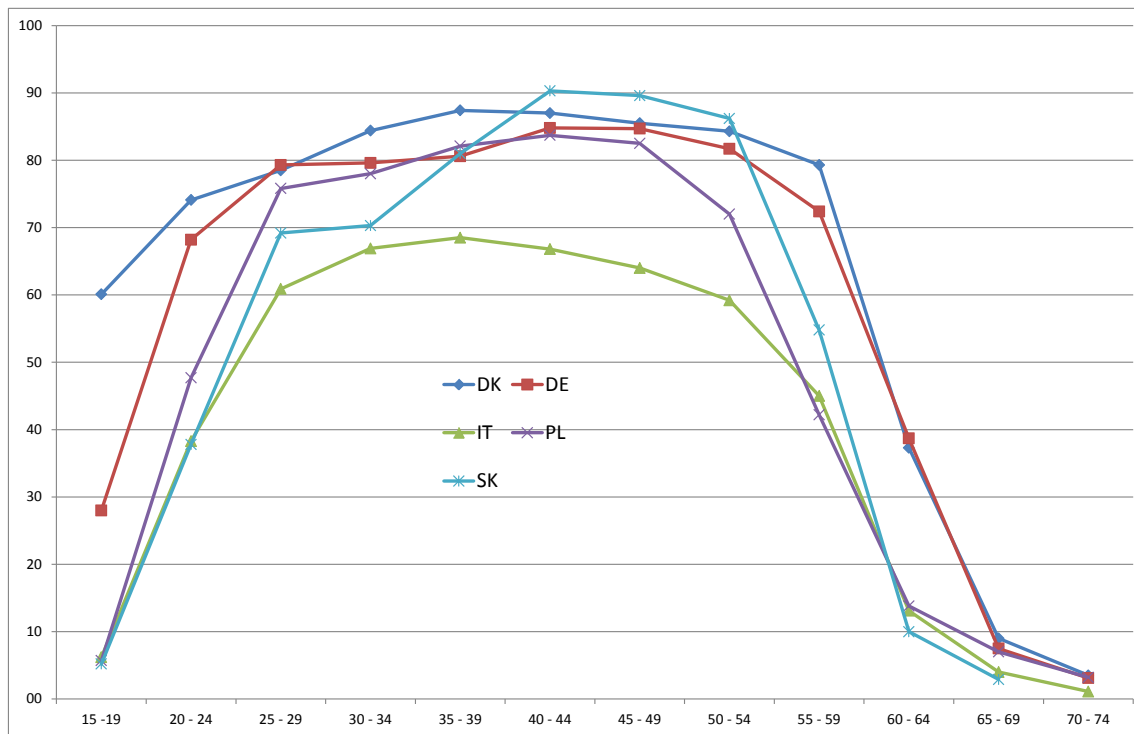
Crespo and Mira (2010) who analyzed the impact of daily care giving on the employment using the SHARE data confirms in general the negative effect of caregiving on employment, but the authors showed that for the Northern countries the effect was negligible and only for the Southern countries significant. The impact is larger for low educated peoples and for intensive caregiving to people with severe impairments.

Vilaplana Prieta (2011) estimated the effects of problems in labour force participation and unmet needs for formal care on informal caregiving using the information of the Eurobarometer 283. Informal care givers are all persons providing any kind of help and care. The probability of having labour force participation problems depends on the professional status and varies across the countries. In general lower qualified workers receive less labour market problems than white collar workers. Among the studied countries the labour market problems are highest in Poland, followed by Italy and Slovakia. Germany and Denmark show relatively low labour market problems due to the long-term care system. In Denmark caregivers can be employed by the municipality, in Germany care giving leave is available. But even if labour market problems exist women have a high probability of being caregiver in Poland (37 %), in Italy (26 %) and in Slovakia (22 %), whilst in Germany (14 %) and Denmark (12 %) the probability is much lower.

Unger (2013) analysed the impact of caregiving on labour market participation in the Nordic countries. He shows that only intensive elderly care has a statistically significant negative effect on employment in Nordic countries, like Denmark. This is in line with the results of Vilaplana Prieta (2011) and Crespo (2010) that the long-term care system in Denmark which provide personal care and help with domestic tasks supports (indirect) the labour market participation of informal caregiver.

According to the literature the future increase in female labour force participation will have different effects on the reconciliation of care responsibilities and employment depending on the intensity of caregiving, the long-term care system and the characteristics of the caregiver. Figure 3 shows the female labour force participation in the five studied countries in 2011. Females in Denmark realized a high labour force participation in all age-groups, females in Germany showed a lower labour force participation in the birth-giving age-groups and a slightly lower participation in the older age-groups than Denmark, females in Poland participate to a lower degree than Germany, and females in Slovakia realized in particular in the younger and birth giving age-groups lower participation rates as females in Denmark, Germany or Poland. While the four mentioned countries differ in their female labour force participation only in the birth giving age-groups and the older age-groups, females in Italy showed significant different labour market behaviour. Only 50 % of females aged 20 to 64 years are active at the labour market in Italy. According to the national Europe 2020 employment targets the activity rates (20-64 years, both sexes) have to increase from 75.4 % to 80 % in Denmark, from 76.7 % to 77 % in Germany, from 65.1 % to 72 % in Slovakia, from 64.7 % to 71 % in Poland and from 61 % to 67 % (low) or 69 % (high) in Italy. Thus, for females in Italy a high increase in activity rates is required, whereas in Germany and Denmark the required increase in female employment is significant lower.

In the past decade the female activity rates increased in particular in the older age-groups (50+) in all studied countries (Figure 4 in appendix), caused not at least by the increase in the regular retirement age (age eligible to receive old age pensions). As the majority of informal caregivers are aged 50+, in particular the changes in the pensions systems may increase the burden to combine employment and care giving tasks.

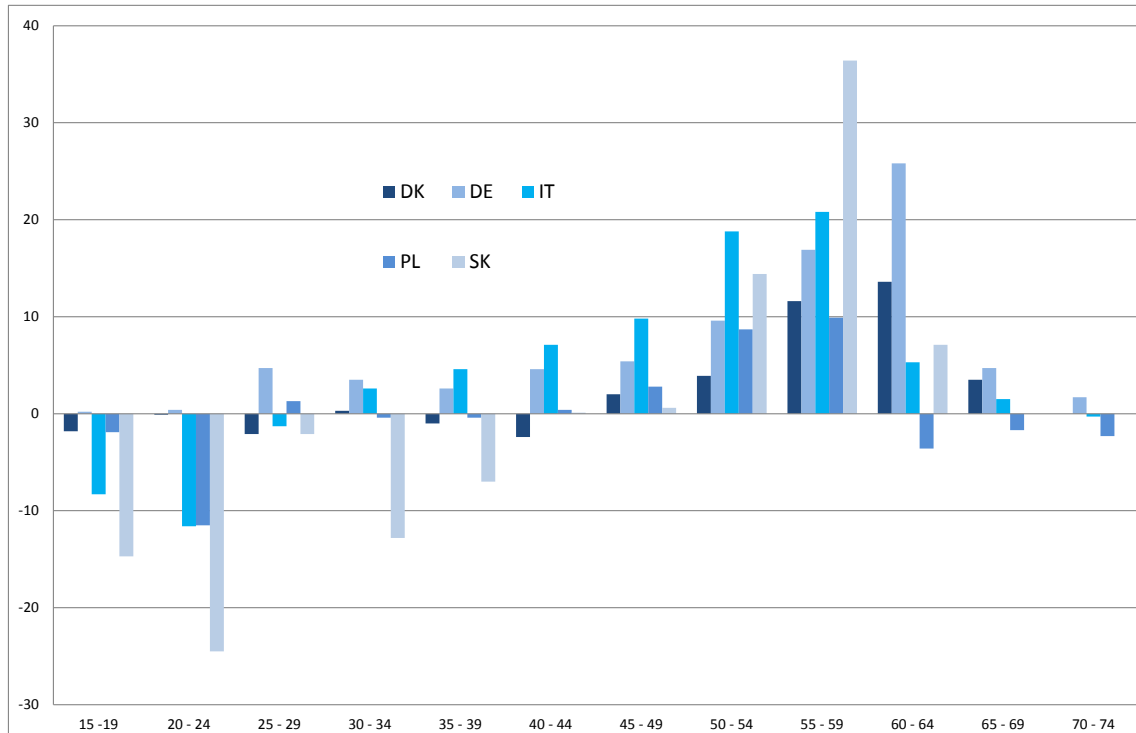
Figure 3 Female activity rates 2011

Source: Eurostat; LFS, calculation of DIW Berlin.

As a result, we assume that the increase in female labour force participation will have only a marginal (negligible) effect on care giving in Denmark due to the generous long-term care system. It is assumed that in Denmark the clear division of tasks between the state responsible for personal care and the family responsible for help to remain socially active will not change. For Poland and Slovakia it is expected, that an increase in female labour force participation will have only marginal impacts on care giving due to the fact that formal care services are rare. According to Vilaplana Prieto (2013) under the condition of unmet formal care needs the probability of care giving is still high in these countries also in the cases that labour market problems occur. In Germany in the past a negative effect of care giving on employment was stated, thus in particular the increase in female activity rates in old working age may have a negative effect on the possibility to be informal caregiver. On the other side we expect that the new available leave for care giving up to 6 months will reduce this negative effect. The effect of caregiving on employment is strongly related to the intensity of caregiving, but we have no information on the intensity of caregiving of informal carer for the included countries. Thus, we cannot take into account this effect for the countries, in particular for Germany.

For Italy a possible effect of increasing female labour force participation on informal carer is estimated by our Italian partner. Coda Moscarola (2013) assumes that the female activity rates will increase from around 50 % to 67 % in 2020. The increase in female employment reduces the number of informal carer by a third.

Figure 4 Changes in female activity rates between 2000 and 2011 (%)



Appendix 6: Changes in recipients of home and institutional (public financed) formal care

The pure demographic effect on the people receiving formal long-term care services in institutions or at home is shown by combining the constant age-specific (if available) utilization rates of the base year with the population by age-groups and gender for the two NEUJOPBS scenarios tough and friendly. No changes in the long-term care system or in the available care services are assumed. The estimations were carried out for home care and institutional care, but for Italy only for institutional due to data restrictions.

Denmark

In Denmark with a generous social system all people in need of help with domestic tasks and personnel care are eligible to receive permanent home help from the municipalities. As home care has the strict priority to institutional care, also people living in nursing dwellings receive this kind of service. Statistics Denmark provides data on the recipients of permanent home help in institutions (nursing dwellings) and at home by age-groups and gender. Under constant utilization rates the number of long-term care recipients at home is expected to increase by 17.5 % (tough) and 32 % (friendly) and the number of long-term care recipients in institutions will increase by 15 % and 34.8 % (Table 42 and Table 43)

Table 42 Changes in recipients of home care in Denmark

	2010	2025			changes 2025/2010			changes 2025/2010 in %		
		tough	friendly	Europop	tough	friendly	Europop	tough	friendly	Europop
Recipients of permanent home help (free choice) at home (1000)	176.9	207.9	233.5	237.8	31.0	56.6	60.9	17.5	32.0	34.4
Cases per inhabitant	0.032	0.037	0.040	0.041	0.005	0.008	0.009	15.0	25.3	28.0
Share women	0.68	0.68	0.67	0.66	0.00	-0.01	-0.02	-0.2	-1.4	-3.1
Share of elderly	0.84	0.87	0.88	0.88	0.03	0.04	0.04	3.1	4.5	4.9
Source: StatBank Denmark; NEUJOBS demographic scenarios D10.1; calculations of DIW Berlin.										

Table 43 Changes in recipients of home help in nursing homes or nursing dwellings

	2010	2025			changes 2025/2010			changes 2025/2010 in %		
		tough	friendly	Europop	tough	friendly	Europop	tough	friendly	Europop
Recipients of permanent home help in nursing homes/dwellings (1000)	42.0	48.3	56.7	56.8	6.3	14.6	14.7	15.0	34.8	35.0
Cases per inhabitant	0.008	0.009	0.010	0.010	0.001	0.002	0.002	12.5	28.0	28.6
Share women	0.70	0.69	0.68	0.66	-0.01	-0.02	-0.04	-1.5	-2.5	-5.1
Share of elderly	0.95	0.95	0.96	0.96	0.01	0.01	0.01	0.8	1.4	1.5
Source: StatBank Denmark; NEUJOBS demographic scenarios D10.1; calculations of DIW Berlin.										

Germany

In Germany the long-term care statistics carried out every second year provides information on beneficiaries of home care services, in nursing homes as well as on recipients of cash benefits for self-organized (mostly informal) caregiving by age-groups and gender. People who have at least substantial impairments in ADL and IADL are eligible to receive benefits. Under constant utilization rates the number of recipients of institutional care is expected to increase by 18 % in the tough and around 40 % in the friendly scenario (Table 44).

Table 44 Beneficiaries of the long-term care insurance in Germany in 2010 and 2025

	2010	2025			Changes 2025 to 2010 (in 1000; points)			Changes 2025 to 2010 in %		
		Tough	Friendly	Europop	Tough	Friendly	Europop	Tough	Friendly	Europop
Total										
Beneficiaries in 1000	2.501	2845	3295	3310	344	793	808	13.74	31.72	32.31
thereof with										
substantial impairments	1.379	1570	1813	1824	191	434	445	13.87	31.48	32.31
severe impairments	818	935	1089	1093	117	271	275	14.33	33.09	33.59
very severe impairments	305	340	393	393	35	89	88	11.54	29.11	28.83
share 65+	0.83	0.85	0.87	0.87	0.02	0.04	0.04			
share 80+	0.56	0.61	0.65	0.65	0.06	0.09	0.09			
share females	0.65	0.64	0.64	0.63	-0.01	-0.01	-0.03			
mean age (years)	79	79	80	80	-0.40	0.77	0.76			
Institutional care										
Beneficiaries in 1000	743	875	1036	1033	132	293	290	17.75	39.46	39.08
thereof with										
substantial impairments	292	345	408	407	53	116	116	18.15	39.86	39.65
severe impairments	299	354	421	420	55	121	120	18.25	40.54	40.13
very severe impairments	152	176	208	207	24	56	55	16.00	36.59	35.90
share 65+	0.93	0.93	0.94	0.94	0.00	0.01	0.01			
share 80+	0.70	0.74	0.77	0.76	0.04	0.07	0.07			
share females	0.74	0.72	0.72	0.71	-0.02	-0.02	-0.03			
mean age	84	84	85	85	0.04	0.92	0.73			
Home care										
Beneficiaries in 1000	576	671	785	791	95	208	215	16.43	36.17	37.30
thereof with										
substantial impairments	324	378	443	446	54	119	122	16.68	36.54	37.48
severe impairments	189	221	260	263	32	71	74	17.16	37.53	38.99
very severe impairments	63	137	82	83	74	19	20	117.45	30.21	31.29
share 65+	0.90	0.91	0.92	0.92	0.01	0.02	0.02			
share 80+	0.62	0.67	0.71	0.71	0.05	0.09	0.09			
share females	0.68	0.66	0.65	0.63	-0.02	-0.03	-0.04			
mean age	82	82	83	83	0.58	1.56	1.45			
Benefits in cash for organisation of care										
Beneficiaries in 1000	1182	1299	1474	1485	117	292	303	9.91	24.68	25.61
thereof with										
substantial impairments	762	847	962	971	84	199	208	11.04	26.12	27.30
severe impairments	330	360	408	411	30	78	81	9.16	23.79	24.56
very severe impairments	90	92	104	103	3	14	14	3.02	15.67	15.14
share 65+	0.74	0.77	0.78	0.79	0.03	0.05	0.06			
share 80+	0.43	0.50	0.54	0.54	0.06	0.10	0.10			
share females	0.59	0.58	0.58	0.57	-0.01	-0.01	-0.02			
mean age	74	73	75	75	-0.51	0.73	0.95			

Source: Federal Statistical Office of Germany, LTC statistics; Huisman et al. 2013; calculation of DIW Berlin.

The increase in home care recipients is marginal lower amounting to 16 % in the tough and 36 % in the friendly scenario. A significant share of beneficiaries of the long-term care insurance is people receiving cash benefits for self-organized caregiving. The number of people receiving cash benefits is calculated to increase by 10 % in the tough and 25 % in the friendly scenario.

Italy

In Italy information on age-specific utilization of formal care is only available for residential care. For home care only the total number of recipients is available. Thus the share of home care recipients in total dependent persons is used for the estimation. In Italy most severe disabled persons receive a special transfer (the so called 'assegno di accompagnamento') to cope with the care expenditures they have to incur in given their status, About 800,000 households resort to personal carers paid out-of-pocket. (Coda Moscarola, 2013). The caretakers are included in the table as they are partly financed through the universal cash benefits.

Table 45 Recipients of formal care in Italy

	2010	2025		Changes 2025 to 2010			
		Tough	Friendly	Tough	Friendly	Tough	Friendly
in persons				in %			
Residential care*	353 603	447 197	512 525	93 594	158 922	26.5	44.9
Home care**	597 151	691 578	751 616	94 427	154 465	15.8	25.9
private financed***							
Caretakers (badanti)	800 000	926 503	1006 936	126 503	206 936	15.8	25.9
*) Estimation using constant age-specific utilization rates.-**) Estimation using the share of dependent people receiving home care in 2010.-***) Caretakers are privately financed, but partly payed out of the universal cash benefits for disabled people.							
Source: Coda Moscarola (2013).							

Poland

In Poland the recipients of home care are calculated to increase by 20% (tough) and 38 % (friendly), while the increase in recipients of stationary care is lower with 15 % (tough) and 27 % (friendly).

Table 46 Recipients of stationary care and home care in Poland

	2010	2025		Changes 2025/2010			
		tough	friendly	tough	friendly	tough	friendly
	in 1000			in %			
Stationary care total	140	161	177	21	38	15.37	26.91
Health sector	68	81	92	13	24	19.28	34.55
Social sector	72	80	86	8	14	11.65	19.62
Home care total	149	179	205	30	56	19.98	37.79
Health sector	60	72	82	12	23	19.98	37.79
Social sector	89	107	123	18	34	19.98	37.79
Formal care total	289	340	383	51	94	17.75	32.52
Health sector	128	153	174	25	46	19.61	36.06
Social sector	161	187	209	26	48	16.27	29.71

Source: Golinowska et al., 2013; calculation of DIW Berlin.

Slovakia

In Slovakia the number of recipients of institutional care will increase by 20 % (tough) and 28 % (friendly), but will nearly constant for people receiving long-term care in hospitals. The number of people receiving benefits in kind and in cash at home is expected in increase by 23 % (tough) and 32 % (friendly).

Table 47 Development of recipients of formal long-term care services in Slovakia

	2010	2025		Changes 2025/2010			
		tough	friendly	tough	friendly	tough	friendly
	in persons			in %			
Institutional LTC recipients	33 360	40 002	42 794	6 642	9 434	19.91	28.28
LTC recipients at home (paid service)	83 358	102 463	109 615	19 105	26 257	22.92	31.50
LTC at hospitals	3 476	3 381	3 618	- 95	142	-2.72	4.07
Total	120 194	145 847	156 026	25 653	35 832	21.34	29.81

Source: Radvansky and Lichner (2013); calculation of DIW Berlin.

Appendix 7: People receiving informal care form inside and outside the household

SHARE provides also information on the share of persons receiving care inside and outside the household. The share of people with impairments in at least one ADL receiving regular personal care inside the household ranges from 31 % in Denmark to 55 % in Italy. In Germany 34 % receive care from their spouses, in Poland only 15 %. This can be traced back e.g. on the differences in life expectancy between these countries (also between males and females) and the living arrangements. In Poland the life expectancy is lower and dependent elderly are living more often with their children than in Germany.

In Denmark only a very small part of dependent people receive regular personal care from outside the household. Personal care is seen as the responsibility of the community. The family members provide other help and care to their relatives. In Germany and Italy 19 % receive personal care on a daily basis from outside the household. This include also care giver receiving cash benefits for care giving. In Poland 11 % receive regular personal care from outside the household.

Table 48 Share of people receiving informal care from inside or outside the household

	Denmark	Germany	Italy	Poland
Share of persons with impairments in at least 1 ADL receiving ...				
personal care on a regular basis from persons inside the household	31	45	55	36
thereof from spouses	28	34	30	15
personal care on a almost daily basis from persons outside the household	(3)	19	19	11
thereof from more than one helper	(1)	11	8	4
personal care from persons outside the household (all)	(8)	25	26	16
thereof from more than one helper	(3)	15	12	7
help and care from persons outside the household (all kinds)	50	57	40	37
thereof from more than one helper	21	32	20	18
Note: Value in parathesis are based on less than 30 observations.				
Source: SHARE wave 1 and 2 (Poland wave 2 only); pooled data, weighted; calculation of DIW Berlin.				