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Ageing, Care Need and Long-Term Care Workforce in Germany

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AGEING, CARE NEED AND LONG-TERM CARE WORKFORCE IN GERMANY

ERIKA SCHULZ

SUPPLEMENT B TO NEUJOBS WORKING PAPER D12.2

DECEMBER 2013

This paper aims to show the impact of population ageing 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 services. Since 1995 formal care services in institutions and at home as well as cash benefits for informal home care financed by the long-term care insurance system are available, but only for people with at least substantial impairments in activities of daily living. Thus the bulk of caregiving to the elderly is still the task of the family.

In Germany 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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AGEING, CARE NEED, AND LONG-TERM CARE WORKFORCE IN GERMANY

ERIKA SCHULZ*

SUPPLEMENT B TO NEUJOBS WORKING PAPER D12.3

1 Introduction

Germany as all European countries will face an ageing of the population 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. As 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.

In 1995 a long-term care insurance system was introduced providing benefits in kind and in cash to people with at least substantial impairments in activities of daily living. Help and personal care to the elderly with lower levels of impairments is still predominantly a task of family members. Spouses, daughters, daughters in law and other family members are the main caregivers (Döhner, 2007). But the potential of informal caregiver is also expected to decline due to changing household compositions with more elderly living alone and increasing female labour force participation. The expected increase in the need for long-term care on the one hand and the changes in household compositions on the other hand is a challenge for families as well as for the society. The required changes in the amount of and access criteria for an adequate (publicly financed) provision of formal care are topics of the public discussion since several years.

People in need of care prefer to stay at home for as long as possible. If the need for care occurs often the partner or members of the family take over the tasks the dependent had done. But if the level of care needed increases, informal care giver in particular if they are also in older age need help from professional caregiver. To support informal care giver, the availability of home care or cash benefits to organize adequate home care services is essential. 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 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.

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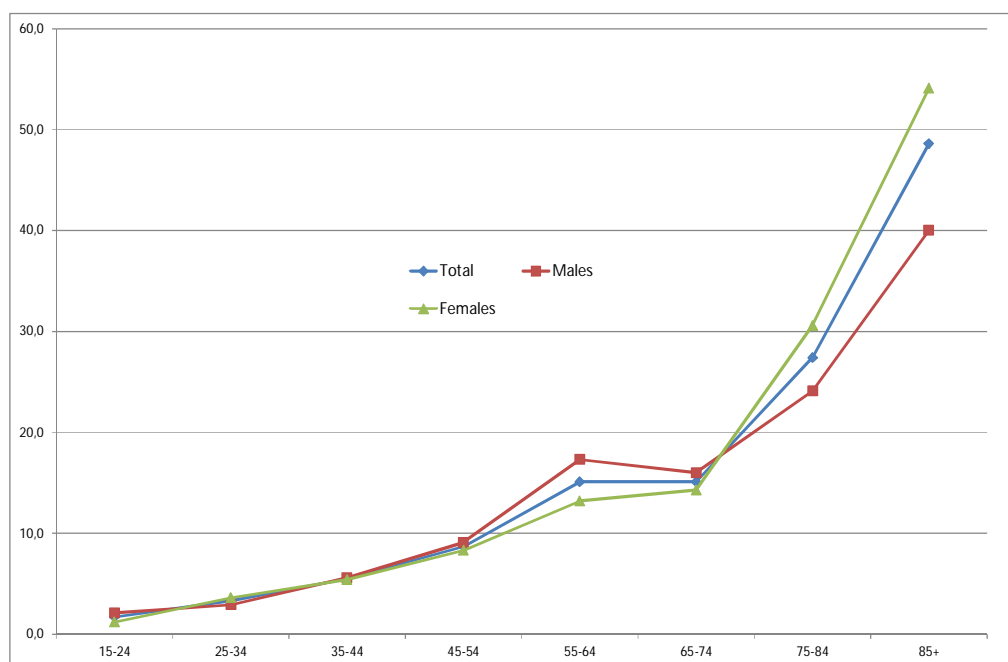
The report is structured as follows: Section 2 provides an overview of the number of people in need of care and the realized care giving arrangements. Section 3 shows the current size and occupational structure of long-term care workforce. Section 4 discusses the factors influencing the future demand 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 (formal and informal) long-term care workforce depends on the number of people in need of care and the ability to perform every-day tasks by themselves. 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).

Information on the quantity of people in need of care is rare. Two surveys provide information on dependency and impairments: the European Union Statistics on Income and Living Conditions (EU SILC) provides information for people aged 16+ living in private households and the Survey of Health, Ageing and Retirement in Europe (SHARE) provides information for people aged 50+ living in private households. The EU SILC asks for 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?" Figure 1 shows the share of people reporting severe impairments in performing every-day tasks for men and women. In general, the share of people with self-perceived impairments increases with age, but the growth is higher for females than for males. 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 Germany 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 Germany is calculated.¹ In 2010 around 7.8 million people reported to have severe impairments in daily activities, thereof 3.6 million males and 4.3 million females (Table 1).

Table 1 Dependent people by age-groups and gender in Germany 2010

Age-groups	Total	Males	Females	Total	Males	Females
	in 1000 persons			Age-structure in %		
0-24	337	218	119	4.29	6.08	2.79
25-44	981	488	493	12.51	13.61	11.58
45-64	2 620	1 434	1 186	33.39	39.97	27.84
65-74	1 453	725	728	18.51	20.22	17.08
75-84	1 515	523	992	19.31	14.59	23.28
85+	941	198	743	11.99	5.52	17.44
Total	7 847	3 587	4 260	100	100	100

Source: Eurostat, EU SILC; calculation of DIW Berlin.

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).

Around 31 % of the dependent population is aged 75+; among men 20 % and among women 41 %. Females are living longer, but often they suffer from impairments in daily living due to longstanding illnesses.

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 aged 50+ with impairments in at least 1 ADL is for men on average 11 % and for women 14 %. Only a small part of males reported impairments solely in IADL, around 4 %. The corresponding share for females is 9 %. A large share of males (85 %) and females (77 %) had no impairments at all. The SHARE results are shown in Table 2. In total some 4.2 million people aged 50+ reported impairments in at least 1 ADL in Germany, thereof 1.7 million males and 2.5 million females.

Table 2 People aged 50+ with and without impairments in ADL and IADL in Germany in 2010

Age-groups	Males				Females				Total			
	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	with at least 1 ADL	no ADL with at least 1 IADL	no ADL, no IADL	Total
Share in %												
50-59	7.6	(2,1)	90.2	100	4.4	4.1	91.5	100	6.0	3.1	90.9	100
60-69	8.5	4.7	86.8	100	8.4	6.6	85.0	100	8.4	5.7	85.9	100
70-79	10.8	5.9	83.3	100	15.8	13.1	71.1	100	13.6	9.9	76.6	100
80+	35.9	(7,6)	56.5	100	40.4	17.7	41.9	100	39.0	14.4	46.6	100
50+	10.9	4.3	84.7	100	13.9	9.2	76.9	100	12.7	6.9	80.4	100
in 1000 persons												
50+	1 679	641	12 732	15 053	2 482	1 615	13 536	17 633	4 161	2 256	26 268	32 686
Values in () are based on less than 30 observations.												
Source: SHARE wave 1, 2, and 4; weighted results (pooled data); calculation of DIW Berlin.												

2.2 Care settings – informal and formal care

2.2.1 Formal and informal care

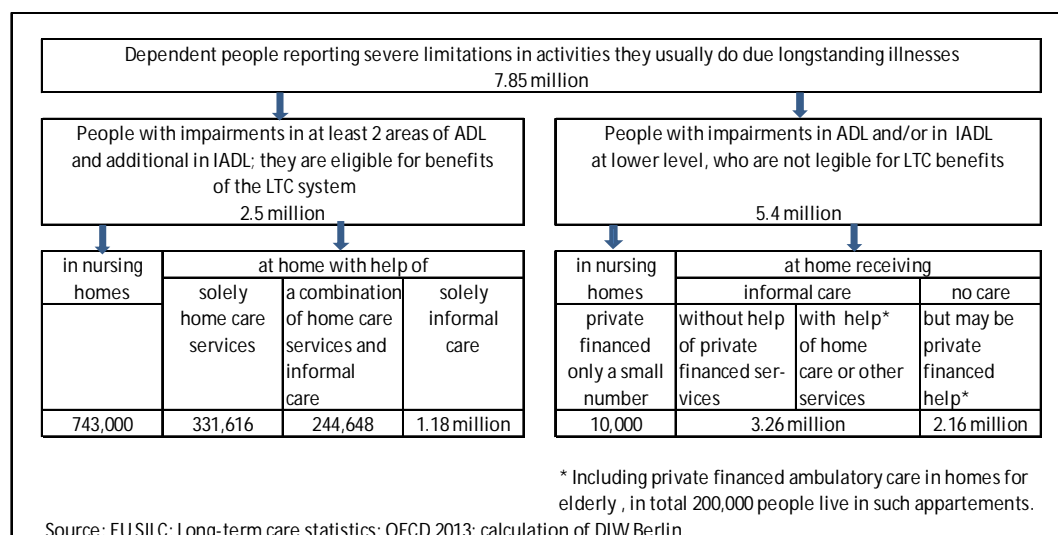
Many dependent people rely on formal or informal care, other are able to cope with their impairments themselves. The coping strategies as well as the available public financed formal care services determine the need for formal care workforce. In Germany the 1995 introduced long-term care insurance system provides benefits in kind and in cash, but only to people with at least substantial impairments, and it covers only a part of the costs (Schulz 2010a). 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 (level I to level III and hardship cases) 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. Around 332,000 beneficiaries receive solely care from professional home care services, and some 245,000 receive a combination of home care services and cash benefits for informal care (Figure 2). The majority of beneficiaries at home receive cash benefits solely for informal care. In 2011, around 1.2 million people receive solely informal care.

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 2011 around 735,000 beneficiaries lived in nursing homes.

While dependent people with at least substantial impairments can receive publicly financed help and care from formal home care services or in institutions, dependent people with a lower level of dependency rely on informal care and on privately financed care and help. A part of dependent people copes with its situation by themselves using for example new technologies 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.

Figure 2 Overview of dependent people and care arrangements in Germany



Information on the care arrangements of dependent people receiving no public financed care and help is rare. As almost all people living in nursing homes are beneficiaries of the LTC system, the number of residents with a so called care level 0 (people with less than substantial impairments) is small. Schneekloth and Thörne (2007) estimated that only some 45,000 institutionalized people do not get benefits from the LTCI funds in 2005. But in the meantime the number declined significantly (TNS Infratest Sozialforschung, 2011).

Thus, nearly all dependent people receiving no benefits are living at home. This includes also apartments in homes for the elderly. They can receive informal care with and without the help of (private financed) formal care services or they receive no informal care but may be they engage private financed helpers. Schneekloth and Leven (2003) provide some information about the characteristics of people with care level 0 living at home. People in need of care, but receiving no benefits from the long-term care insurance funds are accounted for some 3 million in 2002. They are on average younger than beneficiaries of the LTCI funds. The share of elderly amount to 68 % (75 % among the beneficiaries) and the share of the oldest old (80 years and older) amount to 30 % (see Table 3). A high percentage of people in need of help is married (42 %), but also widowhood is common (36 %). 41 % are living alone, another 40 % in a two-person-household, and 11 % in a three-person-household. Two thirds are women.

Table 3 Characteristics of people in need of care receiving no benefits from the long-term care insurance (care level 0) at home in Germany 2002

	in %		in %
Gender		Family status	
male	34	married	42
female	64	widowed	36
		divorced	5
		single	17
Age-groups		Household Size	
under 40	10	1 Person	41
40-64	23	2 Persons	40
65-74	26	3 Persons	11
75-85	26	4 + Persons	8
85 and older	16		

Source: Schneekloth and Leven 2003.

The OECD health data also provide information on the number of informal caregiver of people not receiving benefits from the LTC system. The number of informal caregiver to people receiving no LTC benefits is estimated to be around 3.3 million in 2006 (OECD, 2013). The number of private financed helpers is unknown. It is estimated that 200,000 persons from abroad are working as domestic workers, but take over also personal care and help (Kniejska, 2011; Neuhaus et al., 2009). The share of irregular workers is unknown, but estimated to be high.

To sum up: The number of dependent people can only be estimated. According to the EU SILC around 7.9 million people were dependent in Germany. Dependent people with at least substantial impairment are eligible for LTC benefits. In 2011 2.5 million receive LTC benefits, thereof 743,000 for institutional care, 332,000 for home care services, 245,000 for a combination of home care services and informal care, and 1.2 million for informal care solely. As a result of the EU SILC information on dependent people and the information on LTC beneficiaries, around 5.4 million dependent have less than substantial impairments. They are not eligible to receive LTC benefits. Thus, they rely on informal care, on private financed formal care or they are able to cope with their impairments themselves. Information on this part of dependent people is rare. According to the OECD health data around 3.3 million receive informal care. According to a survey in nursing homes, only a small number is living in nursing homes. Thus, it can be assumed that the other dependent receive no care or organize private financed care and help. The experience is that regular formal care may be too expensive. Thus it can be assumed that irregular employment is common in this field of private financed care and help. But no data or estimation exists.

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. Information on the amount on informal care and the kind of help and care provided is rare. International comparable information is available from the EUROBAROMETER 67.3 and the SHARE survey. The surveys provide information on all kinds of help (for example help with financial tasks, shopping) and personal care provided to people in need of. According to the EUROBAROMETER the number of informal care giver providing any kind of help or care aged 25-64 years is account to be 9 million in Germany that is a share of 22 % (Vilaplana Prieto, 2011). Focusing only on help with ADL changes the picture. According to the study of Pickard (2011) using also the EUROBAROMETER data, around 14 % of people aged 15+ provide help in one or more ADL tasks and 7 % in two or more ADLS tasks in Germany.

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.

The share of informal caregivers aged 50+ inside and outside the household is shown in Table 4. In Germany around 6 % of people aged 50+ provide care on a regular basis inside the household, 5 % of males and some 8 % of females.

Table 4 Share of persons aged 50+ providing informal care to someone inside or outside the household in Germany

	Males	Females	Total
Share of people aged 50+ providing	in%		
regular personal care to someone inside the household	5.14	7.58	6.31
personal care to someone outside the household almost daily	1.36	3.85	2.72
Personal care to someone outside the household	4.02	7.74	6.06
all kind of help and care outside the household	38.09	30.59	33.98
Source: SHARE wave 1 and 2; 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. Around one third 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. Focusing only on the provision of personal care to someone outside the household changes the picture: Around 6 % 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. Around 3 % provide personal care on a daily basis to someone outside the household. However, the living arrangements have also an impact on the division of care giving inside and outside the household. The EUROFAMCARE report stated that 37 % of caregivers live with the person in need in the same household in Germany (EUROFAMCARE, 2006).

Table 5 shows the characteristics of informal caregivers aged 50+. Around three quarter (77 %) of people providing regular personal care to someone outside the household is females and a high share is aged 50-69 years (84 %). 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 (44 %) or to other members of the family (16 %). Inside the household care giving to the partner is common (63 %). Thus, the share of females is lower (58 %) and the age of caregiver is higher than in the case of caregiving outside the household.

Table 5 Characteristics of informal caregiver aged 50+ in Germany (%)

Characteristics of caregiver	Share of people providing personal care to someone	
	outside the household (almost daily)	inside the household (regularly)
share of caregiver aged 50-69	83.80	59.59
share of female caregiver	77.46	57.65
share caregiving to one parent	43.86	
share caregiving to other family member*	16.49	
share caregiving to partner		62.63
share caregiving to other*		21.31
*) Except child.		
Source: SHARE wave 1 and 2; pooled data; weighted results; calculation of DIW Berlin.		

The SHARE survey has the disadvantage that it includes only people aged 50+. A survey on the situation of care provision at home carried out in private households includes people at all ages, but it was carried out in 2002. However, to provide an overview of the characteristics of informal carer the results of this survey are mentioned in appendix 1.

3 Long-term care workforce – current situation

3.1 Overview

The main source for the employment in long-term care is the long-term care statistics. The long-term care statistics which is carried out every other year provides information on the vocational qualification, the working time 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 952,000 people were employed in long-term care facilities, thereof 291,000 in home care services and 661,000 in nursing homes (Table 6). The number of employees increased by 327,000 between 1999 and 2011 that is 52 %.

Nursing and caring occupations are still the fields of female employment. In 2011 around 85 % of employees were females; 88 % in home care services and 85 % in nursing homes. The share of female employment has not changed over time.

Table 6 Personnel in long-term care facilities 1999 to 2011

	Home care services			Nursing homes			Total		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1999	183 782	27 377	156 405	440 940	69 560	371 380	624 722	96 937	527 785
2011	290 714	35 946	254 768	661 179	99 179	562 000	951 893	135 125	816 768
Changes between 1999 and 2011									
Number	106 932	8 569	98 363	220 239	29 619	190 620	327 171	38 188	288 983
%	58.2	31.3	62.9	49.9	42.6	51.3	52.4	39.4	54.8
Source: Federal Statistical Office; Statistics on long-term care.									

In nursing and caring activities part-time employment is common. In 2011 around 486,000 employees worked part-time, that is 51 % (Table 7). Most of them (70 %) are working more than 50 % of the normal full time working time, 30 % are working half of normal working time or less. Beside full-time and part-time employment two other working arrangements are common in the long-term care sector: marginal employment and the engagement of students, trainees, voluntaries, persons in a voluntary social year or people from the so called Federal voluntary service. In 2011 around 50,000 people had such an employment arrangement, thereof around 75 % as trainees. Some 124,000 people were marginally employed, which means they earned less than required to be compulsory insured in the social security system. Most had a so called mini-job (up to 400 Euro per month), some worked as temporary workers (less than 50 days in a year) and some on a so called 1-Euro-base (work with additional cost compensation to unemployment benefits). In particular the part-time employment showed a high dynamic in the past, whereas the full-time employment increased only by 9 % between 1999 and 2011.

Table 7 Personnel in long-term care by working time 1999 and 2011

Year	Total	Full-time	Part-time	more than 50%	less than 50%	marginal	other
1999	624 722	268 458	233 589	150 046	83 543	81 921	40 754
2011	951 893	292 171	485 864	341 514	144 350	124 042	49 816
Changes between 1999 and 2011							
Number	327 171	23 713	252 275	191 468	60 807	42 121	9 062
%	52.4	8.8	108.0	127.6	72.8	51.4	22.2
Source: Federal Statistical Office; Statistics on long-term care.							

Home care services realized a higher share of part-time employment (70 % in 2011) as well as marginal employment (21 %) than nursing homes (61 % part-time and 9 % marginal employment) (Table 8). In particular in nursing homes the share of full-time workers declined significantly.

Table 8 Personnel in long-term care facilities by working time (%)

Year	Total	Full-time employment	Part-time employment			Marginal employment	Other contracts*
			total	more than 50%	50% or less		
	Total						
1999	100	43	37	24	13	13	7
2011	100	31	51	36	15	13	5
	Nursing homes						
1999	100	48	35	23	12	10	7
2011	100	32	61	36	15	9	7
	Home care services						
1999	100	31	42	27	16	21	5
2011	100	27	70	35	15	21	2
*) Students, trainees, volunteers, civilian servant in lieu of military services (1999), assistant in voluntary social year.							
Source: Federal Statistical Office: Statistics on long-term care.							

For the year 2009 information on the working time by fields of activities in nursing homes and home care services is available. In general, housekeeping, social services, and in assistant activities show a high share of part-time and marginal employment. In home care services 43 % of people active in housekeeping have a marginal employment contract, and 42 % work part-time, thereof 17 % less than half of the normal working time (Table 9).

Table 9 Employees in long-term care facilities by working time and fields of activities in 2009 (%)

Field of activity	Total	Full-time	Part-time*	P-t>50%	P-t<=50%	Marginal	Others
Nursing homes							
Total							
Total fields of activity	100	33	50	34	15	10	7
Care and nursing care	100	36	48	35	13	7	9
Social care	100	23	55	34	21	14	8
Additional care and attendance (§ 87b SGB XI)	100	12	83	44	38	5	1
Housekeeping sector	100	23	57	35	22	18	3
Building services sector	100	47	23	14	9	16	13
Administration, management	100	46	43	25	18	9	2
Other sectors	100	23	35	20	15	32	10
Home care services							
Total							
Total fields of activity	100	27	48	33	15	22	3
Management of nursing service	100	84	15	12	3	1	0
Basic care	100	24	54	38	16	20	2
Housekeeping	100	11	42	25	17	43	3
Administration, management	100	43	42	26	16	13	2
Other sectors	100	20	31	19	11	39	10

Source: Federal Statistical Office; Statistics on long-term care.

Also in basic care activities part-time (54 %) and marginal employment (20 %) dominate. In nursing homes marginal and part-time employment is in general lower than in home care services, but has also a high share in housekeeping activities (57 % part-time and 18 % marginal employment) and social care activities (55 % and 14 %, respectively).

To meet the needs of the frail elderly the mentioned activities are carried out by personal with different occupations and qualification levels. 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 (Table 10). 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.

On average 15 % of nursing home employment and 12 % of workers in home care services are males. But there are some activities/occupations with nearly no male employment like paediatric nurse, state approved family nurse or state approved village nurse. On the other side is the share of males disproportional high among employees with a degree in nursing science granted by a college or university (some 30 %).

Table 10 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
Ergo therapist	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.

Under consideration of the different working hours of the staff the Table 11 and Table 12 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.

Table 11 Employment in home care services by profession and field of activity in Germany 2011 - Full-time equivalents

	Total fields of activity	Nursing care service manage- ment	Basic care	House- keeping	Administra- tion, manage- ment	Other sectors
Total vocational qualifications	193 301	15 776	137 734	19 511	10 536	9 744
State-approved geriatric nurse	45 469	4 176	38 555	332	899	1 506
State-approved geriatric nursing assistant	8 452	134	7 695	435	47	141
Nurse, male nurse	54 096	9 910	39 441	342	1 991	2 412
Nursing assistant	8 850	44	8 031	589	81	104
Pediatric nurse, pediatric male nurse	5 057	796	3 770	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	1 831	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	12 822	1 783	156	644
Trained housekeeper for the elderly	554	3	170	355	11	16
Other housekeeping qualification	3 806	7	997	2 621	57	124
Other vocational qualification	32 966	106	14 487	9 636	5 949	2 787
Without completed vocational qualification or still in training	11 548	4	7 483	2 715	326	1 021

Source: Federal Statistical Office of Germany, LTC statistics.

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.

Table 12 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
Ergotherapist	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.

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

In 2010, Germany had 81.8 million inhabitants, thereof 16.9 million aged 65+ and 4.2 million aged 80+.² Germany had one of the oldest populations among the European countries with a share of elderly of around 21 %. The future population is determined

² In Germany a population census was carried out in May 2011. First results were published in May 2013. The results indicates that the population accounted to 80.2 million in May 2011, which is 1.5 million lower than the estimated population based on the official inter-censal population updates. The NEUJOBS population forecast is based on the official inter-censal population update data as the new census results were not available at the time of forecasting.

by the size and age-structure in the base year (stock) and by the flow variables birth, death and migration. While the migration flows have an influence mostly on the number of people in working age, the fertility rates and the changes in life expectancy determines the share of elderly and oldest old in total population. Thus the ageing process will be mostly determined by the ageing of the population stock, the fertility rates and the life expectancy.

The NEUJOBS demographic scenarios tough and friendly assume a further increase in life expectancy (LE) for males and females (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 birth was 78 years for men and 83 years for women. Men aged 65 could expect to live 18 additional years, women more than 21 years (Table 13). Men aged 80 could expect to live more than 8 additional years and women 9.5 years. In both scenarios the LE is expected to increase, but to a higher degree in the friendly scenario. In the friendly scenario the LE at 65 is assumed to increase by 3.2 years for males and 2.7 years for females. People aged 80 can expect to have a two years higher life expectancy. In the tough scenario the assumed increase in LE65 is with 1 year for males and 0.8 years for women significant lower. The LE at 80 is expected to increase by 0.4 (males) and 0.5 (females) years.

Table 13 Assumption of population scenarios - Germany

	2010	2025	
		Friendly	Tough
Fertility rate	1.39	1.70	1.39
LE at birth males	78.0	82.4	79.6
LE at birth females	83.0	86.5	84.1
LE at age 65 males	18.0	21.2	19.0
LE at age 65 females	21.3	24.0	22.1
LE at age 80 males	8.2	10.1	8.6
LE at age 80 females	9.5	11.4	10.0
Net migration per year (1000)	-10.7	366.2	-100.3
Source: Eurostat, Huisman et al.2013, Van Der Gaag (internal data).			

The share of elderly in total population is also 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 means that the following generation is one third smaller than the current one. 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.

As a result the population is expected to decline by 6.6 million in the tough and by 1.7 million in the friendly scenario. In 2010, every fifth person was at least 65 years old. 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 share of the elderly is expected to be only slightly lower in the tough scenario (Table 14). In the friendly scenario the number of the elderly will increase by 2.6 million, in the tough scenario by around 1 million.

Table 14 Demographic development in Germany 2010 to 2025

Age-groups	2010	2025		changes 2025/2010				2010	2025	
		tough	friendly	tough	friendly	tough	friendly		tough	friendly
	in 1000 persons				in %				age-structure in %	
0-14	11 023	9 515	10 594	-1 508	- 429	-13.68	-3.89	13.47	12.64	13.23
15-34	18 961	15 836	16 970	-3 125	-1 991	-16.48	-10.50	23.18	21.04	21.19
35-49	19 132	14 114	14 826	-5 018	-4 306	-26.23	-22.51	23.39	18.76	18.51
50-64	15 785	17 781	18 203	1 996	2 418	12.64	15.32	19.30	23.63	22.73
65-79	12 721	12 836	13 292	115	571	0.90	4.49	15.55	17.06	16.60
80+	4 181	5 169	6 197	988	2 016	23.64	48.22	5.11	6.87	7.74
total	81 802	75 250	80 082	-6 552	-1 721	-8.01	-2.10	100.00	100.00	100.00
Source: Huisman et al. 2013; calculation of DIW Berlin.										

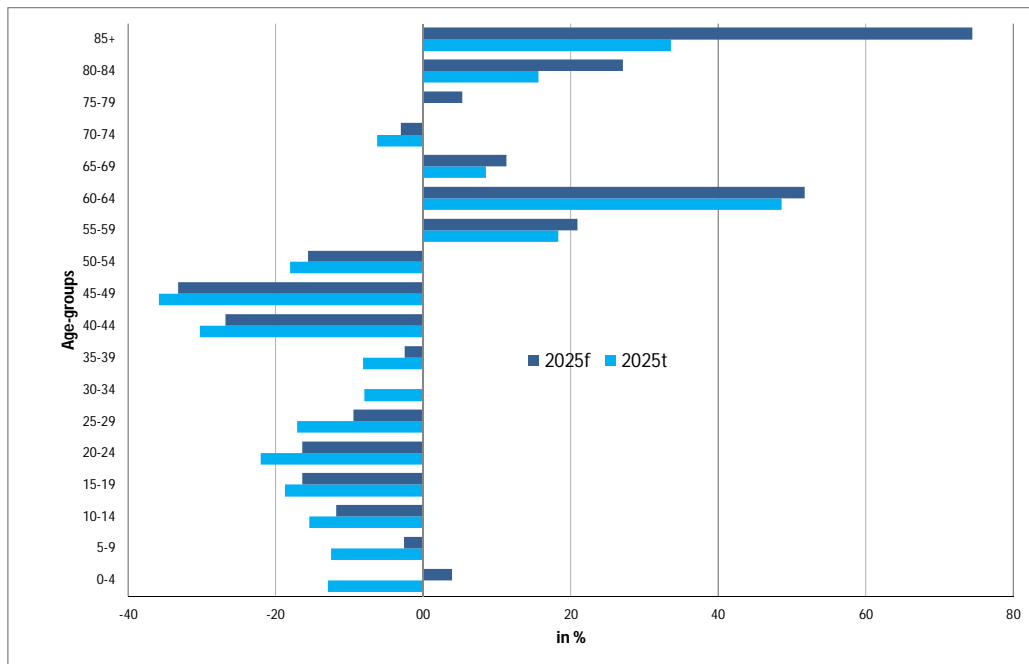
As the need of long-term care increases significantly from the age 75 onwards, the size and share of the oldest old, in general defined as people aged 80+, are of particular interest. In 2010, 4.2 million people were aged 80+ in Germany. The share in total population was some 5 %. Until 2025, the number of the oldest old is expected to increase by some 2 million (friendly) and 1 million (tough). That is a growth of 48 % in the friendly and 24 % in the tough scenario. In 2025 around 7 % (tough) and 8 % (friendly) of population will be at least 80 years old.

The shift of the baby-boomer born at the end of the fifties and the beginning of the sixties at higher ages and the effect of the demographic components on the age-structure of the population is shown in Figure 3. The baby-boomer which dominate the age-groups 40-50 in 2010, will dominate the age-group 55-70 in 2025. The different assumption on the further increase in LE leads to the differences in size of people aged 75+. The different assumptions in fertility rates can be seen in the different size of the youngest age-groups, and the assumptions concerning migration can be seen in the difference between the friendly and tough curve in the younger and middle working age-groups.

The changes in the single age-groups are shown in Figure 4. In the younger and middle age-groups (persons aged <55years) a decline in population in both demographic scenario is expected. For people at least 55 years old an increase in population is expected. As a high share of informal caregiver is at least 50 years old, also an increase in the informal care giver potential is expected.

Figure 3 Age-profile of the population in Germany 2010 and 2025

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

Figure 4 Population by age-groups – changes between 2010 und 2025 (%)

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

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), 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.³ 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 15 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 1 million in the friendly and by 0.3 million in the tough scenario. That is an increase of 4 % (tough) and 13 % (friendly).

³ The study on the impact of ageing populations on the long-term care workforce has to be carried out for Denmark, Germany, Italy, Poland, and Slovakia. To provide comparable results for all countries, it was decided to use constant dependency rates for all countries.

Table 15 Development in the number of dependent people in Germany 2010 to 2025

Age-groups	2010	2025		Changes between 2010 and 2025			
		tough	friendly	tough	friendly	tough	friendly
	in 1000 persons		in 1000 persons		in %		
0 - 15	183	158	176	- 25	- 8	-13.82	-4.14
16 - 24	154	122	128	- 32	- 26	-20.58	-16.62
25 - 34	315	275	299	- 40	- 16	-12.76	-5.01
35 - 44	666	528	558	- 138	- 109	-20.70	-16.30
45 - 54	1 138	824	853	- 314	- 285	-27.59	-25.07
55 - 64	1 481	1 955	1 998	473	517	31.95	34.87
65 - 74	1 453	1 471	1 516	19	63	1.28	4.32
75 - 84	1 515	1 607	1 724	92	209	6.10	13.78
85+	941	1 237	1 605	296	664	31.41	70.51
Total	7 847	8 178	8 856	331	1 009	4.22	12.86
Source: Eurostat, EU SILC; Huisman et al. 2013; calculation of DIW Berlin.							

Due to the changes in the size and age-structure of the population the number of dependent people under 55 years old is expected to decline, while the number of elderly dependent will increase. The highest increase is expected for dependent aged 80+ with 31 % in the tough and 71 % in the friendly scenario. Thus, the share of dependent elderly (65+) will increase from 50 % in 2010 to 53 % (tough) and 55 % (friendly) in 2025. In particular the number and the share of the oldest old among dependent people will grow significantly. In 2010, the share of oldest old dependent was 12 %, and will rise up to 15 % (tough) and 18 % (friendly) in 2025.

The SHARE results using the share of people aged 50+ with impairments in at least 1 ADL shows a similar development of people with impairments in ADL compared to the development of dependent people aged 50+: The number of impaired people is expected to increase by 13 % (tough) and 24 % (friendly), and the number of dependent people aged 50+ according to the EU SILC results is expected to increase by 12 % (tough) and 22 % (friendly).

According to the SHARE data the number of impaired people aged 50+ will amount 4.7 million in the tough and 5.2 million in the friendly scenario (Table 16). Both calculations indicate a significant increase in the number of dependent people as well as in the number of impaired people under the assumption of constant disability rates. They show that the expected population ageing will be a challenge for the society and the long-term care system.

Table 16 Number of people aged 50+ with impairments in ADL or IADL in Germany in 2010 and 2025

Age-groups	2025		Changes between 2010 and 2025				
	2010	tough	friendly	tough	friendly	tough	friendly
	in 1000 persons					in %	
	with impairments in at least 1 ADL						
50-59	691	687	705	- 5	13	-0.66	1.95
60-69	776	988	1 011	212	235	27.28	30.26
70-79	1 064	1 021	1 062	- 43	- 2	-4.01	-0.19
80+	1 629	2 005	2 400	376	770	23.06	47.26
50+	4 161	4 701	5 177	540	1 016	12.98	24.43
	with no impairments in ADL, but in IADL						
50-59	355	351	359	- 4	5	-1.04	1.30
60-69	524	666	680	142	157	27.05	29.89
70-79	774	741	769	- 32	- 5	-4.20	-0.62
80+	604	725	860	122	256	20.12	42.39
50+	2 256	2 483	2 668	227	412	10.06	18.28
	with no impairments in ADL and in IADL						
50-59	10 429	10 342	10 601	- 87	171	-0.84	1.64
60-69	7 888	10 041	10 276	2 152	2 388	27.29	30.27
70-79	6 003	5 778	6 030	- 225	27	-3.74	0.46
80+	1 948	2 439	2 938	491	990	25.22	50.84
50+	26 268	28 600	29 845	2 332	3 577	8.88	13.62
Source: SHARE wave 1, 2, and 4; weighted and pooled data; Huisman et al., 2013; calculation of DIW Berlin.							

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).

Changing living arrangements

The NEUJOBS demographic scenarios provide also information on the changes in living arrangements of the population by age-groups and gender. 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.

The Table 17 shows the living arrangement of people aged 50+ in 2010 and the changes between 2010 and 2025 for the two demographic scenarios. The category other comprises single parents, couple living with children and other households. In 2010 around 60 % of people 50+ lived with a partner and 32 % lived alone. The share of single households increased with age. Due to the higher LE of females, women are to a higher share singles than men, in particular in the highest age-groups.

The expected future changes in living arrangements will lead in general to a decline in the share of elderly households (50+) living with other persons in the same household in both scenarios. Due to the increase in LE 65+ which is expected to be higher for males than for females the share of couples will increase for people aged 75+ in both scenarios. More couples are growing old together. As informal caregiving is more likely inside the household, this trend increases the potential of informal caregivers inside the household.

Table 17 Living arrangement of the elderly in 2010 and changes between 2010 and 2025

	Population	Living arrangements			Population	Living arrangements			Population	Living arrangements		
Age-groups	Total in 1000	Single Share in % (changes in %-points)	Couple	Other	Males in 1000	Single Share in % (changes in %-points)	Couple	Other	Females in 1000	Single Share in % (changes in %-points)	Couple	Other
2010												
50-59	11477	18,4	56,8	24,9	5735	18,5	53,1	28,4	5742	18,2	60,4	21,4
60-64	4308	19,5	71,9	8,6	2118	15,5	74,6	9,9	2189	23,3	69,4	7,3
65-69	4881	21,1	72,3	6,6	2345	14,1	78,9	6,9	2535	27,6	66,1	6,3
70-74	4740	24,8	69,1	6,2	2187	13,2	81,7	5,1	2553	34,6	58,3	7,1
75-79	3101	34,8	59,0	6,2	1327	16,2	79,4	4,4	1773	48,7	43,7	7,6
80-84	2312	47,0	42,7	10,3	844	23,6	70,4	6,0	1468	60,4	26,8	12,8
85+	1869	55,9	21,0	23,1	495	33,4	52,3	14,3	1373	64,0	9,7	26,3
Sum	32686	25,6	60,0	14,4	15053	17,2	67,6	15,2	17633	32,7	53,6	13,7
Changes between 2010 and 2025 in the tough scenario												
50-59	-95	0,1	1,1	-1,3	-10	-0,1	1,8	-1,7	-85	0,3	0,5	-0,9
60-64	2091	0,1	0,0	-0,2	1058	0,1	0,0	-0,2	1033	0,2	0,0	-0,2
65-69	414	-0,1	0,4	-0,3	219	0,0	0,0	0,0	195	0,0	0,7	-0,6
70-74	-295	0,1	0,5	-0,6	-130	-0,2	0,3	-0,1	-165	0,5	0,5	-1,0
75-79	-5	-1,0	1,8	-0,8	36	-0,3	0,6	-0,2	-41	-0,8	2,0	-1,2
80-84	360	-0,6	1,6	-0,9	214	-0,4	0,6	-0,2	146	1,1	0,0	-1,1
85+	628	-1,6	2,9	-1,2	314	0,2	0,2	-0,4	314	0,2	0,4	-0,6
Sum	3099	0,2	0,9	-1,1	1702	0,2	1,0	-1,2	1397	0,4	0,5	-0,9
Changes between 2010 and 2025 in the friendly scenario												
50-59	190	0,1	1,0	-1,1	158	-0,2	1,6	-1,4	32	0,3	0,6	-0,9
60-64	2228	0,1	0,0	-0,2	1143	0,1	0,0	-0,2	1085	0,2	0,0	-0,2
65-69	551	-0,1	0,4	-0,3	305	0,0	0,0	0,0	246	0,0	0,7	-0,6
70-74	-144	0,0	0,6	-0,6	-35	-0,2	0,3	-0,1	-109	0,5	0,5	-1,0
75-79	165	-1,3	2,1	-0,8	140	-0,3	0,6	-0,2	24	-0,8	2,0	-1,2
80-84	625	-1,2	2,3	-1,0	365	-0,4	0,6	-0,2	260	1,1	0,0	-1,1
85+	1391	-2,3	3,8	-1,5	631	0,2	0,2	-0,4	760	0,2	0,4	-0,6
Sum	5005	0,7	0,2	-0,9	2707	0,5	0,8	-1,2	2298	1,2	-0,5	-0,7
Source: Huisman et al 2013: calculation of DIW Berlin.												

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

We calculated the changes in informal caregiver aged 50+ providing care on a regular or daily basis 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 both demographic scenarios. In the tough scenario the increase amounts to 250,000, in the friendly scenario to around 400,000 (Table 18). The dynamic is higher for informal carer inside the household than outside the household. Inside the household an increase in informal caregiver of 10.5 % (tough) and 17.6 % (friendly) is expected. 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. The increase of informal caregiver outside the household is 9.6 % (tough) and 13.4 % (friendly).

Table 18 Changes in informal caregiver aged 50+ taken changes in living arrangements into account in Germany

Age- groups		2025		Changes between 2010 and 2025			
	2010	tough	friendly	tough	friendly	tough	friendly
	in persons					in %	
	Informal caregiver total						
50-59	756	747	765	- 9	9	-1.16	1.19
60-69	770	977	998	207	228	26.89	29.58
70-79	596	574	598	- 22	2	-3.77	0.32
80+	354	431	514	77	160	21.77	45.27
total	2 476	2 729	2 875	253	399	10.21	16.11
	Informal caregiver outside the household						
50-59	401	397	406	- 5	5	-1.13	1.15
60-69	307	388	396	81	89	26.42	28.87
70-79	100	96	100	- 4	0	-3.94	0.00
80+	57	67	79	11	23	18.81	40.22
total	864	948	980	83	116	9.64	13.42
	Informal caregiver inside the household						
50-59	355	351	359	- 4	4	-1.20	1.23
60-69	463	589	603	126	139	27.20	30.06
70-79	496	478	498	- 19	2	-3.73	0.39
80+	297	363	434	66	137	22.33	46.24
total	1 612	1 781	1 894	170	283	10.52	17.55
Source: SHARE wave 1 and 2; pooled data; calculation of DIW Berlin.							

The SHARE data provide only information on people aged 50+, but the population estimations indicate that the potential of informal caregiver under 50 years of age will decline markedly. According to the survey of Schneekloth and Leven (2003) around 13 % of the main informal caregiver was under 40 years old and 26 % were aged 40-54

years in 2002, thus more than 5 % of people aged 40-59 provide informal care as main caregiver. Until 2025 the number of people aged 40-54 is estimated to decline by 5.7 million in the tough and 5.1 million in the friendly scenario. Thus, it can be expected that the potential of main informal caregiver aged 40-54 will decline by 310,000 (tough) and 280,000 (friendly). This is only a raw calculation, but it shows the pressure on the remaining informal caregiver potential to provide the amount of care required. Estimation based on national data shows similar results (Schulz, 2010b).

Increase in female labour participation

The largest group of informal caregivers are females in prime and old working age mainly aged 40-69. As care giving is often a physically and mentally demanding full-time job the reconciliation of care giving to elderly and employment is a challenge for female caregiver. To support the reconciliation the possibility to take care leave was introduced in 2012, but until now only a small number of informal carer applied for care leave.

In Germany the intensity of caregiving plays a significant role in which way people react in the case that the need of caregiving occurs (Viitanen, 2005). In the past the increases in female employment had a negative effect on intensive care giving. In the future a further increase in female labour force participation is expected due to two main trends: first, the increase of higher educated females which have a higher labour force participation than the lower educated once; second, the increase in normal retirement age for females to 67 years. Thus, it can be expected that the reconciliation of employment and care giving in particular in the older working age-groups will be harder. But, as no information on intensity of caregiving is available we could not take into account this trend for the estimation of informal caregiver.

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 the development of dependent people receiving formal care based on the current available services and their utilization is shown. 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 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 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 people receiving solely cash benefits for organizing care at home, people receiving home care services solely or in combination with cash benefits and people receiving institutional care.

Under constant utilization rates the number of beneficiaries will increase by 344,000 in the tough and 793,000 in the friendly scenario (Table 19). This is an increase of 13.7 % (tough) and 31.7 % (friendly). The future development is characterized by

1. A slightly shift to formal care
2. A slightly shift to severe impaired people (care level II)
3. An increase in the share of male beneficiaries
4. An increase in the share of oldest old

Ad 1) In 2010, significant differences in the characteristics of people receiving cash benefits, home care services or institutional care exists. People receiving cash benefits are on average younger (mean age 74 years compared to 82 years (home care recipients) and 84 years (people in nursing homes)), the share of females is lower (59 % compared to 68 % (home care) and 74 % (nursing homes)) and the share of people with substantial impairments is higher. The increase in the number of the oldest old leads to a shift to a higher share of formal care. The number of recipients of institutional care is expected to increase by 18 % (tough) and around 40 % (friendly). The increase in home care recipients is marginal lower amounting to 16 % in the tough and 36 % in the friendly scenario, but the number of people receiving cash benefits is calculated to increase 'only' by 10 % (tough) and 25 % (friendly).

Ad 2) In 2010, around 55.1 % had substantial impairments, 32.7 % severe impairments and 12.2 % very severe impairments. Until 2025 the share of people with substantial and with very severe impairments is estimated to decline, and the share of people with severe impairments will increase to 33.1 %. People with severe and very severe impairments are more likely to receive care and help by home care services or in nursing homes.

Ad 3) Due to the higher increase in LE65 of males the share of males in beneficiaries will increase in particular among people receiving home care services.

Ad 4) The share of oldest old (80+) will increase markedly among all kinds of long-term care benefits, but in particular among the beneficiaries of cash benefits. In 2025 around 54 % of recipients of cash benefits, 71 % of recipients of home care services and 77 % of residents in nursing home will be at least 80 years old. Among the oldest old mental illnesses are common. People suffering from dementia need additional support and advice. This type of help is not included in the definition of care levels, and could therefore not be taken into account. But we have to keep this in mind by interpreting the needed amount of long-term care employment.

Table 19 Beneficiaries of the long-term care insurance in Germany in 2010 and 2025

	2010	2025		Changes 2025 to 2010			
				(in 1000; %points)		in %	
		Tough	Friendly	Tough	Friendly	Tough	Friendly
	Total						
Beneficiaries in 1000	2 501	2 845	3 295	344	793	13.7	31.7
thereof with							
substantial impairments	1 379	1 570	1 813	191	434	13.9	31.5
severe impairments	818	935	1 089	117	271	14.3	33.1
very severe impairments	305	340	393	35	89	11.5	29.1
share 65+ (%)	83.1	85.2	86.6	2.1	3.5		
share 80+ (%)	55.5	61.1	65.0	5.6	9.5		
share females (%)	65.5	64.3	64.0	-1.2	-1.5		
mean age (years)	79	79	80	-0.40	0.77		
	Institutional care						
Beneficiaries in 1000	743	875	1 036	132	293	17.7	39.5
thereof with							
substantial impairments	292	345	408	53	116	18.1	39.9
severe impairments	299	354	421	55	121	18.2	40.5
very severe impairments	152	176	208	24	56	16.0	36.6
share 65+ (%)	92.8	93.2	94.1	0.3	1.2		
share 80+ (%)	69.6	73.6	76.9	4.0	7.3		
share females (%)	74.0	72.4	72.2	-1.6	-1.8		
mean age (years)	84	84	85	0.04	0.92		
	Home care						
Beneficiaries in 1000	576	671	785	95	208	16.4	36.2
thereof with							
substantial impairments	324	378	443	54	119	16.7	36.5
severe impairments	189	221	260	32	71	17.2	37.5
very severe impairments	63	71	82	8	19	12.7	30.2
share 65+ (%)	90.3	91.1	92.2	0.8	1.9		
share 80+ (%)	62.2	67.3	70.9	5.0	8.7		
share females (%)	67.9	65.6	64.8	-2.3	-3.1		
mean age (years)	82	82	83	0.58	1.56		
	Benefits in cash for organisation of care						
Beneficiaries in 1000	1 182	1 299	1 474	117	292	9.9	24.7
thereof with							
substantial impairments	762	847	962	84	199	11.0	26.1
severe impairments	330	360	408	30	78	9.2	23.8
very severe impairments	90	92	104	3	14	3.0	15.7
share 65+ (%)	73.5	76.7	78.5	3.2	5.0		
share 80+ (%)	43.4	49.6	53.5	6.1	10.1		
share females (%)	59.0	58.2	57.9	-0.8	-1.1		
mean age (years)	74	73	75	-0.51	0.73		
Source: LTC statistics; Huisman et al. 2013; calculation of DIW Berlin.							

Source: LTC statistics; Huisman et al. 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 20). 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 was 37 %. In 2025 these differences are lower accounting for 32 % in the tough and 30 % in the friendly scenario

Table 20 Dependent and estimated care giving arrangements in 2010 and 2025

	Dependent persons	Persons receiving formal care			Informal caregiver 50+			Difference		
		in institutions	at home in kind	total cash benefits		outside the household	inside the household	total	in relation to dependent	
		in 1000								in %
2010	7 847	743	576	1 182	2 501	864	1 612	2 476	2 870 36.57	
Tough scenario	8 178	875	671	1 299	2 845	948	1 781	2 729	2 604 31.84	
Friendly scenario	8 856	1 036	785	1 474	3 295	980	1 894	2 875	2 686 30.33	
Source: Hiusman et al. 2013: EU Silc: Long-term care statistics: SHARE: calculation of DIW Berlin.										

Source: Hiusman et al. 2013: EU Silc; Long-term care statistics; SHARE; 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. But this is not the case. Imbalances are reported with a shortage of qualified nurses and an oversupply of nursing assistant. The Federal Employment Agency reported that in August 2013 around 32,800 geriatric nurse assistant were registered as unemployed, but only 4,100 vacancies were registered. Contrary was the situation of qualified geriatric nurses: 3,800 were registered as unemployed and 9,700 vacant jobs were reported (BA, 2013). But not all persons seeking for a job and not all vacant jobs are registered at the Federal Employment Agency. The Federal Association of private suppliers of social services reported a shortage of 30,000 qualified nurses and carers. They stated that the shortage to increase to around 220,000 nurses in 2020 (bpa, 2013). The reported imbalances have to keep in mind by interpreting the results for workforce demand.

Under constant ratios of beneficiaries to employees the demand for long-term care workforce will increase by 165,000 in the tough and 366,000 in the friendly scenario (Table 21).

Table 21 Demand for long-term care workforce 2010 and 2025 in Germany

		2025		Changes 2025 to 2010			
	2011	Tough	Friendly	Tough	Friendly	Tough	Friendly
	in 1000					in %	
	Institutional care						
Beneficiaries	743	875	1 036	132	293	17.8	39.4
Employment	661	778	922	117	261	17.8	39.4
Ratio	0.89						
FTE	480	565	669	85	189	17.8	39.4
Ratio	0.65						
	Home care services						
Beneficiaries	576	671	785	95	209	16.5	36.3
Employment	291	339	397	48	106	16.5	36.3
Ratio	0.51						
FTE	193	225	263	32	70	16.5	36.3
Ratio	0.34						
	Total						
Employment	952	1 117	1 318	165	366	17.4	38.5
FTE	673	790	932	117	259	17.4	38.5
Source: Calculation of DIW Berlin.							

Source: Calculation of DIW Berlin.

Due to the increase in the share of severe impaired beneficiaries and the shift to institutional care the increase in workforce needed is higher in nursing homes than in home care services. To meet the demand the employment in nursing homes has to increase by 17.8 % (tough) and 39.4 % (friendly), in home care services by 16.5 % (tough) and 36.3 % (friendly).

Currently the shortage of qualified nurses and geriatric nurses is discussed. In 2011 208,000 qualified geriatric nurses and 136,000 qualified nurses were employed in home care services and nursing homes (Table 22). Until 2025 around 36,000 (tough) and 80,000 (friendly) geriatric nurses and 23,000 (tough) and 51,000 (friendly) qualified nurses have to be additionally employed to meet the demand. The required amount additional nursing assistants is significantly lower and does not exceed the current number of unemployed.

Table 22 Changes in the demand for formal long-term care workforce by occupations in Germany 2025/2011

	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
Ergo therapist	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..

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.

The estimation of the demand for formal care is based on the assumption that the current amount of formal care workforce is sufficient. But in Germany a shortage of qualified nurses and personal carers is reported (BA, 2013). The Federal Employment Agency offers an international placement service for the recruitment of foreign qualified workers from other EU countries as well as from third countries. In the case of qualified nurses and personal workers managed migration schemes for the recruitment of workers from Serbia and Bosnia and other countries exists. This has led to an increase in the number of foreign workers, but this temporary employment shows high turnover. Also the domestic recruitment strategies showed low success in the past due to unfavourable working conditions and low salary (Colombo et al., 2011).

The demand for formal care workers may be higher than estimated, because the potential of young informal care potential is expected to decline significantly. Dependent people with less than substantial impairments rely on informal care or private financed formal help. Currently, 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). It can be assumed that the demand for such kind of workers will increase. The challenge is that the share of irregular employment is estimated to be high.

5 Changes in labour force supply

5.1 Development of overall labour force

In the NEUJOBS project the NEMESIS model (**N**ew **E**conometric **M**odel of **E**valuation by **S**ectorial **I**nterdependency and **S**upply) 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. 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 is significant higher (1.7 million) than the numbers provided by the LFS. The difference can be traced back to the incomplete coverage of marginal employment in the LFS (Eurostat, 2013). The total labour force is expected to decline by 2.1 million in the tough scenario and are nearly constant in the friendly scenario (-153,000 persons). The expected changes in labour force are in-between the estimations for the labour force based on the LFS data under constant and increasing participation rates (Schulz, 2013).

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. One of the broad NEMESIS sectors is the grouped sector “non-market services which 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”. 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.

In 2010, the total employment amounted to 40.5 million, thereof 11.6 million in the non-market sector and 4.1 million in sector Q (Table 23). According to the NEMESIS model, in the tough scenario the total employment as well as in the non-market sector will decline. The employment in ‘residential care and social work’ is expected to decline

also, but to a lower degree. A loss of 47,000 jobs is estimated. However, the importance of 'residential care and social work' employment in total employment will increase.

Table 23 Employment by sectors in Germany– results of the NEMESIS model

	2010	2025		changes 2025/2010			
		tough	friendly	tough	friendly	tough	friendly
		in 1000				in %	
Employment							
total	40 513	37 054	40 674	-3 459	161	-8.5	0.4
high skilled	11 500	11 203	14 015	- 297	2 515	-2.6	21.9
low skilled	29 013	25 851	26 659	-3 162	-2 354	-10.9	-8.1
Unemployment	3 096	4 119	2 782	1 023	- 314	33.0	-10.1
Labour force *	43 609	41 173	43 456	-2 436	- 153	-5.6	-0.4
Population	81 802	75 250	80 082	-6 552	-1 720	-8.0	-2.1
Share labour force (%)	53.3	54.7	54.3				
Employment							
non market services	11 611	11 366	13 631	- 246	2 020	-2.1	17.4
share in total employment (%)	28.7	30.7	33.5				
high skilled	4 656	4 025	5 466	- 631	810	-13.5	17.4
low skilled	6 955	7 340	8 165	385	1 210	5.5	17.4
Employment in							
health care and social work (Q)	4 144	3 788	4 635	- 355	491	-8.6	11.8
share in non market services (%)	35.7	39.6	34.8				
Employment							
human health care (Q86)	2 427	2 118	2 558	- 309	132	-12.7	5.4
share in non market services (%)	20.9	23.0	20.6				
Employment in residential							
care and social work (Q87+88)	1 717	1 670	2 077	- 47	359	-2.7	20.9
share in non market services (%)	14.8	16.5	14.2				
*) Labour force definition: employment + unemployment.							
Source: Boitier, B., Lancesseur, N. and Zagamé, P. "Global scenarios for European socio-ecological transition", NEUJOBS Deliverable D9.2, 2013, for scenarios results.							

Employment in the friendly scenario shows a slightly positive trend in total economy (0.4 %) and a significant increase in 'non-market services' (17.4 %). The increase in employment in 'residential care and social work' is expected to be higher (21 %) than in total non-market sector. Around 359,000 new jobs are expected.

5.2 Discussion of labour supply results

The NEMESIS model provides estimations of the employment by industries and sectors taking into account the framework conditions and assumption of the two NEUJOBS scenarios. The results have to be interpreted in this context. National

estimations on the future supply of people with nursing and caring occupations show a marginal decline in health and nursing occupations until 2025 or a small increase (Schulz, 2012). Selected national estimations are shown in the appendix 2. The supply will not meet the demand, and the shortage of nursing and caring personal is expected to widen. The national estimations do not expect a positive development in caring and nursing occupation as in the friendly scenario assumed. In the friendly scenario a high dynamic of high qualified employment is estimated. In nursing homes and home care services less than 1 % of employees have a degree in nursing science, around 22 % are qualified geriatric nurses and 14 are qualified nurses both with a 3-year-vocational-qualification. To realize the expected increase in high qualified personal in the friendly scenario a shift to higher qualified staff is needed. The long-term care statistics showed a trend to higher qualified staff in the past, but this trend was stopped in the last years. National estimations expect that the current gap in qualified nursing staff will significantly widen.

But also under the optimistic framework conditions of the friendly scenario with an estimated increase in employment in residential care and social work by 20.9 % the gap at the care market is expected to widen. Under the assumption that the expected changes in employment in residential care and social work (in %) can be also applied for the long-term care personnel, the shortage of care workers will amount around 191,000 in the tough and 167,000 in the friendly scenario in 2025. Additional, we have to take the current imbalances into account which have an effect on the needed qualified personal.

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, the bulk of care giving will be still the tasks of family members. Thus, the long-term care workforce consists of formal and informal caregiver. Both dependent people and informal caregiver aged 50+ 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 39 % in the friendly scenario. Although in the friendly scenario an increase in the workforce supply in residential care and social work by some 21 % is estimated the gap on the nursing and care market will widen. In the tough scenario the employment in residential care and social work will decline.

The increasing need of care workers is a challenge for Germany in total and in particular for regions with a currently significant shortage of qualified nursing staff. 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 carers are

- Financial support for people who want to take the available 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 (directly)
- Flexible working times, homework, online working places (better reconciliation of care and employment)
- More user friendly support of training, counselling, coaching by professional care givers or advisory boards comprising different kind of professionals
- 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 (currently discussed image campaigns).

Ad b) The recruitment of foreign workforce has to be strengthen. The experience with labour migration in the past was that only a small part had at least a one year qualification in nursing care. Thus, the labour migration from other EU member states contributes only to a small extent towards closing the gap in qualified nurses (Afentakis and Maier, 2013). A study on the possibility of recruitment of qualified nursing and care personnel carried out on behalf of the Federal Ministry of Economy and Technology came to the same result. The potential for the recruitment of nursing personnel from other European countries is small. The authors suggested strengthening the recruitment of nursing staff from third countries like Vietnam, Philippine, Korea and china (Merda et al., 2012). Currently polite projects to recruit qualified nursing personal from third countries are carried out (BA, 2014). Agreements with countries (for example Philippine) concerning the migration of health and nursing professionals were signed. Foreign staff is expected to play an increasing role in nursing homes and home care services. But also in private households nursing and caring workers from abroad play a significant role. 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 can be to introduce a tax reduction scheme for households employing caretakers for family members.

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, 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 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.

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 yet introduced.

References

- Afentakis, A. and T. Maier (2010), Projektionen des Personalbedarfs und –angebots in Pflegeberufen bis 2025 (Projections of demand and supply of personnel in nursing occupations until 2025). *Wirtschaft und Statistik*, Heft 11: 990-1002.
- Afentakis, A. and T. Maier (2013), Sind Pflegekräfte aus dem Ausland ein Lösungsansatz, um den wachsenden Pflegebedarf decken zu können? Analysen zur Arbeitsmigration in Pflegeberufen im Jahr 2010 (Can nursing staff from abroad meet growing demand for care? Analysis of labour migration in nursing professions in 2010). *Bundesgesundheitsblatt*, 56:1072-1080.
- BA (2013); Der Arbeitsmarkt in Deutschland – Arbeitsmarkt Altenpflege. (Labour market in Germany – Labour market geriatric nurse) Arbeitsmarktberichterstattung- Oktober 2013 (Federal Employment Agency).
- BA (2014); Fachkräfte aus Ländern außerhalb Europas (Qualified staff from third countries) www.arbeitsagentur.de
- Bpa (2013), Analyse: Fachkräftemangel in der Pflege nimmt weiter drastisch zu (Analysis: Still significant increase of shortage of qualified nursing staff) www.bpa.de (Federal Association of Private Suppliers of Social Services)
- Boitier, B., N. Lancesseur and P. Zagamé (2013), Global scenarios for European socio-ecological transition, NEUJOBS working paper D 9.2.
- Bonsang, E. (2008), Does informal care from children to their elderly parents substitute for formal care in Europe? CREPP Working Papers 2008/01.
- Carretero, S. et al. (2012), Can technology-based services support long-term care challenges in home care? European commission Joint Research Centre (JRC) Scientific and Policy Reports. Luxembourg.
- Colombo, F., A. Llana-Nozal, J. Mercier and F. Tjadens (2011), Help Wanted? Providing and Paying for Long-Term Care. OECD Health Policy Studies. OECD Publishing.
- Döhner, H. (2007), EUROFAMCARE – Service for Supporting Family Carers of Elderly People in Europe: Characteristics, Coverage and Usage. National survey report for Germany. Hamburg.
- Drosdowski, T., M.I. Wolter, R. Helmrich, and T. Maier (2010), Entwicklung der Erwerbspersonen nach Berufen und Qualifikationen bis 2025: Modellrechnungen mit dem BIBB-DEMOS-Modell (Development of active population by occupations and qualifications until 2025: modeling with the BIBB-DEMOS-model). In: R. Helmrich and G. Zika (2010), 125-152, Bonn.
- EUROBAROMETER (2007), Health and long-term care in the European Union. Special Eurobarometer 283/wave 67.3. Brussels (EC DG Employment and Social Affairs).
- EUROFAMCARE (2006), Services for supporting family carers of older dependent people in Europe: Characteristics, coverage and usage. The trans-European survey report. Hamburg.

- European Commission DG ECFIN and Economic Policy Committee (EC EPC) (2012), The 2012 Ageing Report. Economic and budgetary projections for the 27 EU Member States (2010-2060). Brussels.
- Eurostat (2013), National Account Classification of Economy, Definition of country specific employment data. [Hppt://epp.eurostat.ec.europa.eu](http://epp.eurostat.ec.europa.eu)
- Fries, J.F. (1980), Aging, natural death, and the compression of morbidity. *New England Journal of Medicine*, 3: 130-135.
- Fries, J.F. (1989), The compression of morbidity. Near or far? *Milbank Memorial Fund Quarterly/Health and Society* 67: 208-232.
- Fujisawa, R. and F. Colombo (2009), The long-term care workforce: Overview and strategies to adapt supply to a growing demand. *OECD Health Working Papers*, No. 44, OECD Publishing.
- Gabriele, S., P. Tanda and F. Tediosi (2011), The impact of long-term care on caregivers' participation in the labour market. ENEPRI research report No. 98, Brussels. www.ancien-longtermcare.eu/node/27.
- Gruenberg, E.M. (1977), The failures of success. *Milbank Memorial Fund Quarterly/Health and Society* 55: 3-24.
- Hackmann, T. (2010), Arbeitsmarkt Pflege: Bestimmung der künftigen Altenpflegekräfte unter Berücksichtigung der Berufsverweildauer (Labour market nursing care: Calculation of future geriatric nurses taking into account the duration of stay in this occupation). *Sozialer Fortschritt*, No. 9: 235-244.
- Helmrich, R. and G. Zika (ed.) (2010), *Beruf und Qualifikation in der Zukunft. BIBB-IAB-Modellrechnungen zu den Entwicklungen in Berufsfeldern und Qualifikationen bis 2025*. Bonn 2010
- Helmrich, R., G. Zika, M. Kalinowski and M. Wolter (2012), Engpässe auf dem Arbeitsmarkt: Geändertes Bildungs- und Erwerbsverhalten mildert Fachkräftemangel. (Shortage on the labour market: Changed qualification and labour force participation behaviour mitigate shortage of qualified staff). *BIBB Report Nr. 18*.
- Huisman, C., J. de Beer, R. van der Erf, N. van der Gaag and D. Kupiszewska (2013), Demographic scenarios 2010 – 2030. *NEUJOBS working paper D10.1*
- Hummel, M., A. Thein, and G. Zika (2010), Der Arbeitskräftebedarf nach Wirtschaftszweigen, Berufen und Qualifikationen bis 2025 (Labour Demand by sectors, occupations and qualifications until 2025) . In: Helmrich R. and G. Zika (2010), 81-102, Bonn.
- Kalinowski, M. and H. Quinke (2010), Projektionen des Arbeitskräfteangebots bis 2025 nach Qualifikationsstufen und Berufsfeldern (Projections of labour supply until 2025 by qualification and occupational fields). In: Helmrich, K. and G. Zika (2010), 103-124, Bonn.
- Klein, T. and R. Unger (2002), *Aktive Lebenserwartung in Deutschland und in den USA (Active life expectancy in Germany and the USA)*. Kohortenbezogene

- Analysen auf Basis des Sozio-ökonomischen Panels und der Panel Study of Income Dynamics. Zeitschrift für Gerontologie und Geriatrie 35:528-539.
- Kniejska, P. (2011), Polnische Pflegekräfte in Deutschland: eine Möglichkeit zur Behebung des Pflegenotstandes? (Polish nurses in Germany: a possibility to close the gap in nursing care?) Schriftenreihe der GFPS No. 2.
- Lafortune, G., G. Balestat et al. (2007), Trends in severe disability among elderly people: Assessing the evidence in 12 OECD countries and the future implications. OECD Health Working Papers, No. 26, OECD, Paris.
- Lethbridge, J. (2011), Care Services for Older People in Europe – Challenges for Labour. www.psiu.org.
- Manton, K.G. (1982), Changing concepts of morbidity and mortality in the elderly population. Milbank Memorial Fund Quarterly/Health and Society 60: 183-244.
- Neuhaus, A., M. Isfort and F. Weidner (2009), Situation und Bedarfe von Familien mit mittel- und osteuropäischen Haushaltshilfen [Situation and needs of families with home-helpers from Eastern and Central European countries], Deutsches Institut für angewandte Pflegeforschung e.V., Köln (www.dip.de).
- Merda, M. et al. (2012), Chancen zur Gewinnung von Fachkräften in der Pflegewirtschaft. (Potential for recruitment of qualified nursing and care personnel) Studie im Auftrag des Bundesministeriums für Wirtschaft und Technologie. www.bmwi.de
- OECD (2013), A Good Life in Old Age? Monitoring and Improving Quality in Long-Term Care. OECD Health Policy Studies. OECD Publishing.
- Pickard, L. (2011), The supply of informal care in Europe. ENEPRI research report No. 94, Brussels. www.ancien-longtermcare.eu
- Riedel, M. and M. Kraus (2011), Informal care provision in Europe: Regulation and profile of providers. ENEPRI research report No. 96, Brussels. www.ancien-longtermcare.eu
- Robine, J.-M. et al. (1993) Calculation of health expectancies, harmonization, consensus achieved in future perspective. Paris: Libbey.
- Robine, J.-M. et al. (2003), Determining Health expectancies. Chichester: John Wiley & Sons Ltd.
- Robine, J.-M., Y. Saito and C. Jagger (2009), The relationship between longevity and healthy life expectancy. Quality in Ageing, 10 (2): 5-14.
- Schneekloth, U. and I. Leven (2003), Hilfe- und Pflegebedürftige in Privathaushalten in Deutschland 2002 (Persons in need of care in private households in Germany in 2002), Infratest Sozialforschung, München.
- Schneekloth, U., I. von Törne (2007), Entwicklungstrends in der stationären Versorgung – Ergebnisse der Infratest-Repräsentativstudie (Development trends in institutional care – results of the Infratest- representative survey). In: Schneekloth, U. and Wahl, H.W. (editors), Möglichkeiten und Grenzen selbständiger Lebensführung in stationären Einrichtungen (MUG IV) – Demenz,

- Angehörige und Freiwillige, Versorgungssituation sowie Beispiele für „good practice“, München, p. 53-168.
- Schulz, E. (2004), Use of health and nursing care by the elderly. ENEPRI research report No. 2, Brussels. www.enepri.eu/Agir.
- Schulz, E. (2010a), The long-term care system for the elderly in Germany. ENEPRI research report No. 78, Brussels. www.ancien-longtermcare.eu/node/27.
- Schulz, E. (2010b), Projection of care need and family resources in Germany. In: Doblhammer, G. and R. Scholz (eds) (2010), Ageing, Care Need and Quality of Life. The perspective of caregivers and people in . Wiesbaden: Springer: 61-81.
- Schulz, E. (2012), Pflegemarkt: Drohendem Arbeitskräftemangel kann entgegengewirkt werden. DIW Wochenbericht 51/52 (Long-term care market: Imminent shortage of care personnel can be counteracted)
- Schulz, E. (2013), Impact of ageing on curative health care workforce- country report Germany. Supplement C to NEUJOBS working paper D12.1. www.neujobs.com
- TNS Infratest Sozialforschung (2011), Abschlussbericht zur Studie „Wirkungen des Pflege-Weiterentwicklungsgesetzes“ im Auftrag des Bundesministeriums für Gesundheit (Impact of law on further long-term care development). www.bundesgesundheitsministerium.de
- Viitanen, T.K. (2005), Informal elderly care and female labour force participation across Europe. . ENEPRI research report No. 13. www.enepri.eu
- Vilaplana Prieto, A. (2011), Informal care, labour force participation and unmet needs for formal care in the EU27, Croatia and Turkey. ENEPRI research report No. 97. www.ancien-longtermcare.eu.
- Ziegler, U. and G. Doblhammer-Reiter (2007), Cohort changes in the incidence of care need in West Germany between 1986 and 2005. Rostock Center – Discussion Paper No. 12, Rostock.

Appendix 1

Survey on care giving at home in Germany in 2002

Information about the situation of informal care provision and the characteristics of informal care givers provides the survey on care giving at home carried out by Infratest in 2002 (Schneekloth and Leven 2003). The study showed that informal care giving activities are often shared between some members of the family. On average, beneficiaries of the long-term care insurance receive help by two informal care givers, people with care level 0 not eligible for LTC benefits by 1.7 persons. Only one third of people in need of care receive help by one individual person (36 %), but 29 % by two and 27 % by three or more family members. In view of the number of people in need of care at home (around 1.2 million without help of professional care givers and 245,000 people receiving benefits in kind and in cash) and additional considering the people in need of help with practical duties (3.3 million) the number of family members providing any kind of help or personal care can be estimated to amount to 5 to 7 million people. According the European Community Household Panel (ECHP), on average 5 % of the population provided help and care to elderly people in Germany in 2001 (Schulz 2004). That is more consistent with the lower estimation.

In most cases the spouse, daughters or daughters in law are responsible for personal care, but also the sons provide help mostly with financial tasks: 28 % receive help from their partner, 32 % from the daughter or daughter in law, and 10 % from their son (main care givers). As care giving occurs in higher ages, and the partner's ranges first as care givers, also the informal care givers are to a significant degree elderly persons. Around one third of informal carers are in retirement age, another quarter is aged between 55 and 65, and around one quarter between 40 and 55 (Table 24). This indicates that the SHARE data which focus on people aged 50+ cover a high share of informal carer.

Table 24 Characteristics of informal care givers at home in Germany 2002 (%)

	Care giving to people with care level			Care giving to people with care level	
	I-III	0		I-III	0
Gender			Family status		
male	27	30	married	69	78
female	73	70	widowed	12	8
			divorced	5	4
Age-groups			single	12	10
under 40	11	13	Activity status		
40-54	27	26	Full time employed	19	32
55-64	27	23	Part time employed	15	15
65-79	26	28	Marginally employed	6	3
80 and older	7	4	Not employed	60	50
NA	3	6			

Source: Schneekloth and Leven 2003.

Care giving is in the majority of cases a full time job and a heavy burden for informal carers. Reconciliation of care giving and work is often hard. Therefore, informal care givers aged 15 to 64 years are to a high degree not employed (people providing help for beneficiaries 60 %, people providing help for persons with care level 0 around 50 %), and only to a low degree full time employed (19 % respectively 32 %). The same pictures provides the question if care givers have changed their employment status at the beginning of care giving. Around half of informal carer were not employed as care giving occurs, some 10 % (care giving to beneficiaries) respectively 4 % (care giving to people in need of help) give up their job, 11 % respectively 5 % reduced the working time, but 26 % respectively 40 % continued to work in 2002 (Table 25).

Table 25 Impact of care giving on the employment status of informal carers 2002 (%)

Changes in employment status	Beneficiaries on LTCI funds		People in need of help (care level 0)	
	1991	2002	1991	2002
At the beginning of care giving ...				
not employed	52	51	45	48
employed and carer				
give up the job	14	10	5	4
reduced working time	12	11	5	5
continue to work	21	26	44	40
No answer	1	2	2	3

Source: Schneekloth and Leven 2003: Infratest-Survey 2002.

Appendix 2

National estimations of long-term care workforce

Estimation of labour force and employees by major occupational fields

The Federal Institute for Vocational Education and Training (BIBB) and the Institute for Employment Research (IAB) have developed models which allow for projections of the labour demand and labour supply broken down by major occupational fields and qualifications (Helmrich and Zika, 2010). In total the models differentiate 54 occupational fields which are based on the official German classification of occupations (KldB 92) and four qualification levels based on ISCED classification. Results of the projections are reported on the level of the aggregated to 12 major occupational fields. One major occupational field comprises occupations related to the health and nursing care and social activities and body care (major field 11).

The projection of the labour demand is based on a macro-economic projection and simulation model. The IAB/INFORGE model is disaggregated by 59 economic sectors; take into account the inter-industrial relations and the international integration. The core of the projection model is a macro-model and an input-output-model. This model was expanded by the occupational fields.

This model was used to estimate the labour demand by economic sectors and major occupational field until 2025 (Hummel et al., 2010). In 2005, the base year of the projection, the branch health and social work (NACE branch N) had some 4 million employees. It is estimated that the number of employees will increase until 2025 up to 5.1 million (Table 26). The average yearly growth rate amounts to 0.9 %. The share of the health and social work sector in total economy will increase from 10.4 % in 2005 to 12.8 % in 2025.

The estimation by occupational fields shows the same trend. The employees with a health, social or other personal service occupation (major field 11) increases from 4.3 million in 2005 (4.7 million in 2010) to 5.3 million in 2025. The proportion of this occupational field in total employees will rise from 11.2 % in 2005 to 13.5 % in 2025.

The labour supply was estimated using two different models. The Fraunhofer Institute for Applied Information Technology (FIT) estimates the development of the workforce based on the basic labour force by occupational fields and calculations of the number of people entering the labour market by occupational field and leaving the labour market by occupational fields (Kalinowski and Quinke, 2010). The core model is a transition model from the vocational training to the labour market (including transitions between different vocational training activities). They estimated that the labour supply will decrease from 43.3 million in 2005 to 39.3 million in 2025. In the major occupational field 11, health and social occupations, body care, a contrary trend is expected. Taking into account that not all people who had a vocational training in one of the mentioned occupations will stay and work in this occupation the labour

supply (with flexibility) will be nearly constant. In 2025 it is estimated to account for 4.8 million people that are only 45,000 people more than 2005.

The Federal Institute for Vocational Education and Training (BIBB) carried out calculations of labour supply using a model with the demographic development, changes in educational qualifications, changes in participation rates and changing vocational choice as modules (Drosdowski et al., 2010). This DEMOS model was expanded by the occupational fields (BIBB-DEMOS). Based on the demographic projection of the Federal Statistical Office the population by educational qualification is calculated. In a next step the labour participation rates differentiated by qualifications are estimated and the workforce is calculated. The choice of the vocational training is modelled in the next step. The result is the labour supply differentiated by the occupations learned. According to this BIBB-DEMOS model the labour force in the major occupation field 11 will decline from 4.7 million in 2005 to 4.6 million in 2025. But in view of the declining trend of the total labour force the proportion of health and social workers will increase by around one percentage-point.

IAB and BIBB carried out an update of their estimation on labour demand and supply in 2012. In the field of health and social care occupations still a shortage of workforce is expected, in particular for qualified nursing staff (Helmrich et al., 2012)

Table 26 Demand and supply of labour force in the major field of occupation 11 (health and social occupations) in Germany 2005 to 2025 (millions)

Year	2005	2010	2015	2020	2025
Demand for employees/labour force (IAB/INFORGE model)					
Total	38.851	39.788	40.193	40.230	39.694
Major occupational field 11					
Health and social occupations	4.275	4.710	4.969	5.163	5.258
Supply side: Labour force (BIBB-FIT model)					
Total	43.277	43.152	42.502	41.180	39.308
Major occupational field 11					
Health and social occupations	4.736	4.897	4.964	4.904	4.781
Supply side: Labour force (BIBB-DEMOS model)					
Total	43.277	43.658	43.301	42.254	40.435
Major occupational field 11					
Health and social occupations	4.735	4.905	4.936	4.823	4.616

Source: Helmrich and Zika (2010); Estimation which takes the changes between learned occupation and practiced occupation into account (with flexibility).

Projection of demand and supply of care personnel

Afentakis and Maier (2010) carried out an estimation of the labour force in the occupational field 48 (health care occupations without approbation) and of the care and nursing care personnel (nurses, nursing assistant and geriatric nurses). They built on

the estimations of BIBB, IAB and FIT mentioned above, but only with regard to the supply side.

The demand on care personnel was calculated based on the ratio of full-time equivalent (FTE) to persons cared for in three occupations, namely approved nurses, nursing assistant and geriatric nurses, employed in hospitals, nursing homes and home care services. In 2005 in this three occupation in total 738,000 persons (FTE) were employed (Table 27). The number of these employees will rise up to 939,000 in the so called status quo scenario with constant prevalence rates of hospitalisation and care need respectively 882,000 in the scenario with declining prevalence rates in 2025.

Table 27

Personnel in care occupations 2005 and changes in demand until 2025

Occupation	Total	Ambulatory care	Stationary care	Long-term care total	Hospitals	Hospitals and care services
Full-time equivalents in 1000						
2005						
Nurses 853	558	52	51	103	378	481
Nursing assistant 854	171	6	14	20	35	55
Geriatric nurse, geriatric nursing assistant 864	239	43	142	185	16	201
Care occupations	968	101	208	308	429	738
2025 status -quo-scenario						
Nurses 853						
Nursing assistant 854						
Geriatric nurse, geriatric nursing assistant 864						
Care occupations				457	483	939
2025 declining prevalence rates						
Nurses 853						
Nursing assistant 854						
Geriatric nurse, geriatric nursing assistant 864						
Care occupations				418	464	882

Source: Afentakis/Maier (2010); Health personnel account (HLA) 2005.

The supply side is calculated using the results of the BIBB-DEMOS model for the development of labour force in the occupational field 48, namely the health occupations without medical licence (approbation). This occupational field includes nurses, nursing assistant and geriatric nurses. In total 2.4 million employees belongs to the occupational field 48. It is estimated that the employees in this occupational field will increase until 2025 by 0.5 million, that is to say 23.2 % (demand side). The labour force in this occupational field (with flexibility) amounted to some 2.68 million people in 2005 (supply side). This calculation is based on people who have learned one of the occupations of this field taken into account the changes into this occupational field and out of this occupational field from people with other learned qualifications. The BIBB-DEMOS model estimates a slightly increase in the labour force until 2015 and afterwards a decline. In 2025 the labour force in the occupational field 48 will be nearly the same as in 2005.

The estimated change in the occupational field 48 is transferred to the nursing occupation. In 2005 some 820,000 people worked as nurses, geriatric nurses or nurse assistant or are unemployed and had worked in former time in one of this occupations (labour force). Some 750,000 people were employed in these occupations in 2005. Thus, in 2005 the supply was in general higher than the demand due to the fact, that also not qualified or persons with other learned qualifications worked in nursing care. According the BIBB-DEMOS estimation results for the occupational field 48 the labour force in nursing care is calculated to decline from some 820,000 in 2005 to 827,000 in 2025. The demand will increase from 750,000 to around 940,000 (status-quo) respectively to 880,000 (declining prevalence rates) in 2025. Thus, the supply will not meet the demand and a deficit of 112,000 (status quo scenario) respectively 55,000 (declining prevalence rates) appears.

Projection of geriatric nurses

Hackmann (2010) carried out an estimation of the occupation geriatric nurse (864 KldB92 –field 864 of the German classification of occupations 1992). According the micro-census 445,000 geriatric nurses was employed in 2007, transferred into FTE the number was 316,000. Geriatric nurses are mainly employed in the social care sector which includes care services, but also services which are engaged in other areas of the economy. Hackmann calculated the further demand on geriatric nurses using the development of people in need of care and constant ratios of employees to people cared for in ambulatory and stationary care. He estimated a continuing increase in geriatric nurses up to 850,000 FTE in 2050 (500,000 in 2025). Under the assumption of constant ratios of ambulatory and stationary care, the number of geriatric nurses in nursing homes will increase from 220,000 to 640,000 and in ambulatory care from some 100,000 to 210,000.

Hackmann confront this demographic determined increase of the demand on care with a calculation of the number of realized employment in care. Latter is based on a simultaneously estimation of labour demand and labour supply using a time series model (1975 to 2007) including the per capita care expenditure as a dummy for the intensity of care needed, the changes in female employment, the changes in real wages, and the changes in the unemployment rate of women. According this time series model the realized number of FTE will increase only by some 100,000 (from 316,000 up to 420,000 in 2050). To meet the expected increase in demand additional measures are necessary.

Hackmann discussed the possibility to increase the length of stay in geriatric care occupation. If the length of stay in this occupation, which is calculated to be on average around 8 years, will be expanded up to the level of approved nurses in hospitals, which are working on average around 14 years in this occupation, than an increase in realized employment of geriatric nurses up to 680,000 FTE is calculated. But also under this assumption the supply cannot meet the demand.

Calculation of the development of personnel in long-term care

The above mentioned studies estimate the development of care personnel, but not in the demarcation of personnel employed in long-term care services. Whereas the demand side is mainly calculated under the assumption of constant ratios of people in need of care to care personnel, the supply side is estimated using different models.

The pure demographic effect on the labour demand shows Table 28. The supply is determined by the demographic development, too. Under the assumption that the share of people working in long-term care in total labour force is constant over time the labour supply in long-term care will be nearly constant until 2025. But the significant decline in workforce in the following decades will lead to a markedly decline in labour supply in long-term care. The gap between demand and supply will rapidly widen. According to the model of Hackmann which take the changes in demand and supply factors into account the supply of geriatric nurses will increase by some 33 %. Transferring this trend to the long-term care market, the supply will increase from 630,000 FTE to 890,000 FTE while the demand will increase up to 1.5 million in 2050. The gap is smaller than in the case of the pure demographic effect, but is still significant.

Table 28 Projections on the demand and supply of care workforce

	Dimension	Workforce demand			Workforce supply		
		2005	2025	2050	2005	2025	2050
BIBB-IAB (2010)							
All occupations	in million persons	38,9	39,7		43,3	40,4	
Health und social care occupations incl. Body care	in million persons	4,3	5,3		4,7	4,6	
Afentakis/Maier (2010)							
Health care occupations without medical licence	in million persons	2,4	2,9		2,7	2,7	
Nurses, nursing assistant, geriatric nurses, geriatric nurse assistant	in 1000 FTE	308	457		342	346	
Hackmann (2010)							
Geriatric nurse	in 1000 FTE	316	480	850	316		420
DIW Berlin (2011)							
long-term care personnel (pure demographic effect)	in 1000 FTE	630	965	1506	630	629	509
long-term care personnel (decline in prevalence and taken into account sectoral changes)	in 1000 FTE			854			839
Source: Helmrich und Zika (2010), BIBB-IAB Modellrechnungen; Afentakis und Maier (2010);Hackmann (2010); calculation of DIW Berlin (Schulz 2012).							