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Personal Social Services Research Unit

Projections of Demand and Expenditure on Adult Social Care 2015 to 2040

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Economics of Health and Social Care Systems Policy Research Unit

Personal Social Services Research Unit

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The analysis set out in this report is the responsibility of the authors and does not necessarily represent the views of the Department of Health and Social Care.

Abstract

This paper presents updated projections prepared for the Department of Health and Social Care of demand for long-term care for older people and younger adults in England to 2040 and beyond and associated future expenditure. The projections were produced using updated versions of the Personal Social Services Research Unit's (PSSRU) aggregate long-term care projections models and the CARESIM microsimulation model developed by Ruth Hancock at the University of East Anglia. The projections cover publicly funded social care for older people and younger adults and for older people only privately funded social care.

The key findings of the research are:

- Public expenditure on social services for older people is projected to rise under the current funding system from around £7.2 billion (0.45% of GDP) in 2015 to £18.7 billion (0.75% of GDP) in 2040 at constant 2015 prices and under a set of base case assumptions about trends in the drivers of long-term care demand and in the unit costs of care services;
- Public expenditure on social services for younger adults is projected to rise under the current funding system from around £8.9 billion (0.55% of GDP) in 2015 to £21.2 billion (0.85% of GDP) in 2040 at constant 2015 prices and under a set of base case assumptions about trends in the drivers of long-term care demand and in the unit costs of care services;
- These base case projections are sensitive to assumptions about future trends in mortality and disability rates and in the real unit costs of care.

These findings need to be treated with some caution. They are based on a set of assumptions about future socio-economic and demographic trends. They relate to current patterns of care and the current funding system and do not take account of any of the funding reforms which have been proposed in recent years and on which the government plans to publish a Green Paper in summer 2018. They do not allow for the potential impact of rising expectations or other behavioural changes.

Projections of Demand and Expenditure on Adult Social Care 2015 to 2040

Introduction

This paper presents updated projections of demand for social care for older people (aged 65 and over) and younger adults (aged 18 to 64) in England to 2040 and associated future expenditure. They cover publicly funded social care for both age groups and privately funded social care for older people. They cover both community-based services and residential care.

The projections were produced using updated versions of the Personal Social Services Research Unit's (PSSRU) aggregate long-term care projections models and of the CARESIM microsimulation model developed by Ruth Hancock at the University of East Anglia. The versions of the models used here have a base year of 2015 but incorporate the latest Office for National Statistics (ONS 2017) official population projections, data on number of service users and on local authority expenditure on social care (NHS Digital 2017) and Office for Budget Responsibility (OBR 2018) economic assumptions that were available in April 2018.

Description of the PSSRU long-term care projections models

The PSSRU long-term care projections models aim to make projections of four key variables: the future numbers of disabled older people and younger adults, the likely level of demand for long-term care services and disability benefits, the costs associated with meeting this demand and the social care workforce required. The models – one for older people and one for younger adult groups - are cell-based (macro-simulation models) and take the form of Excel spread-sheets.

The models do not make forecasts about the future. They make projections on the basis of specific assumptions about trends in such variables as future mortality rates and disability rates. The approach involves simulating the impact on demand for care and support of specified changes in demand drivers or specified changes in policy. It does not involve forecasting future policies or future patterns of care. This means that the projections reported in this paper should be treated as indications of likely future expenditures on care and support if policies are unchanged and drivers of demand follow the specified trends. They are not forecasts: in practice not only may drivers of demand not follow the assumptions but policies may change. Since the purpose of the projections is to inform policy development it would not be helpful to take account of views about possible policy changes.

The models are updated regularly as new data become available, in particular population projections, data on numbers of people in care homes and numbers of users of home care services, data on social care expenditure and estimates of the unit costs of care. The version of the models that have been used to make the projections in this paper utilises official 2016-based population (ONS 2017) and 2008-based marital status projections (ONS 2010), data from the Health Survey for England for 2011 to 2014, the 2005 PSSRU survey of older care home admissions (Darton et al. 2006), March 2017 data on residential care and home-based care, expenditure data for 2016/17 and unit costs adjusted to 2015/16 prices (NHS Digital 2017). Data and methods are discussed further in the Annex.

Description of the CARESIM long-term care model

CARESIM is a microsimulation model which uses a sample of people aged 65+ living in England from the UK Family Resources Survey (FRS) to simulate how much sample members would need to contribute to the costs of their care, should they need care, under the current or variant funding systems. A description of the CARESIM model is presented in Adams et al (2016).

The CARESIM model produces projected trends in:

- The proportion of older people by age group, gender and household composition who own their home,
- The proportion of older service users, by type of care package, who are required to fund their own care privately under the provisions of the current means test,
- The proportion of the gross weekly costs of publicly funded care, by type of care package, which older service users are required to meet in user charges.

To produce these last two sets of proportions, projections of the number and characteristics (age, gender, marital status, home-ownership and educational level) of older service users from the PSSRU model are used as weights so that the FRS sample of people aged 65+ is rendered representative of the projected population of older service users.

Base case assumptions

The models produce projections on the basis of specific assumptions about future trends in the key drivers of demand for long-term care. The main assumptions used in the base case are summarised in box 1 below. The base case projections take account of expected changes in factors exogenous to long-term care policy, such as demographic trends. They hold constant factors endogenous to long-term care policy, such as patterns of care and the

funding system. The base case is used as a point of comparison when the assumptions of the model are subsequently varied in alternative scenarios.

Box 1: Key assumptions of the base case of the PSSRU model

- The number of people by age and gender changes in line with the Office for National Statistics (ONS) 2016-based principal population projections.
- Marital status rates change in line with GAD 2008-based marital status and cohabitation projections to 2035 except that they remain constant for people with learning disability.
- There is a constant ratio of single people living alone to single people living with their children or with others and of married people living with partner only to married people living with partner and others.
- Prevalence rates of disability in old age by age group (65-69, 70-74, 75-79, 80-84, 85+) and gender remain unchanged, as reported in the Health Survey for England 2011 to 2014.
- Prevalence rates of learning disability by age and gender and of physical disability at ages 18 to 30 change in line with projections to 2030 by Emerson and Hatton (2012) ; and prevalence rates of physical disability at ages 31 to 64 and of mental health needs remain constant by age and gender.
- Home-ownership rates for older people, as reported in the 2010/11 Family Resources
- Survey (FRS), change in line with projections produced by the CARESIM model.
- The proportions of people receiving unpaid care, formal community care services, residential care services and disability benefits remain constant for each sub-group by age, disability and other needs-related characteristics.
- The proportion of older care recipients whose care is privately funded varies in line with projections from the CARESIM model.
- The proportion of the costs of publicly funded care met by older service users through user charges also changes in line with projections from the CARESIM model.
- Health and social care unit costs rise in real terms in line with Office for Budget Responsibility (OBR 2018) assumptions for future trends in productivity, with an uplift for the years to 2020 to take account of the planned rises in the national living wage (except that non-labour non-capital costs remain constant in real terms).
- Real Gross Domestic Product rises in line with Office for Budgetary Responsibility projections (OBR 2018).
- The supply of formal care will adjust to match demand and demand will be no more constrained by supply in the future than in the base year.

There is ample scope to debate these base case assumptions. It could be argued for example that mortality rates in old age will fall more rapidly than official projections, disability rates may rise (or fall), the supply of unpaid care by adult children may not rise in line with needs, the supply of residential care may not rise in line with severe disability and/or average earnings in the care sector may rise by more than 2% per year in real terms from 2030. We have conducted a wide range of sensitivity analyses on these issues in this and previous studies – see for example Wittenberg et al. (2006, 2011). The Department of

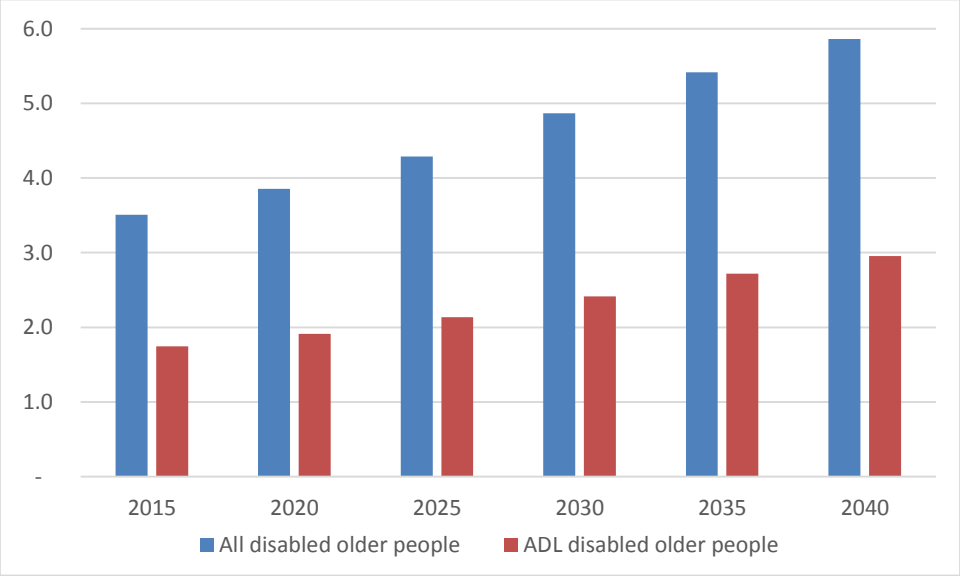
Health and Social Care requested sensitivity analyses specifically on variant population projections, trends in disability and trends in the real unit costs of care as reported below.

Projections for older people under base case assumptions

The ONS 2016-based principal population projections for England project that the overall older population of England aged 65 and over will rise from 9.7 million in 2015 to 14.9 in 2040 (rise of 54%) and to 17.4 million in 2070 (rise of 79%). The population aged 85 and over is projected to rise much more rapidly, from 1.3 million in 2015 to 2.7 million in 2040 (rise of 109%) and to 4.6 million in 2070 (rise of 256%).

Under the base case assumptions, the numbers of disabled older people, defined as those unable to perform at least one instrumental activity of daily living (IADL) or having difficulty with performing or inability to perform without help at least one activity of daily living (ADL), would rise by 67% between 2015 and 2040 and by 116% between 2015 and 2070, from 3.5 million to 5.9 million in 2040 and 7.6 million in 2070. The number of older people with more severe disability, that is, unable to perform without help (or at all) one or more ADL tasks, would increase by 69% between 2015 and 2040 and 124% between 2015 and 2070, from 1.7 million in 2015 to 3.0 million in 2040 and 3.9 million in 2070 (Figure 1).

Figure 1: Projected number of disabled older people (millions) in England 2015-2040



The numbers of disabled older people in households receiving unpaid care are projected to increase by 116%, from 2.1 million in 2015 to 3.5 million in 2040 and 4.5 million in 2070. The numbers of disabled older people receiving care from a spouse or partner are projected to

increase faster than the numbers receiving care from an adult child, under base case assumptions. Yet care by children will still need to increase by over 60% over the next 25 years and 107% over the next 55 years, if the proportion of disabled older people (by age, gender and marital status) receiving care from their children is to remain the same as it is today. Whether the supply of care by children will actually rise in line with need is very uncertain (Pickard et al. 2007, 2012).

The number of older users of local authority funded home care services or direct payments is projected to rise from 249,000 in 2015 to 466,000 in 2040 (an increase of 87%) and 640,000 in 2070 (an increase of 157%), to keep pace with demographic pressures (Table 1). The number of users of privately funded home care is projected to rise less rapidly, by 65% between 2015 and 2040 and by 130% between 2015 and 2070. The reason that the proportion of home care users who are publicly funded is projected to rise is that under our base case assumptions the cost of home care rises faster than the incomes of older people.

Table 1: Projected number of older service users (thousands) in England 2015-2040

	2015	2020	2025	2030	2035	2040	Change %
Community care							
Direct payments	43	48	54	62	70	76	77%
Publicly funded care	206	214	249	299	355	390	89%
Privately funded care	101	126	135	144	152	167	65%
Residential care							
Publicly funded residents	157	167	187	202	238	262	67%
Privately funded Residents	150	163	182	221	255	280	87%
Total	657	718	807	928	1070	1175	87%

The number of older people in local authority funded residential care will need to rise by 67%, from 157,000 in 2015 to 262,000 in 2040 to keep pace with demographic changes. The number of privately funded residents is projected to rise by 87% over this period (Table 2). The main reason for this difference is the projected rise in the proportion of older people who own their own home and so are generally not eligible for local authority support.

Public expenditure on social services for older people, net of user charges, is projected to rise by 159% under the current funding system from around £7.2 billion (0.4% of GDP) in 2015 to £18.7 billion (0.7% of GDP) in 2040 at constant 2015 prices (Table 3). Public

expenditure on community-based care is projected to rise more rapidly than public expenditure on residential care (180% as against 142%) over the period 2015 to 2040 (Table 4).

Private expenditure is projected to rise from £6.3 billion in 2015 to £16.5 billion in 2040, an increase of 163%. Total expenditure on social services for older people is projected to rise by 166%, from £15.7 billion (0.8% of GDP) in 2015 to £41.7 billion (1.4% of GDP) in 2040 at constant 2015 prices. It should be noted that the figures for private expenditure are estimates drawn from various sources on the numbers of privately funded care home residents, the numbers of privately funded home care users and the weekly costs of privately funded care. This means that the projections for private expenditure should be treated with caution.

Projections for younger adults under base case assumptions

According to ONS 2016-based principal population projections for England, the number of people aged 18 to 64 will rise by 3.0% between 2015 and 2040, from 33.4 million in 2015 to 34.6 million in 2040. The numbers of social care services users with learning disability aged 18 to 64 or physical disability aged 18 to 30 are projected to change in line with the trends reported by Emerson et al (2012). The numbers of service recipients with physical disabilities aged 31 to 64 and the numbers with mental health difficulties aged 18 to 64 are projected to change in line with changes in the overall population.

Table 2: Projected expenditure on social care for older people, 2015-2040, £billion at 2015/6 prices

	2015	2020	2025	2030	2035	2040	Change %
Social services net expenditure	7.2	8.5	10.2	12.2	15.6	18.7	159%
User charges	2.2	2.8	3.4	4.1	5.3	6.3	192%
Private expenditure	6.3	7.3	8.6	11.0	13.7	16.5	163%
Total	15.7	18.8	22.3	27.5	34.7	41.7	166%
Total as % GDP	0.8%	0.9%	1.0%	1.1%	1.3%	1.4%	63%

Table 3: Projected local authority net expenditure on social care for older people, 2015-2040, £billion at 2015/6 prices

	2015	2020	2025	2030	2035	2040	Change %
Community care	2.2	2.5	3.1	3.9	5.1	6.2	180%
Residential care	2.8	3.4	3.9	4.5	5.6	6.7	142%
Other expenditure	2.2	2.6	3.2	3.8	4.9	5.8	161%
Total	7.2	8.5	10.2	12.2	15.6	18.7	159%
Total as % GDP	0.4%	0.5%	0.5%	0.6%	0.7%	0.7%	59%

The numbers of learning disabled users of local authority home care services or direct payments are projected to rise by 72.5% between 2015 and 2040 and 115.3% between 2015 and 2070, from 94,000 in 2015 to 162,000 in 2040 and 203,000 in 2070 (Table 4). This is in line with trends projected by Emerson et al (2012). The numbers of physically disabled users of local authority home care services or direct payment would need to rise by 29.4% between 2015 and 2040 and 35.0% between 2015 and 2070, from 68,000 in 2015 to 88,000 in 2040 and 92,000 in 2070. The numbers of users of home care services and direct payment with mental health difficulties would need to rise by 4.7% between 2015 and 2040 and 10.7% between 2015 and 2070, from 38,000 in 2015 to 39,000 in 2040 and 42,000 in 2070.

The number of learning disabled younger adults in local authority funded residential care is projected to rise by 72.5% between 2015 and 2040 and 115.3% between 2015 and 2070, from 50,000 in 2015 to 86,000 in 2040 and 86,000 (Table 4). This is line with trends projected by Emerson et al (2012). The number of physically disabled younger adults in local authority funded residential care would need to rise by 26% between 2015 and 2040 and 34% between 2015 and 2070, from 7,400 in 2015 to 9,300 in 2040 and 9,900 in 2070. The number of younger adults with mental health needs in supported residential and nursing care is projected to decrease by 6.9% between 2015 and 2040 and decrease by 0.5% between 2015 and 2070, from 8,900 in 2015 to 8,200 in 2040 and 8,800 in 2070. The reason for this decrease is that the number of care home residents with mental health needs fell substantially between March 2016 and March 2017.

Public expenditure on social care services for younger adults, net of user charges, is projected to rise by 133%, from around £8.9 billion (0.55% of GDP) in 2015 to £21.2 billion (0.85% of GDP) in 2040 at constant 2015 prices (Table 3). Public expenditure on community-based care is projected to rise by 133%, from £3.6 in 2015 to £8.3 million in 2040. Public expenditure on residential care is projected to rise by 134%, from £2.5 in 2015 to £5.9 million in 2040.

Table 4: Projected number of younger adults receiving social care services (thousands) by user groups in England 2015-2040

	2015	2020	2025	2030	2035	2040	Change %
Learning Disability support							
Publicly funded home care	57.8	65.8	73.6	82.6	91.4	99.7	72.5%
Direct payment	36.5	41.5	46.5	52.1	57.7	62.9	72.5%
Residential care	49.8	56.6	63.4	71.1	78.7	85.8	72.5%
Physical support (including sensory support)							
Publicly funded home care	31.3	38.9	41.3	41.3	41.1	41.3	32.1%
Direct payment	36.5	42.0	45.3	45.6	46.1	46.4	27.1%
Residential care	7.4	8.9	9.4	9.4	9.3	9.3	26.0%
Mental health support							
Publicly funded home care	28.7	31.2	31.8	31.6	31.1	31.2	8.7%
Direct payment	9.0	8.3	8.4	8.4	8.2	8.3	-8.3%
Residential care	8.9	8.2	8.5	8.4	8.2	8.2	-6.9%

Table 5: Projected local authority net expenditure on social care for younger adults, 2015-2040, £billion at 2015/6 prices

	2015	2020	2025	2030	2035	2040	Change %
Community care	3.6	4.3	5.1	6.0	7.2	8.5	137.6%
Residential care	2.5	3.1	3.6	4.3	5.1	6.0	138.8%
Other expenditure	2.8	3.4	4.0	4.8	5.7	6.7	138.7%
Total	8.9	10.9	12.7	15.1	18.0	21.2	138.3%
Total as % GDP	0.55%	0.63%	0.68%	0.73%	0.78%	0.83%	50.6%

Sensitivity of projections for older people to variant population projections

We investigated the sensitivity of our projections of social care for older people to assumptions about trends in fertility, migration and mortality through use of two ONS variant population projections: the old age variant and the young age variant.

The number of ADL disabled older people is projected to rise from 1.75 million in 2015 to 3.05 million in 2040 under the old age variant or 2.80 million under the young age variant compared with 2.95 million under the base case (principal population projection) (Figure 2).

The projected number of publicly funded community care users in 2040 would be around 3.8% higher under the old age variant and 6.0% lower under the young age variant than under the base case (Table 6). The equivalent figures for publicly funded residential care are 4.6% and 7.1%, respectively. Net public expenditure on social care for older people is projected to rise between 2015 and 2040 by 168.8% under old age variant and by 142.5% under the young age variant as against 158.5% under the base case (Table 7).

Figure 2: Projected number of ADL disabled older people in England 2015-2040 under different population projections (in thousand persons)

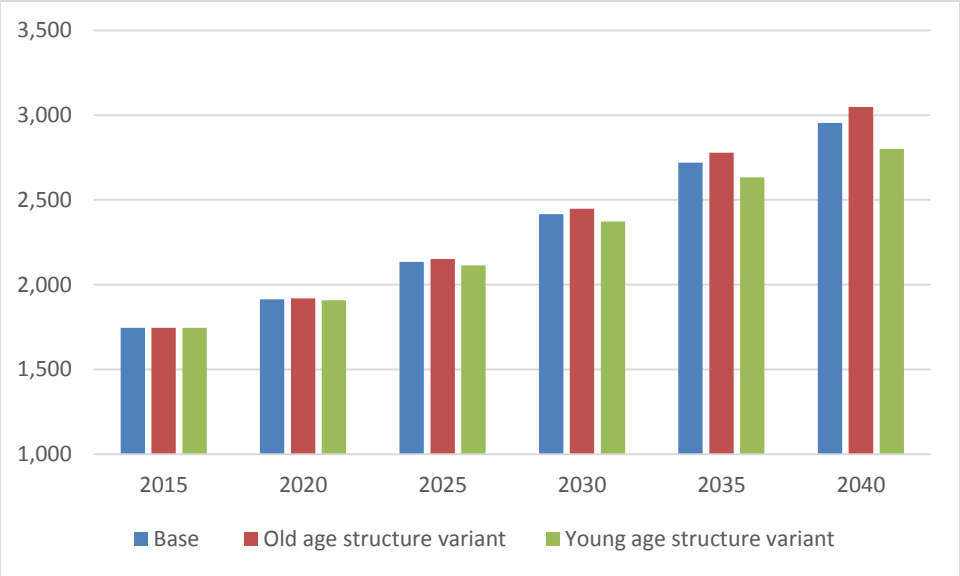


Table 6: Projected numbers of older people using publicly funded social care, 2015-2040, England, under different assumptions on future population change (in thousand persons)

	2015	2020	2025	2030	2035	2040	Change %
Publicly funded community care							
Old age	206	215	252	304	364	405	97%
Young age	206	213	246	293	342	367	78%
Base	206	214	249	299	355	390	90%
Publicly funded care home							
Old age	157	168	189	206	246	274	75%
Young age	157	166	184	196	228	243	55%
Base	157	167	187	202	238	262	67%

Sensitivity to assumptions about trends in functional disability in old age

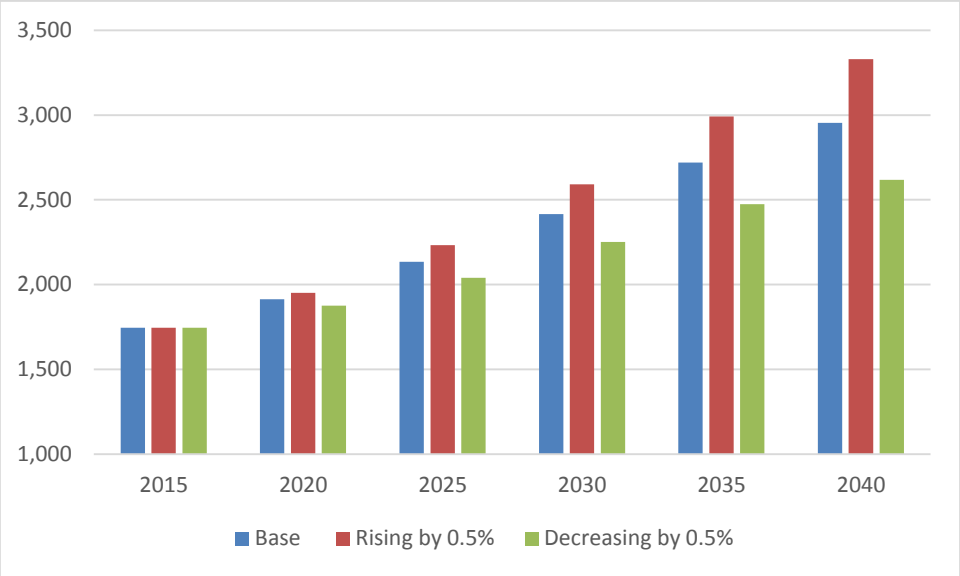
There are different views about whether age-specific disability rates can be expected to rise, fall or remain broadly constant in the future (Bone *et al.* 1995, Dunnell 1995). Constant age specific disability rates may be regarded as a neutral assumption and this is our base case. Yet, if age-specific disability rates remain constant while life expectancy rises, the number of years with disability will rise as well as the number of years without disability. The numbers of disabled older people in the future will depend on the disabling diseases they suffer from and whether optimal treatments to alleviate or postpone the disablement are both available and widely diffused throughout the population in need.

Table 7: Projected net public expenditure on social care for older people, 2015-2040, England, under different assumptions on future population change, in £bn at constant 2015 prices

	2015	2020	2025	2030	2035	2040	Change %
Old age	7.2	8.6	10.3	12.5	16.0	19.5	169%
Young age	7.2	8.5	10.1	12.0	15.0	17.6	143%
Base	7.2	8.5	10.2	12.2	15.6	18.7	159%

We investigated the impact of two alternative illustrative assumptions about trends in disability rates in old age: age-specific rates rising by 0.5% (not percentage point) per year and age-specific rates falling by 0.5% per year. The number of ADL disabled older people is projected to rise from 1.75 million in 2015 to 3.33 million in 2040 under the rising rates scenario or 2.62 million under the falling rates scenario compared with 2.95 million under the base case (Figure 3).

Figure 3: Projected number of ADL disabled older people in England 2015-2040 under different assumptions on prevalence of disability (in thousand persons)



To keep pace with the rise in numbers of disabled older people the numbers of users of publicly funded home care would need to rise by 111.4% between 2015 and 2040 under the rising rates scenario or by 70.3% under the falling rates scenario compared with 89.6% under the base case. For care home services, the increases necessary to meet the rising numbers of disabled older people is 87.9% under the rising rates scenario, 48.2% under the falling rates scenario in comparison to 66.9% under the base case (Table 8).

As set out above, under the base case net social services expenditure on older people is projected to rise by 158.5% between 2015 and 2040, from 0.45% to 0.73% of GDP to keep pace with demographic trends and real unit costs pressures. Under the rising rates scenario, it is projected to rise by 189.1%, from 0.45% to 0.81% of GDP over the twenty-five year period. Even under the falling rates scenario it is projected to rise by 131.3%, from 0.45% of GDP in 2015 to 0.65% of GDP in 2040 (Table 9).

Table 8: Projected numbers of older people using publicly funded social care, 2015-2040, England, under different assumptions on trends in prevalence of disability (in thousand persons)

	2015	2020	2025	2030	2035	2040	Change %
Publicly funded community care							
Annual rise of 0.5%	206	218	260	319	387	434	111%
Annual decrease of 0.5%	206	210	239	281	326	350	70%
Base	206	214	249	299	355	390	90%
Publicly funded care home							
Annual rise of 0.5%	157	170	195	216	262	295	88%
Annual decrease of 0.5%	157	164	179	188	217	232	48%
Base	157	167	187	202	238	262	67%

Table 9: Projected public expenditure on social care for older people, 2015-2040, England, under different assumptions on future prevalence of disability, in £bn at constant 2015 prices

	2015	2020	2025	2030	2035	2040	Change %
PSS net expenditure							
Annual rise of 0.5%	7.2	8.7	10.6	13.1	17.1	20.9	189%
Annual decrease of 0.5%	7.2	8.4	9.8	11.5	14.3	16.7	131%
Base	7.2	8.5	10.2	12.2	15.6	18.7	159%
% of GDP							
Annual rise of 0.5%	0.45%	0.50%	0.57%	0.63%	0.74%	0.81%	81%
Annual decrease of 0.5%	0.45%	0.48%	0.52%	0.56%	0.62%	0.65%	45%
Base	0.45%	0.49%	0.55%	0.59%	0.68%	0.73%	62%

Sensitivity to assumptions about trends in real unit costs of care

Since social care is highly labour intensive, the unit costs of care, such as the cost of an hour's home care, are likely to rise in line with earnings in the sector. There is scope for debate about whether earnings in the care sector will rise in line with average earnings in the economy. In view of the projected increase in demand for social care, wages in the sector may need to rise faster than average earnings to recruit and retain sufficient carers to enable supply to meet demand.

We investigated a scenario in which the unit costs of care rise by 0.5% point faster than under the base case. In this case net social services expenditure on older people is projected to rise by 188.5% between 2015 and 2040, from 0.45% to 0.81% of GDP and net social services expenditure on younger adults is projected to rise by 167.4% between 2015 and 2040, from 0.55% to 0.93% of GDP (Table 10).

Table 10: Projected public expenditure on social care for older people and younger adults, 2015-2040, England, base case and higher unit costs scenario, in £bn at constant 2015 prices

	2015	2020	2025	2030	2035	2040	Change %
Higher unit costs							
PSS net expenditure							
Older people	7.2	8.7	10.6	13.0	17.0	20.9	189%
Younger adults	8.9	11.1	13.3	16.2	19.7	23.8	167%
Total	16.1	19.8	23.9	29.2	36.7	44.7	178%
% of GDP							
Older people	0.45%	0.50%	0.57%	0.63%	0.74%	0.81%	81%
Younger adults	0.55%	0.64%	0.71%	0.78%	0.86%	0.93%	69%
Total	1.00%	1.14%	1.28%	1.41%	1.60%	1.74%	74%
Base case							
PSS net expenditure							
Older people	7.2	8.5	10.2	12.2	15.6	18.7	159%
Younger adults	8.9	10.9	12.7	15.1	18.0	21.2	138%
Total	16.1	19.4	22.9	27.3	33.6	39.9	148%
% of GDP							
Older people	0.45%	0.49%	0.55%	0.59%	0.68%	0.73%	62%
Younger adults	0.55%	0.63%	0.68%	0.73%	0.78%	0.83%	51%
Total	1.00%	1.12%	1.23%	1.32%	1.46%	1.56%	56%

Conclusions

The models produce projections of future public expenditure on social care for older people and younger adults based on a specified set of base case assumptions. This set of assumptions seems plausible but is clearly not the only possible set. This means that the projections should not be regarded as forecasts of the future.

Public expenditure on social services for older people, net of user charges, is projected to rise by 158.5% under the current funding system from around 7.2 billion (0.45% of GDP) in 2015 to £18.7 billion (0.73% of GDP) in 2040 at constant 2015 prices and under a set of base case assumptions about trends in the drivers of long-term care demand and in the unit costs of care services. The equivalent for social services for younger adults is a projected rise by 138.3%, from £8.9 billion (0.55% of GDP) in 2015 to £21.2 billion (0.83% of GDP) in 2040 at constant 2015 prices. Total public expenditure on social services for older people and younger adults is projected to rise by 147.8% under the current funding system from around £16.1 billion (1.00% of GDP) in 2015 to £39.9 billion (1.56% of GDP) in 2040 at constant 2015 prices (Table 10).

Sensitivity analyses in respect of social care for older people show that projected future public expenditure on social care for older people:

- Does not vary greatly between the old age variant, young age variant and principal population projection: in 2040 the two variants differ by only around 4% (old age) and 6% (young age) from the base case (the principal population projection); but
- Does vary rather more significantly if the age-specific prevalence rates of disability rise or fall by 0.5% per year rather than remaining constant (the base case): public expenditure in 2040 is projected to be 12% if disability rates rise or 11% lower if they fall by 0.5% per year than under the base case (constant disability rates).

These findings illustrates the importance of promoting active ageing and other measures which seek to ensure that the prevalence rates of diseases do not follow recent trends or at least that their disabling effects are mitigated. In particular, measures to prevent chronic illness, disability and dependency when people reach old age will not only help to improve people's quality of life and subjective well-being, as reported in the literature (Walker 2002, Boudiny 2013), but will also reduce the rate of increase in future public expenditure on social care of older people.

The analysis shows that the number of disabled older people receiving unpaid care is projected to rise by more than 75% over the next 25 years if the probability of receiving it remains constant. It is not clear however that the supply of unpaid care will rise to meet this demand (Pickard *et al.* 2007, Pickard 2012). Unpaid care, particularly by the adult children of disabled older people, may not increase so rapidly in future, as a result of such factors as women's rising participation in the labour market. If the supply of unpaid care does not

increase to meet demand, the need for formal services would rise faster than under the base case.

The analysis assumes that the unit costs of care, such as the cost of an hour's home care, will rise in line with OBR projections for rises in average earnings (other than for the small element of costs which relate to food, fuel etc. rather than to labour or capital). There is scope for debate about whether wages in the care sector will rise in line with average earnings. If the real unit costs of care rise by 0.5% point per year faster than under the base case (average earnings), public expenditure is projected to be over 12% higher in 2040 under this scenario than under the base case. Clearly projections of future expenditure over a substantial period are sensitive to assumptions about rises in unit costs.

These findings need to be treated with some caution. They are based on a set of assumptions about future socio-economic and demographic trends. They do not constitute the total costs to society of long-term care. That would require inclusion of the costs of a wider range of services to a wider range of public agencies and service users and the opportunity costs of unpaid care. It should also be stressed that no allowance has been made here for changes in public expectations about the quality, range or level of care.

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Annex: Description of the PSSRU older people's long-term care projections model

The PSSRU long-term care projections model aims to make projections of four key variables: the future numbers of disabled older people, the likely level of demand for long-term care services and disability benefits for older people, the costs associated with meeting this demand and the social care workforce required.

The model does not make forecasts about the future. It makes projections on the basis of specific assumptions about future trends. The approach involves simulating the impact on demand of specified changes in demand drivers, such as demographic pressures, or specified changes in policy, such as the introduction of a lifetime cap on care costs. It does not involve forecasting future policies or future patterns of care.

The model is cell-based (a macro-simulation model) and takes the form of an Excel spreadsheet. It consists of five main parts. The first part estimates the numbers of older people with different levels of disability by age group, gender, household type[1], education and housing tenure. The second part estimates the levels of long-term care services required, by attaching a probability of receiving health and social care services to each cell. The third part of the model estimates total health and social services expenditure, and, in the fourth part, total expenditure is allocated to the various sources of funding. Finally, a fifth part relates to the social care workforce.

The first part of the model divides the older population according to a number of characteristics relevant to the use of services, such as the level of functional disability, marital status, whether living alone, with a partner or children, education and housing tenure. The model uses the Office for National Statistics 2016-based population projections as the basis for the numbers of people by age band and gender in each year under consideration until 2070.

The projected older population by age band and gender are separated into disability groups. Disability is a crucial factor in considering need for long-term care, as it is disability rather than age which influences need for care. The model uses as a measure of disability the ability to perform activities of daily living (ADLs) and instrumental activities of daily living (IADLs). The section on disability in the model uses data from the Health Survey for England (HSE) 2011 to 2014. It includes six categories of functional disability, ranging from no disability to inability to perform three or more activities of daily living (ADL) without help.

The projections of household composition/unpaid care in the model are driven by the 2008-based Government Actuary's Department (GAD) marital status and cohabitation projections (GAD 2010). The household type/unpaid care classification in the model is based, in the first

[1] Single living alone, single living with son or daughter, single living with others, married living with partner only, married living with partner and others

instance, on de facto marital status. Older people who are married or cohabiting are distinguished from those who are single, separated, divorced or widowed. The two marital status groups, those who are de facto married and those who are de facto single, are broken down into five household types using the HSE for 2011 to 2014.

The model includes, for those living in private households, a simple breakdown by housing tenure, between those living in owner-occupied tenure and those living in rented accommodation. One reason for the inclusion of housing tenure is that it can be regarded as a simple proxy for socio-economic group. Another is that it is relevant, in the case of older people living alone, to the division between those who fund their own residential or nursing home care and those who are funded by their local authority. The current means test for public support in care homes generally takes account of the value of the person's home (unless it is occupied by their spouse or an older or disabled relative). This means that older home-owners who live alone generally need to fund their residential care privately, while older tenants and older home-owners living with their spouse are often eligible for public funding.

The model also includes a breakdown by education, between those with 15 or less years of education and those with more than 16 years of education, as a further simple proxy for socio-economic group. The rates of home ownership, by age, gender and marital status, and of education by age and gender are from the Family Resources Survey with projected rates for future years produced by the University of East Anglia CARESIM model.

The second part of the model divides the older population between people receiving no care, unpaid care, formal community based care, unpaid and formal community based care and residential care. The overall population with severe disability (3 or more ADL limitations) is first divided between people living in the community and those living in care homes or hospitals (long-stay). Data on the numbers of local authority funded care home residents are derived from NHS Digital statistics (NHS Digital 2017); data on the number of privately funded and NHS funded care home residents are estimated from Laing & Buisson market survey estimates (Laing & Buisson 2017) and data on hospital residents by age and gender and on the breakdown of the care home population by age and gender are derived from the Census 2011 (ONS 2011); and data on the proportion of care home residents who lived alone and on the proportion who owned their home before admission are derived from PSSRU survey of care home admission.

The population living in the community are divided between the four categories - no care, unpaid care, formal community-based care, unpaid and formal community based care - on the basis of analyses of data from the HSE for 2011 to 2014. Demand for non-residential services was calculated by using the fitted values from the bivariate probit regression models[i] as the estimated probabilities of receipt of care by age band, disability and the other factors described above.

The bivariate probit regression models account for the joint determination of formal community care and unpaid care. The fitted values derived from these models are the joint probability of the two types of care. These fitted values were then multiplied by the projected numbers of older people within each cell by age band and other needs-related circumstances to produce estimates of the numbers of care recipients. The estimated numbers of recipients of local authority home care were grossed to match official NHS Digital data.

Three principal sources of unpaid care are identified: care from children, from spouses and from others (other family members, friends or neighbours). The propensity to receive unpaid care from each of the three sources is the fitted values of multinomial or binary logit regression models calculated using the HSE 2011-2014 data. The projections assume a steady state regarding the propensity, within household type/unpaid care groups, to receive care from a spouse, child, spouse and child, or others.

Community care users are divided into three groups according to hours of care: low intensity (1-5 hours), medium intensity (6-10 hours), and high intensity (10+ hours) of care. The proportions in each of the three categories were calculated using the HSE 2011-2014 data and were assumed to remain the same in the projection years. For care users in each intensity group, they are further divided into publicly-funded and privately- funded care users. The proportions that were used to divide the care users in the base year were calculated using HSE 2011-2014 data, and those in the projection years were informed by the analysis results from CARESIM model.

The third part of the model projects total expenditure on the formal services demanded, applying unit costs of formal care to the volume of services projected in the second part of the model. The unit costs are derived from local authority data. The fourth part of the model breaks down projected aggregate expenditure on services by source of funding: NHS, social services and service users. The costs of the health services included are assigned to the NHS. The costs of social services are divided between personal social services and service users. As there are no national data on the quantities of privately funded care, the projections for privately funded care, especially on non-residential care, need to be treated with caution as it is not possible to verify that all privately funded care is captured by the model.

Residents of residential care and nursing homes and home care users are divided into privately and publicly funded residents through analyses using the CARESIM model. The breakdown for 2015 and 2016 is based on official data. Privately funded residents are assumed to meet their care home fees from their own funds (including disability benefits), except that the NHS meets nursing costs in nursing homes. Expenditure on local authority funded residential care and home care is divided between local authority social services and users on the basis of CARESIM modelling. The full costs of privately funded residential and

nursing home care and private domestic care and a proportion of the costs of all other social services are thus assigned to users.

Estimated net and gross expenditure on local authority funded services is grossed to match local authority expenditure data from the Adult Social Care Finance Return (ASC-FR) for 2015/6 and 2016/7. The grossing factors estimated for 2016/7 are applied to all projection years. Expenditure on disability benefits is estimated separately, by multiplying the numbers of recipients by the weekly average amounts. This expenditure is split between sums used to fund care and sums not so used through CARESIM modelling.

A fifth part of the model makes projections of the numbers of social care (but not NHS) staff required to provide the projected volume of social services, for different groups of social care staff. For care staff, it is assumed that the ratio of staff to volumes of care such as home care hours remains constant over time. For administrative and managerial staff, it is assumed that the ratio of such staff to care staff remains constant over time.

[i] The bivariate probit regression models are specified as follows:

$$Y_{1i}=I(\sum_k(\beta_k \times X_{ki}) +\alpha \times Y_{2i}+e_{1i}>0) \quad (1)$$

$$Y_{2i}=I(\sum_k(\beta_k \times X_{ki}) +\sum_j(\gamma_j \times Z_{ji})+e_{2i}>0) \quad (2)$$

where I(.) is an index function, with I(.)=1, if the event in the bracket is true, and I(.)=0, if otherwise. Y_{1i} denotes the dependent variable, Y_{2i} denotes the endogenous regressor, X_{ki} denotes the exogenous regressors that appear in both equations, and Z_{ji} denotes the exogenous regressors that only appear in the second equation. α, β_k, and γ_j are the coefficients on the respective independent variables. e_1 and e_2 are latent error terms and are assumed to be jointly normal.