

**Right Care, Right Place**

# **Modelling Future Demand for Health and Social Care in Dumfries and Galloway**

March 2023

# **DRAFT**

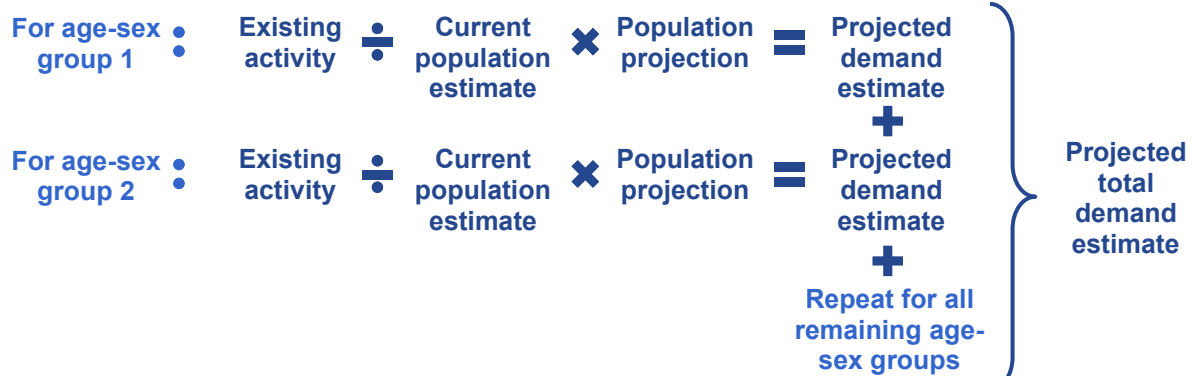
## 2. Method

### 2.1 Direct standardisation approach

The overall approach of this modelling analysis is direct age-sex standardisation. Where possible, existing activity data is split into 5 year age groups by sex. A rate for each group is then calculated using the current population estimated for each group. These rates are then applied to the projected size of each group at 5 year intervals. At a each 5 year interval, the results for all the age groups by sex are added together to forecast total demand.

#### Calculation: direct age-sex standardisation

For each 5 year interval...



Where existing activity data is not available by 5 year age groups and by sex, the data is split by the smallest age groups possible. If no split is possible, given that this analysis focuses on services predominantly used by older adults, the current population estimate for people aged 65 and over is used as the denominator to calculate the rate.

### 2.2 Modelling the aging population

National Records of Scotland (NRS) mid year population estimates for 2021 were used as the current population estimate. NRS small area population estimates for 2021 were used for modelling at a local level.

Using data from the NRS vital events database, a 5 year mortality rate for each 5 year age group by sex, was calculated for the years 2015 to 2019. This time period was chosen as it would not be impacted by the COVID-19 pandemic.

The birth rate across Dumfries and Galloway has been slowly decreasing over the past 30 years. It is very likely that this trend will continue however, for the purposes of this analysis, it was assumed that the birth rate between 2016 and 2021 would be maintained. This assumption will have a bearing on the predicted total population however, the focus of this analysis is to understand future demand for adult health and social care services that are predominantly used by older adults. Consequently this assumption is likely to have a minimal impact on those results.

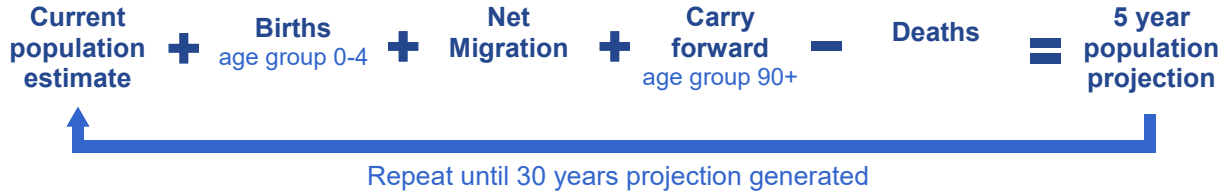
Estimating the how much migration changes a population is difficult. NRS population projections for 2014, 2016 and 2018 used, on average, a +1.5% net migration across all age groups in Dumfries and Galloway every 5 years. This rate was adopted for this model.

At 5 year intervals, starting with the current population estimate, for each 5 year age group by sex, the number of people born or migrated to the region was added, and the number of people who are expected to die was subtracted.

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## Calculation: population projections

For each 5 year age group by sex...



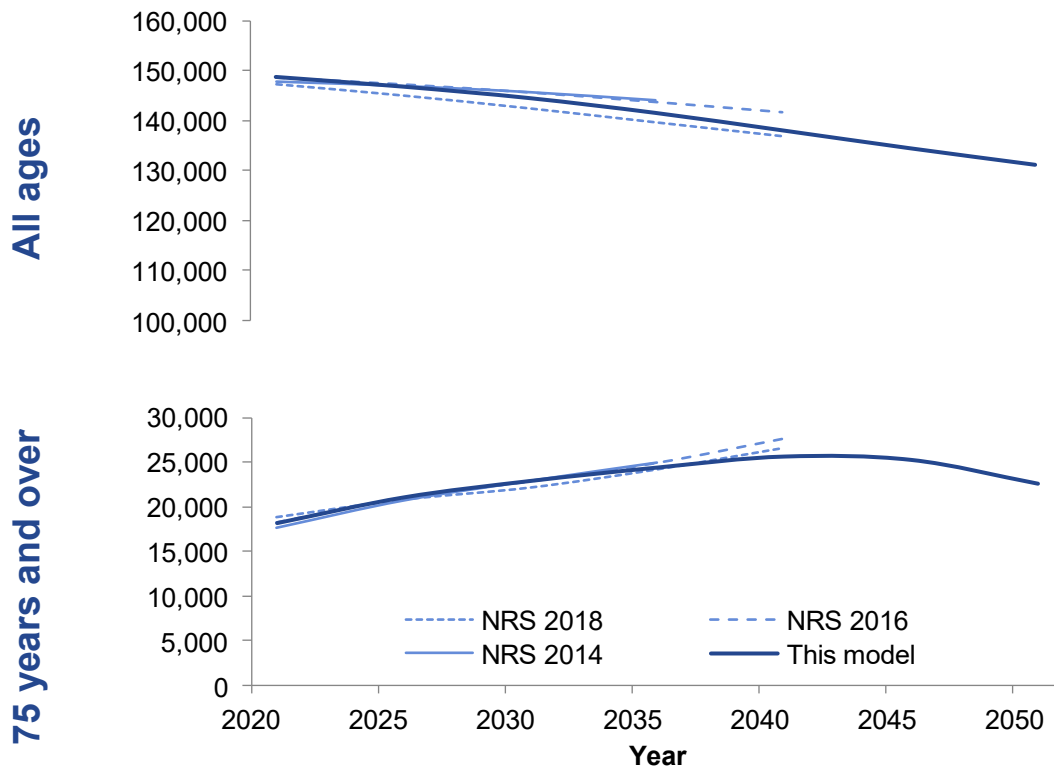
9% of people who reach the age of 90 will also reach their 95th birthday. Therefore, in addition, the model also carried forward 9% of people who had turned 90 in the previous 5 years into the next set of results.

The results for all 5 year age groups by sex were totalled to give a population projection.

To check that these new population projections were sensible, they were compared to the results for Dumfries and Galloway from the NRS population projection published in 2014, 2016 and 2018 (the latest available). This comparison is shown in the charts in [Figure XX](#).

## Figure XX: This model compared to existing population projections

Projected number of people living in Dumfries and Galloway



## 2.3 Modelling demand for beds

This analysis focuses on occupied bed days as a measure of demand for services where people are staying overnight or for an extended time. 1 occupied bed day is equivalent to 1 hospital bed or care home bed being occupied for 24 hours. This may be by 1 person or by multiple consecutive people.

Using occupied bed days in the modelling calculations means that the variation in people's length of stay in hospital, care homes, or other health and social care facilities, is automatically taken into account.

Data on occupied bed days provided by NHS Dumfries and Galloway and Dumfries and Galloway Council was used to calculate existing demand for different care and support services. Where available, preference was given to data from 2019 to minimise the influence of the disruption caused by the COVID-19 pandemic between 2020 and 2022 to long term forecasts of demand.

To provide models for the different local areas, occupied bed day data was split according to people's postcodes or by GP practice registration, depending on which was available.

There are 3 components included in this analysis:

- Community and cottage hospital activity
- Care home activity
- Palliative and end of life care

### 2.3.1 Community and cottage hospitals

Data from NHS Dumfries and Galloway for 2019 is used for 9 community and cottage hospital sites:

- Annan Hospital
- Castle Douglas Hospital
- Galloway Community Hospital - Garrick Ward
- Kirkcudbright Hospital
- Lochmaben Hospital
- Moffat Hospital
- Newton Stewart Hospital
- Thomas Hope Hospital
- Thornhill Hospital

All reasons for admission (such as rehabilitation, cancer care, and palliative and end of life care) were included in the analysis.

Time people spent in Dumfries and Galloway Royal Infirmary (DGRI) or Galloway Community Hospital (GCH) - Dalrymple ward, waiting to be transferred to a community or cottage hospital was also included as this represents demand for community and cottage hospital care and support.

Time people spent delayed in community and cottage hospitals waiting to be discharged (delayed discharge) was not included as this represented demand for other types of care and support.

This analysis does not include any demand for Midpark hospital.

Time spent in a hospital outside of Dumfries and Galloway waiting to be transferred to a community or cottage hospital in Dumfries and Galloway was also not included as this data was not available.

## 2.3.2 Care homes

Data from Dumfries and Galloway Council for 2021 was used in this analysis.

Activity for all people from Dumfries and Galloway in a fully funded or partly funded care home placement was included. People who are privately funding their care home placement are not included in this analysis.

All types of care home placements are included:

- older people placements
- specialist residential care and support
- short breaks for respite
- interim placements

People who were resident in Dumfries and Galloway that have been placed out of the region are also included.

## 2.3.3 Palliative care

In Dumfries and Galloway the specialist palliative care unit is the Alexandra Unit in Dumfries and Galloway Royal Infirmary. This is similar to a hospice model of inpatient specialist palliative care. Palliative and end of life care is also provided through community and cottage hospitals, and in people's own homes by community teams.

In 2018, 7% of people died in the Alexandra Unit, 44% of people died in their usual place of residence (26% at home and 18% in care homes), and the remaining 49% died in other hospital wards, including community and cottage hospitals.

Research done in England in 2011 showed that 33% of people wished to die in a hospice. To understand how many beds would be needed to enable all people to die in a place of their choice, in addition to the palliative and end of life care already provided, the calculation below was applied to the projected number of deaths.

### Calculation: additional bed days to support palliative care

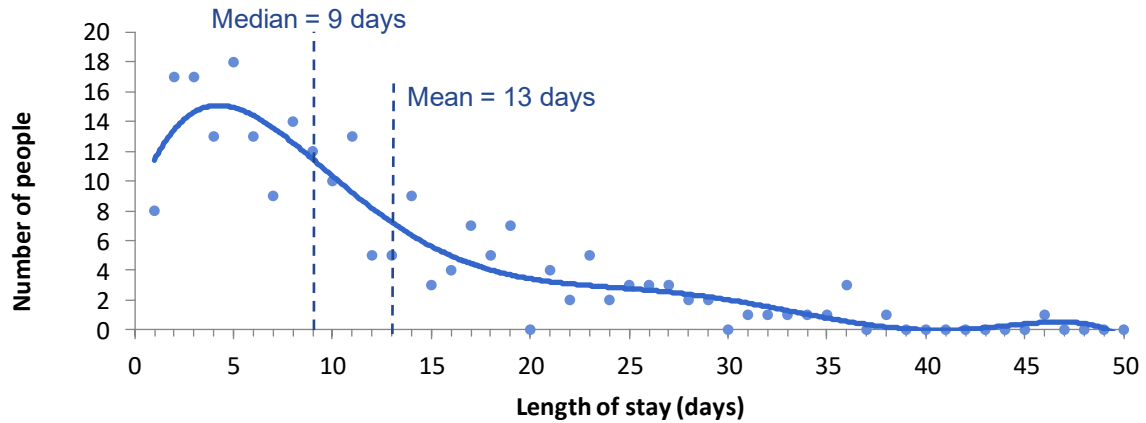
For each 5 year population projection interval...

$$\begin{array}{ccccccc} \text{Total} & & \text{Deaths} & & \text{Deaths} & & \text{Proportion of people} & & \text{Average} & & \text{Bed days to} \\ \text{projected} & \text{---} & \text{caused by} & \text{---} & \text{located in} & \times & \text{wishing to die in a} & \times & \text{time in a} & \text{---} & \text{support} \\ \text{deaths} & & \text{trauma} & & \text{care homes} & & \text{hospice setting} & & \text{hospice} & & \text{palliative care} \\ \text{per year} & & 5\% & & 18\% & & 33\% & & & & \text{per year} \end{array}$$

Looking at data from 2019 at how long people are supported by the Alexandra Unit shows that the distribution is uneven (Figure xx). Half of people supported spent 9 days or less, while some people are supported for more than 40 days. For the purposes of this model the median average time of 9 days was used to calculate bed days.

**Figure xx: palliative care length of stay**

Distribution of people's length of stay in the Alexandra Unit, DGRI; 2019



### 2.3.4 Different scenarios

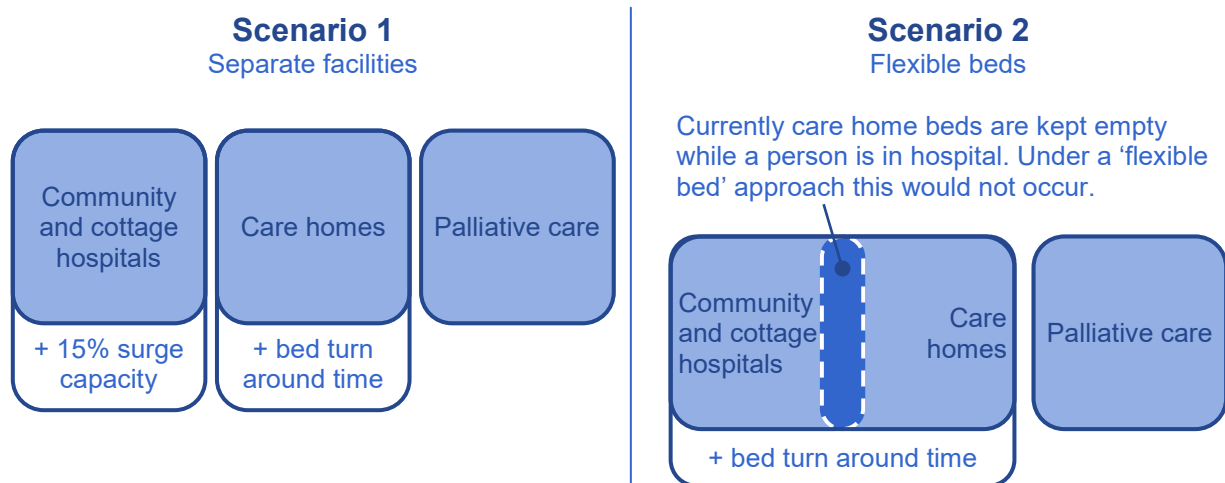
This analysis is being done to help inform the development of new ways of delivering care and support. It does not offer suggestions as to what those 'new ways' might be. To support the discussion, this analysis calculates projected total demand for beds in 2 ways:

- **Scenario 1** - The projected total demand if existing care and support services were to remain separate from each other
- **Scenario 2** - The projected total demand if all beds were entirely flexible so that care and support changed around the bed rather than a person needing to move from one bed to another, or from one site to another.

The figure opposite illustrates how existing care and support is added together for the 2 scenarios to calculate the total current demand in occupied bed days for each 5 year age group by sex.

### Calculation: total demand for each scenario

Number of ....



## 2.3.5 Allowing for variation in demand

Demand for health and social care services varies at different times of the year and by different amounts for each type of care and support. Typically, more people need treatment, care and support during the winter months compared to the summer. Services must plan for this seasonal variation and ensure there is sufficient capacity to cope with emergencies.

Different facilities plan additional capacity in different ways. Typically, hospitals aim for an average occupancy of 85% with 15% capacity for periods of increased demand and emergencies. Care Homes often include the time it takes to renovate a room (the “turn around time”) in their planning. Typically this is 7 days.

The figure above also shows how this additional capacity has been included in each of the modelling scenarios.

## 2.4 Modelling demand for care and support at home

The measure of demand used for care and support at home is assessed hours of care and support per week. This is number of hours identified in a social work assessment that the person being cared for requires to live as independently as possible at home.

A weekly snapshot of data from Dumfries and Galloway Council for INSERT DATE 2023 was used in this analysis. All types of care and support at home were included and were grouped into the following reasons for care:

- learning disability
- physical disability
- mental health
- older person

Further, to provide a complete account of the demand for care and support at home, a demand for care and support at home that had recently been assessed for, but for which a provider had not yet been identified,

## 2.5 Modelling demand for accommodation with care and support

Approximately 1,350 people in Dumfries and Galloway are currently living in sheltered housing or supported accommodation. This was divided by the population estimate for people aged 65 and over living in Dumfries and Galloway to provide a rate that, in turn is applied to the population projections at 5 year intervals.

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## Modelling Assumptions

This analysis makes a series of assumptions necessary to forecast the estimated demand in the future. It is important that these assumptions are recorded, and that the results of the analysis are assessed in relation to them.

This analysis has made the following assumptions:

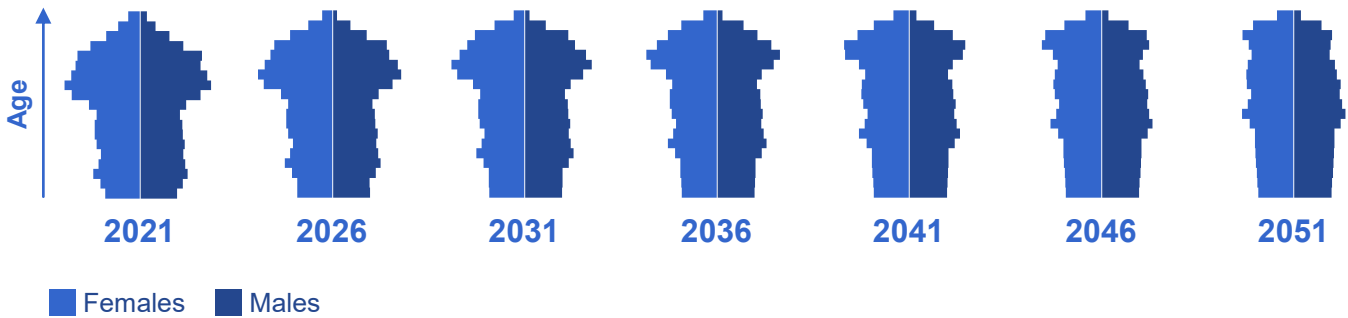
- Dumfries and Galloway will see no sudden change in the size of its population, or sudden change in the distribution of its population between local areas.
- The birth rate in Dumfries and Galloway will remain constant.
- Current life expectancy will remain constant.
- The changing age and sex demographic distribution in Dumfries and Galloway is the main driver for changing levels of demand for treatment, care and support over time.
- Existing health and social care activity, excluding people delayed in hospital, is appropriate and necessary, and that this practice will remain unchanged over time.
- All health and social care services will function as planned and that there is no additional demand caused by disruption elsewhere in the Partnership. (For example, there are no people delayed in hospital.)
- The time people currently spend in the Alexandra Unit for specialist palliative care is representative of the time all people wishing to die in a hospice setting would need to be supported.
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## 3. Results

**Figure xx: Population pyramids**

Projected number of people living in Dumfries and Galloway by age and sex, 2021 to 2051



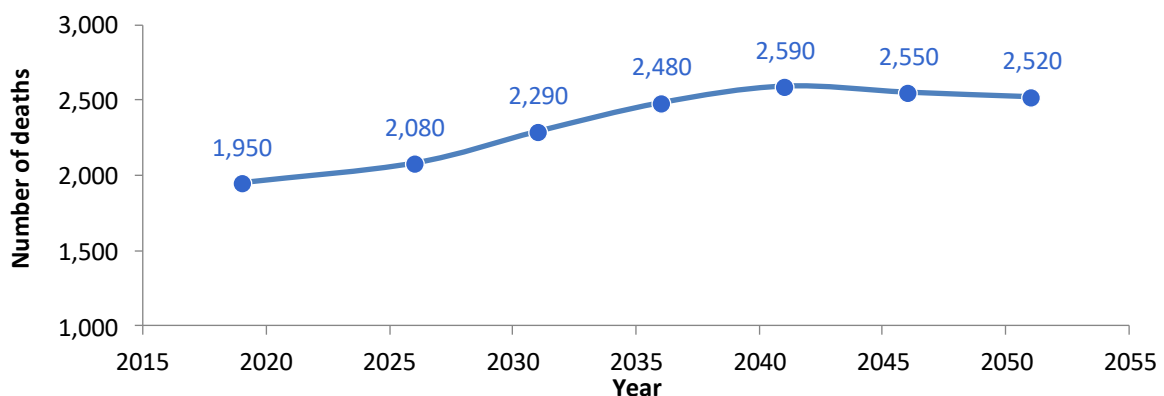
**Table xx: Summary of population projections**

Projected number of people living in Dumfries and Galloway by age (nearest 100)  
(Percentage change compared to the population in 2021)

Year	Total population	Aged 65 to 74 years	Aged 75 to 84 years	Aged 85 and over
2021	148,800	21,400	13,400	4,800
2026	146,900 (-1.3%)	21,600 (+0.7%)	16,200 (+21.3%)	4,900 (+1.3%)
2031	144,500 (-2.9%)	22,800 (+6.6%)	17,200 (+28.6%)	5,700 (+19.8%)
2036	141,500 (-4.9%)	21,000 (+2.7%)	17,500 (+30.7%)	7,000 (+45.5%)
2041	138,000 (-7.3%)	18,100 (-15.3%)	18,600 (+38.9%)	7,100 (+48.6%)
2046	134,500 (-9.6%)	14,700 (-31.4%)	17,900 (+33.6%)	7,500 (+55.4%)
2051	131,100 (-11.9%)	14,200 (-33.8%)	14,700 (+10.0%)	7,900 (+65.2%)

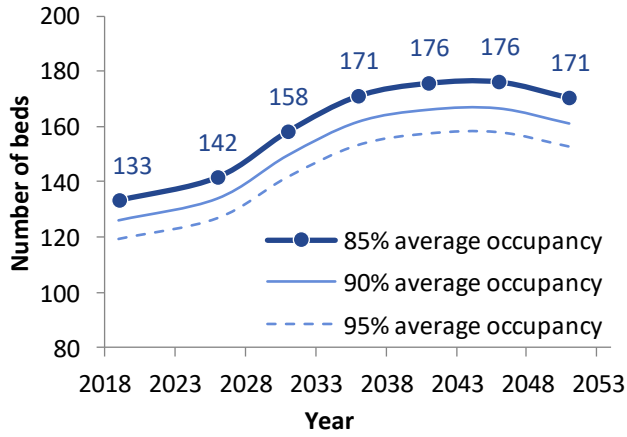
**Figure xx: Projected number of deaths**

Estimated number of deaths for people living in Dumfries and Galloway (nearest 10)



**Figure xx: Projected number of community and cottage hospital beds**

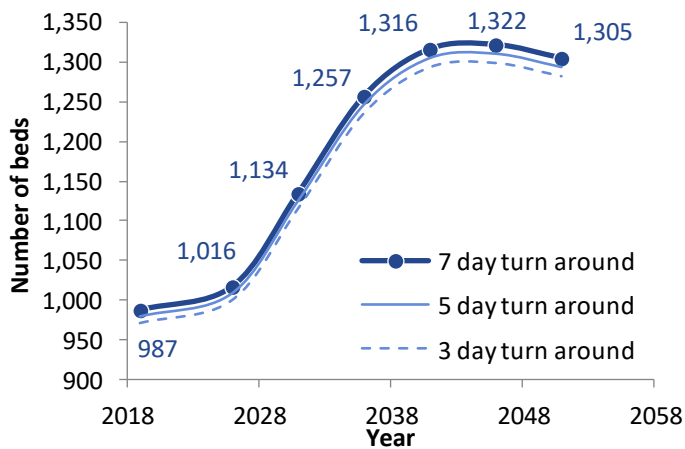
Estimated average number of community and cottage hospital beds by average running occupancy



Year	Estimated number of beds		
	85% average occupancy	90% average occupancy	95% average occupancy
2019	133	126	119
2026	142	134	127
2031	158	150	142
2036	171	162	153
2041	176	166	157
2046	176	167	158
2051	171	161	153

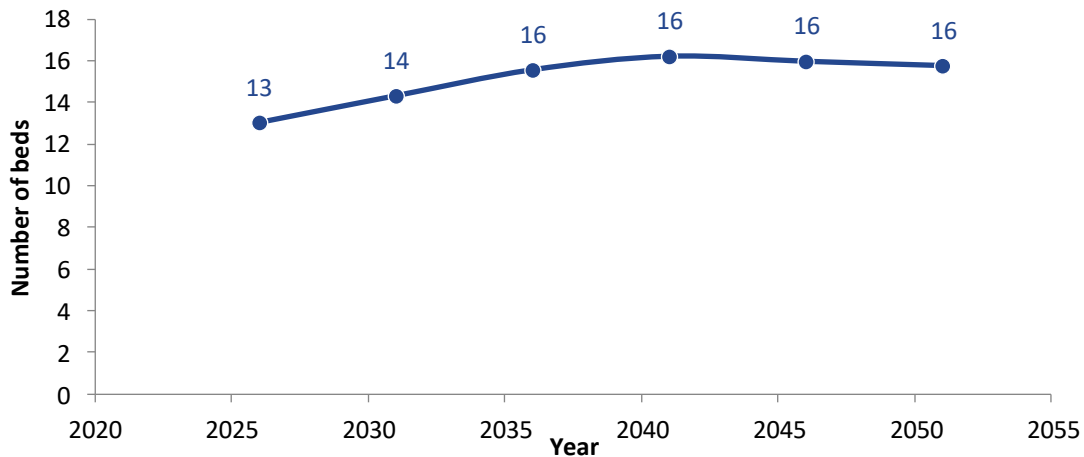
**Figure xx: Projected number of care home beds**

Estimated average number of care home beds by bed turn around times



Year	Estimated number of beds		
	7 day turn around	5 day turn around	3 day turn around
2021	987	979	970
2026	1,016	1,008	1,000
2031	1,134	1,125	1,115
2036	1,257	1,246	1,236
2041	1,316	1,305	1,294
2046	1,322	1,311	1,300
2051	1,305	1,294	1,283

**Figure xx: Projected number of additional beds to support palliative care**  
 Estimated average number of palliative care beds



	Average daily beds (bed days per year- nearest 100)						
	Now	2026	2031	2036	2041	2046	2051
Community and cottage hospital beds	133 (48,700)	142 (51,800)	158 (57,800)	171 (62,500)	176 (64,200)	176 (64,400)	171 (62,300)
Care home beds including...	987 (360,200)	1,016 (371,000)	1,134 (414,000)	1,257 (458,700)	1,316 (480,400)	1,322 (482,400)	1,305 (476,200)
older adults	907 (331,100)	933 (340,700)	1,047 (382,200)	1,167 (425,800)	1,226 (447,600)	1,234 (450,500)	1,220 (445,300)
specialist residential care	30 (11,100)	32 (11,500)	31 (11,400)	30 (11,000)	28 (10,300)	26 (9,500)	25 (9,100)
out of region placements	13 (4,600)	13 (4,900)	14 (5,000)	14 (5,100)	14 (5,000)	13 (4,800)	12 (4,400)
interim placements	8 (2,900)	8 (3,000)	9 (3,300)	10 (3,500)	10 (3,500)	9 (3,500)	9 (3,300)
beds held while people are in community and cottage hospitals	19 (6,800)	20 (7,300)	22 (8,200)	25 (9,000)	25 (9,300)	25 (9,300)	24 (8,900)
Palliative care beds	13 (4,800)	14 (5,200)	16 (5,700)	16 (5,900)	16 (5,800)	16 (5,800)	16 (5,800)
<b>Scenario 1 (separate facilities)</b>							
<b>Total projected beds</b>	<b>1,133 (413,700)</b>	<b>1,172 (428,000)</b>	<b>1,308 (477,500)</b>	<b>1,444 (527,100)</b>	<b>1,508 (550,400)</b>	<b>1,514 (552,600)</b>	<b>1,492 (544,300)</b>
Percentage change		+3%	+15%	+27%	+33%	+34%	+32%
<b>Scenario 2 (flexible beds)</b>							
<b>Total project beds</b>	<b>1,114 (406,900)</b>	<b>1,152 (35,500)</b>	<b>1,286 (469,300)</b>	<b>1,419 (518,100)</b>	<b>1,483 (541,100)</b>	<b>1,489 (543,300)</b>	<b>1,468 (535,400)</b>
Percentage change		+3%	+15%	+27%	+33%	+34%	+32%

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Assessed hours per week - nearest 100 (percentage change)							
	Now	2026	2031	2036	2041	2046	2051
Care and support at home including...	44,300	43,700 (-1%)	43,800 (-1%)	44,200 (0%)	44,000 (-1%)	43,500 (-2%)	42,700 (-4%)
Learning disability	23,700	22,600 (-5%)	21,600 (-9%)	20,900 (-12%)	20,500 (-13%)	20,200 (-15%)	20,000 (-16%)
Physical disability	4,500	4,400 (-3%)	4,000 (-12%)	3,600 (-20%)	3,500 (-23%)	3,500 (-24%)	3,500 (-24%)
Mental health	2,200	2,100 (-3%)	2,000 (-8%)	1,900 (-14%)	1,800 (-18%)	1,800 (-19%)	1,800 (-17%)
Older person	13,800	14,600 (+6%)	16,200 (+18%)	17,800 (+29%)	18,200 (+32%)	18,000 (+31%)	17,400 (+26%)

People living in sheltered housing or supported accommodation (nearest 10)							
	Now	2026	2031	2036	2041	2046	2051
All people	1,350	1,460	1,560	1,580	1,500	1,370	1,260
Percentage change		+8%	+16%	+17%	+11%	+1%	-7%