

# NORTHERN IRELAND HOUSEHOLD PROJECTIONS (2016 BASED) – METHODOLOGY



## 1. Introduction

The 2016-based household projections for Northern Ireland, published in December 2018, are an update of the 2012-based household projections. The methodology has remained unchanged; a review using administrative and survey data suggests that the underlying assumptions of the methodology still stand. The data sources are the most recent population projections (2016-based) and Census information. This document describes the methodology used in the 2016-based household projections. If you have any further questions on the methodology you can contact us at [census@nisra.gov.uk](mailto:census@nisra.gov.uk).

## 2. 2016-based Population Projections used in Household Projections

Northern Ireland level 2016-based population projections were published in November 2017 and 2016-based population projections for areas within Northern Ireland in April 2018. These projections replace the 2012-based population projections which were the basis for the 2012-based household projections.

In the latest publication, the population projection period has been extended to 2041 for Northern Ireland and 11 Local Government Districts within Northern Ireland. Assumptions underlying the 2016-based population projections are based on recent demographic trends.

## 3. Age-Sex Groups used in Household Projections

The methodology used for household projections consisted of applying age-sex specific household membership probabilities to the population projections. Since the 2006-based household projections, 28 age-sex groups have been used; the relevant age-bands were:

- Children: 0-3 and 4-15 years;
- Working age: 16-18, 19-24, 25-29, 30-34, 35-44, 45-49, 50-54, 55-59, and 60-64;
- Older population: 65-74, 75-84 and 85 years and over.

[Annex A](#) presents the relevant age-sex specific household membership probabilities from the 2001 and 2011 Censuses at the Northern Ireland level. Equivalent proportions have been derived for each area within Northern Ireland, and used in the household projections model.

#### 4. Communal Establishment Population

The projected household population is derived by subtracting the projected population living in communal establishments (e.g. army barracks, prisons, students' halls of residence, and nursing homes) from the published population projections:

$$\begin{array}{r} \text{Population} \\ \text{Projections} \end{array} \quad - \quad \begin{array}{r} \text{Communal} \\ \text{Population} \end{array} \quad = \quad \begin{array}{r} \text{Household} \\ \text{Population} \end{array}$$

Counts of the population, by age and sex, living in communal establishments are taken from the latest Census data and used to calculate age-sex specific proportions of the population living in communal establishments. These proportions were kept constant for each year projected into the future for the population aged under 75. This assumes an identical rate of population change for both household and communal population for a specific age-sex group. It should be noted that the assumption of a constant proportion of the population by age-sex group living in communal establishments takes no account of possible future changes in relevant policies.

Table 1 shows the proportion of the population living in communal establishments by age and sex for those aged under 75, as obtained from the 2011 Census. The proportions are highest at student ages (19-24 years), mainly due to the population residing in students' halls of residence. In general, the proportions are higher for males as they are much more common in army barracks and prisons. From age 45 onwards, the proportions are slowly increasing, with the vast majority of communal residents in medical and care establishments.

**Table 1: Percentage of population living in communal establishments by age and sex (2011 Census)**

<b>Age group</b>	<b>Males</b>	<b>Females</b>
0-3	0.1	0.0
4-15	0.1	0.1
16-18	1.2	1.4
19-24	3.3	2.8
25-29	1.1	0.3
30-34	0.7	0.2
35-44	0.6	0.2
45-49	0.7	0.3
50-54	0.7	0.4
55-59	0.7	0.4
60-64	0.8	0.5
65-74	1.1	1.2

In the 2012-based household projections, the assumption of constant proportions of people aged 75 and over living in communal establishments was revised to take into account the falling trends over the last 20 years. This assumption was replaced with the average of constant 2011 Census proportion and a 2001-2011 trended proportion based on Census data.

Table 2 shows the proportion of the population in communal establishments by age and sex for those aged 75 and over, according to the last three Censuses and projected for 2021, 2031 and 2041.

**Table 2: Percentage of population living in communal establishments, by age and sex (1991-2011 Census and projected for 2021, 2031 and 2041)**

Sex/Age	Census			Projected		
	1991	2001	2011	2021	2031	2041
Males aged 75-79	5.1	3.9	2.7	2.2	2.0	1.8
Males aged 80-84	8.9	6.8	5.2	4.5	4.1	3.7
Males aged 85-89	17.0	13.4	9.8	8.5	7.5	6.8
Males aged 90+	27.3	23.5	18.9	17.1	15.6	14.4
Females aged 75-79	6.5	5.1	3.4	2.8	2.5	2.2
Females aged 80-84	14.2	11.1	7.9	6.7	5.9	5.3
Females aged 85-89	26.3	21.5	16.8	14.9	13.5	12.4
Females aged 90+	41.3	39.0	32.5	29.8	27.6	25.7

### 5. Household membership probabilities – Two-point exponential model

The two-point exponential model, based on household propensities from the most recent two censuses, emerged as the most robust projections technique in the 2002-based household projections, and has been used ever since. There are several reasons for using this method.

Firstly, the two-point exponential model constrains the projections by slowing down the trend as probabilities approach 0 or 1 and is therefore more in keeping with reality than a linear regression model which would allow projected negative or non-unitary probabilities. Secondly, the use of 2001 and 2011 Census data ensures that projections are based on the latest household formation trends. Thirdly, the use of household propensities takes account of all household members and avoids the older male bias that is inherent in the traditional ‘headship’ method.

The formula for the two point exponential model is as follows:

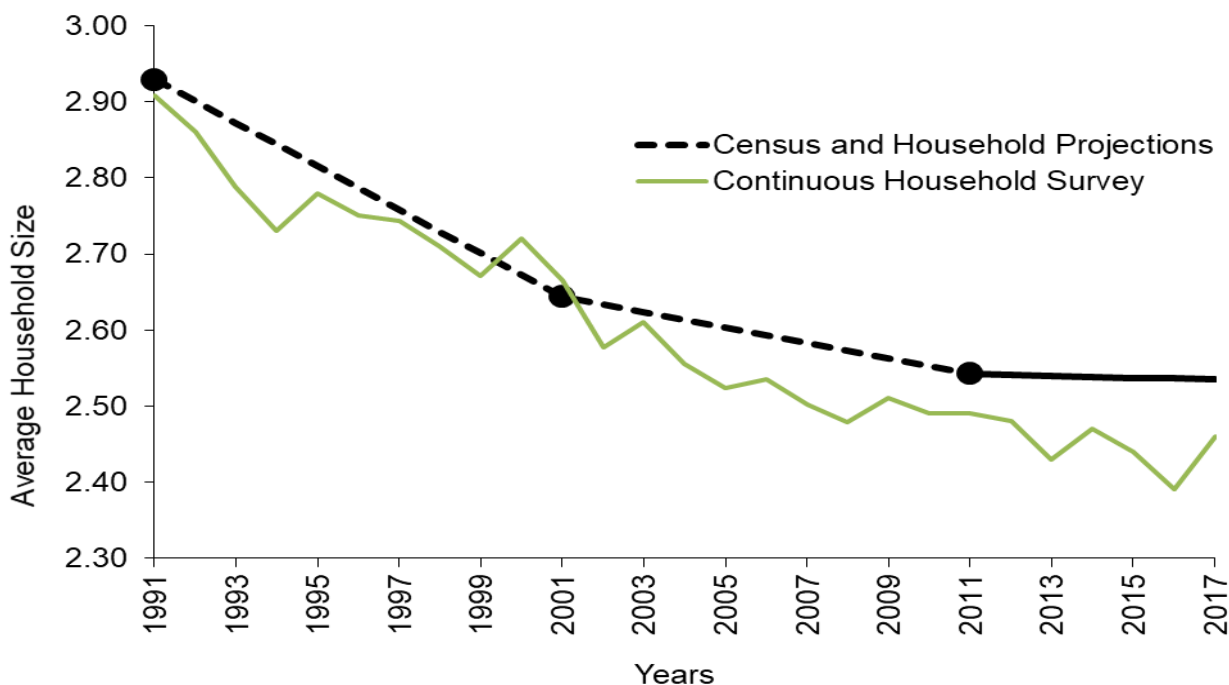
$$p_i = 1 + (p_{2001} - 1) \cdot \left( \frac{p_{2011} - 1}{p_{2001} - 1} \right)^{\frac{i-2001}{10}} \quad \text{for } p_{2011} \geq p_{2001}$$

$$p_i = p_{2001} \cdot \left[ \frac{p_{2011}}{p_{2001}} \right]^{\frac{i-2001}{10}} \quad \text{for } p_{2011} < p_{2001}$$

where  $i$  is the projection year (2012, 2013, ....); and  
 $p_i$  is the household membership probability in year  $i$ .

Whilst the two-point exponential model uses two data points (namely the 2001 and 2011 Census data) on which to model household membership probabilities, the results should be no less reliable than those obtained using more data points taken from social survey data (which would contain sampling errors not present with Census data). The Continuous Household Survey, for example, provides a time series of data points, but each data point is subject to sampling variation as shown in Figure 1 below. This variability is yet more pronounced when the Continuous Household Survey is used in sub-groups of the population such as the household types noted in this document. Accordingly, while models could be fitted using Continuous Household Survey time series data, the data would not be able to discriminate easily between competing models. The chosen model, the two-point exponential, has been selected on the basis that it is an excellent mathematical representation of what could reasonably be extrapolated to happen in the future.

**Figure 1: Average household size, 2016-based household projections and observed from Continuous Household Survey, 1991-2017 (non-zero y-axis)**



## **6. Households with Children**

The 2002-based projected household membership probabilities for children tended towards children living in smaller households and more lone adult with children households in the future. This was based on the trend between the 1991 and 2001 Censuses. Recent demographic evidence suggests that these trends have not continued post the 2001 Census. For example, the number of [divorces](#) has been stable over recent years; the number of births registered by the mother alone has been constant since the late 1980s, and the distribution of parity of births has changed only for parities of 4 or more<sup>1</sup>.

Therefore, since the 2006-based household projections, the household membership probabilities for persons aged 15 and under are kept at a constant value according to the latest Census. To complete households with children, adults were added to match the number of children according to the age-sex specific proportion within a particular household type (see [Annex B](#) for further details). For example, say 100 children are projected to reside in a household type defined as “two adults plus one child”, then these 100 children are matched with (roughly) 100 adult females and 100 adult males with a distribution of ages that corresponds with the age distribution of adults in that household type according to the Census<sup>2</sup>. After the allocation of adults to complete households with children, the remaining adults are then distributed over childless household types using their projected household membership probabilities.

## **7. Older two-adult households**

The 2006-based household projections also introduced a correction factor for the projected number of females in two-adult households. There is a continued significant improvement in mortality rates, which lead to larger projected populations aged 75 and over. The relative growth in this age group is larger for males, even though the number of females continues to remain higher than males. Continuing the Census trends in projecting household membership probabilities to this age group leads to the projected number of males in two-adult households being higher than the number of females. This result is unlikely to continue beyond parity between males and females. Therefore the number of females aged 75 and over in two-adult households is projected relative to the number of males in such households. The number of females aged 75 and over in one-person households was used to source the additional females needed to create 2-adult households.

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<sup>1</sup> Further information on birth registrations is available in Table 3.2 and 3.11 of the Registrar General Annual Report: <https://www.nisra.gov.uk/statistics/births-deaths-and-marriages/registrars-general-annual-report>

<sup>2</sup> These figures are illustrative only. Actual numbers from the 2011 Census suggest 92 males and 108 females per 100 children living in households with two adults and one child. This household type also includes single mothers with two children, one of which is aged 16 or over and thus classified as an adult, which explains the imbalance between male and female adults in such households.

Table 3 presents age-sex-specific probabilities of forming a two-adult household with a female aged (a) 75 to 84 years, and (b) 85 years and over. The probabilities are applied to the number of persons in each age-sex group who form a two-adult household and aggregated to give the number of females of those age groups in two-adult households. For example, for every male aged 85 and over who is projected to live in a two-adult household, there will be 0.274 females aged 85 and over in two-adult households.

**Table 3: Age-sex specific probabilities of sharing a two-adult household with a female aged 75+**

<b>Age-sex group</b>	<b>Female, 75-84</b>	<b>Female, 85+</b>
Male, 25-29	0.004	0.001
Male, 30-34	0.006	0.001
Male, 35-44	0.042	0.004
Male, 45-49	0.088	0.019
Male, 50-54	0.057	0.026
Male, 55-59	0.022	0.018
Male, 60-64	0.007	0.012
Male, 65-74	0.040	0.004
Male, 75-84	0.493	0.021
Male, 85+	0.473	0.274
Female, 25-29	0.008	0.000
Female, 30-34	0.006	0.001
Female, 35-44	0.005	0.001
Female, 45-49	0.002	0.001
Female, 50-54	0.004	0.001
Female, 55-59	0.028	0.004
Female, 60-64	0.044	0.010
Female, 65-74	0.025	0.013
Female, 75-84		0.013

## **8. Projections for areas within Northern Ireland**

The same methodology has been used to create household projections for each Local Government District (LGD) using the associated 2016-based population projections and LGD-specific 2001 and 2011 Census tables on communal establishment population probabilities, household membership probabilities and age-sex structure of adults in households with children. The adjustment for elderly couples is based on Northern Ireland level data, as the number of couple households with females aged 75 and over is too small at LGD level to obtain reliable ratios.

Adjustments were made to remove any discrepancies between the aggregated LGD-level and Northern Ireland household projections for each household type and year (see [Annex C](#)). These adjustments made negligible difference to the projected total number of households. This is a net result of small levels of scaling up or down of household projections by size and type.

## 9. Comparison with household projections across the UK

Household projections are produced separately for each of the countries within the UK.

At the time of writing, the latest household projections are:

- [England](#): 2016 based, published in September 2018;
- [Scotland](#): 2016-based, published in July 2018; and
- [Wales](#): 2014-based, published in March 2017.

Table 4 below shows some results of the most recent population and household projections in each country. Northern Ireland's projected increase in the number of households compared to that of the population as a whole is smaller than both Scotland and Wales, where household growth is double the population growth. One of the explanations for this is that projected population growth in Northern Ireland was largely driven by natural change (i.e. an excess of births over deaths) rather than net inward migration, which was the main driver in other UK countries.

**Table 4: Population and household projections (thousands) by UK country**

	<b>England</b>	<b>Northern Ireland</b>	<b>Scotland</b>	<b>Wales</b>
<b>Population projections</b>				
2016	55,268	1,862	5,405	3,113
2026	58,506	1,940	5,579	3,211
2036	60,905	1,986	5,671	3,251
<i>2016-26 change (%)</i>	5.9	4.2	3.2	3.1
<i>2016-36 change (%)</i>	10.2	6.7	4.9	4.4
<b>Household projections</b>				
2016	22,885	725	2,446	1,340
2026	24,537	768	2,604	1,410
2036	26,131	803	2,719	1,456
<i>2016-26 change (%)</i>	7.2	6.0	6.4	5.2
<i>2016-36 change (%)</i>	14.2	10.7	11.2	8.7
<b>Average household size</b>				
2016	2.37	2.54	2.17	2.28
2026	2.34	2.49	2.10	2.22
2036	2.28	2.44	2.04	2.18

## 10. Sensitivity Analysis – Impact of additional persons

The sensitivity of the methodology was tested by examining the impact on the projected number of households when adding 1,000 people to the population (see Table 5).

**Table 5: Additional households generated by additional 1,000 persons, by age and sex, 2016 and 2041**

Age band	Additional households when adding 1,000 persons (2016)		Additional households when adding 1,000 persons (2041)	
	Males	Females	Males	Females
Aged 0-3	6	5	-1	-1
Aged 4-15	-33	-32	-38	-37
Aged 16-18	308	305	315	310
Aged 19-24	320	334	306	312
Aged 25-29	412	442	359	399
Aged 30-34	504	545	446	529
Aged 35-44	590	556	598	597
Aged 45-49	529	460	580	489
Aged 50-54	483	460	513	470
Aged 55-59	489	490	505	486
Aged 60-64	517	534	534	521
Aged 65-74	534	586	539	536
Aged 75-84	405	879	327	882
Aged 85+	419	733	367	784

It shows that, when adding 1,000 children aged 0 to 3 years, there is a negligible impact on the number of households. This suggests that the added children are absorbed within existing households. When adding 1,000 children aged 4 to 15 years, the number of households falls slightly as a result of adults being sourced from childless households to complete household types with children.

It is important to note additional adults aged 16 and over will be distributed over childless household types, as adults to complete households with children have already been allocated (see [Section 6](#)). The differences reflect the average size of childless households that people of these ages reside in. Broadly speaking, the average size of a childless household falls from 3 people for those aged 16 to 24 years, to 2 people for those aged 30 to 74 years. In other words, one household is being created for every additional two adults aged 30 to 74 years. There are relatively small differences in the findings between males and females aged under 75.



For males aged 75 and over, the increasing proportion of the population in communal establishments reduces the number of additional households created for every 1,000 added males. However, roughly twice as many households are created for each added female compared to added males in that age group. This is a direct result of the adjustment made in the model for elderly couples (see [Section 7](#)). This means that, in effect, an additional 1,000 females aged 75 and over will be allocated to either communal establishments, single adult households or 3+ adult households.

### 11. Sensitivity Analysis - comparison of 2016-based and 2012-based household projections

A further comparison has been made between the 2016-based and the previously published 2012-based household projections, which differ as a result of both the updated population projections and the changes made to the methodology. Figure 2 plots the two series of household projections for Northern Ireland.

**Figure 2: 2012-based and 2016-based household projections, Northern Ireland, 1991-2041 (non-zero y-axis)**

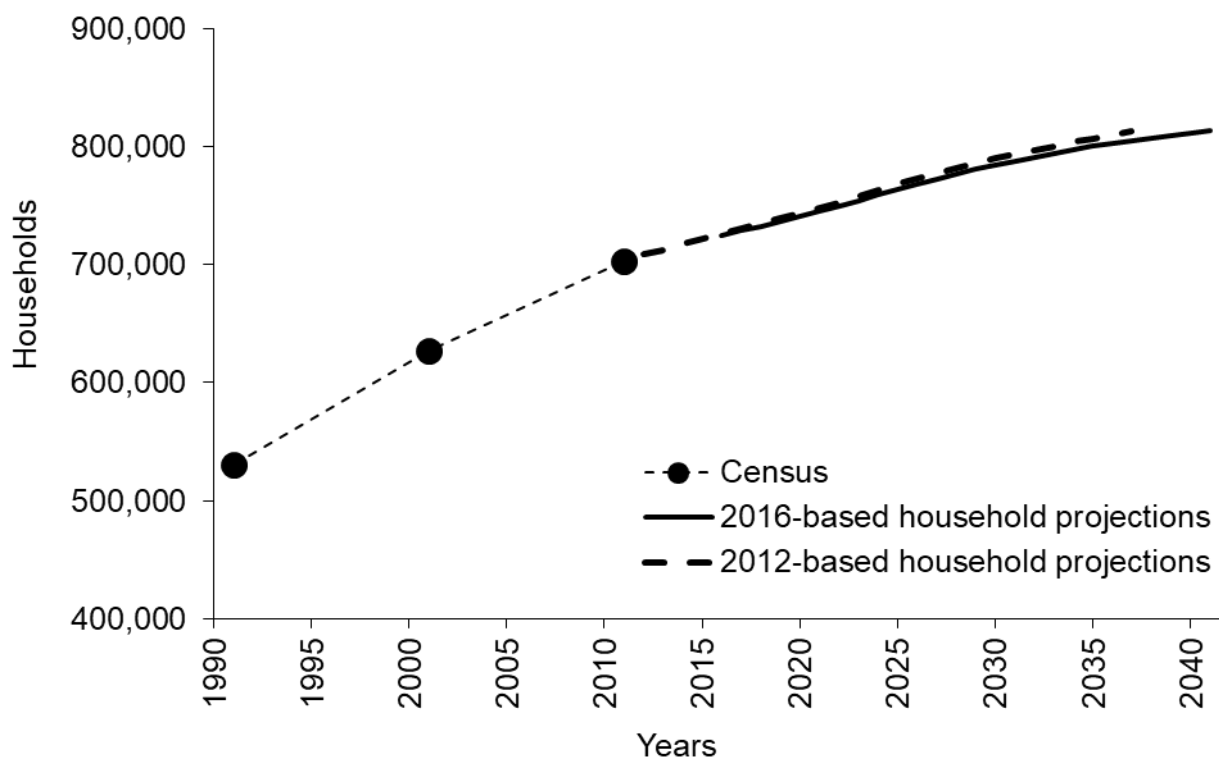


Table 6 provides a breakdown of the differences for several years. As there was no change in the methodology and assumptions in the household projections, the difference can only be attributed to the difference in population projections.

The population estimates for mid-2016 were higher than its projected figure in the 2012-based population projections, hence it would be expected to return a larger number of projected households. However, the projected number of households was smaller, as the larger population was a net effect of a larger number of children (who live in larger households), and a decline in the number of older people, who live in smaller households.

For the following years, the 2012-based projected population exceeded the 2016-based equivalent; the widening gap is reflected when comparing these projections. Population size is projected to have a greater impact than the structure of the population.

**Table 6: Breakdown of difference between 2012-based and 2016-based household projections**

	<b>2016</b>	<b>2026</b>	<b>2036</b>
2012-based projections	726,200	772,900	809,900
2016-based projections	725,100	768,500	802,600
<b>Difference</b>	<b>-1,000</b>	<b>-4,500</b>	<b>-7,300</b>
Population size	300	-4,000	-6,000
Population structure	-1,300	-400	-1,300

[Annex D](#) shows the difference between the 2012-based and 2016-based household projections for the 11 Local Government Districts. In four Local Government Districts, projected number of households for 2026 is higher in the 2016-based projections compared to the 2012-based projections: Ards & North Down, Causeway Coast & Glens, Lisburn & Castlereagh and Mid & East Antrim.

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## Annex A

## 2001 and 2011 Census Household Membership Probabilities

Table A.1. 2001 Household Membership Probabilities

	1 adult (no children)	2 adults (no children)	2 Person with children (1 adult)	3 adults (no children)	3 Person with children (2 adults)	3 Person with children (1 adult)	4 adults (no children)	4 Person with children (2+ adult)	4 Person with children (1 adult)	5 adults (no children)	5 Person with children (2+ adult)	5 Person with children (1 adult)	6 adults (no children)	6 Person with children (2+ adult)	6 Person with children (1 adult)	7+ adults (no children)	7+ Person with children (2+ adult)	7+ Person with children (1 adult)
Males Aged 0-3	-	-	0.070	-	0.191	0.061	-	0.306	0.030	-	0.185	0.013	-	0.092	0.007	-	0.044	0.002
Males Aged 4-15	-	-	0.039	-	0.066	0.063	-	0.281	0.040	-	0.257	0.017	-	0.149	0.007	-	0.077	0.003
Males Aged 16-18	0.005	0.052	0.000	0.137	0.036	0.000	0.138	0.151	0.000	0.061	0.184	0.000	0.023	0.131	0.000	0.006	0.077	0.000
Males Aged 19-24	0.046	0.113	0.001	0.187	0.032	0.000	0.200	0.058	0.000	0.102	0.087	0.000	0.041	0.072	0.000	0.011	0.050	0.000
Males Aged 25-29	0.126	0.252	0.002	0.161	0.100	0.001	0.116	0.079	0.000	0.053	0.040	0.000	0.025	0.023	0.000	0.008	0.014	0.000
Males Aged 30-34	0.142	0.208	0.004	0.092	0.141	0.002	0.049	0.201	0.001	0.019	0.091	0.000	0.007	0.032	0.000	0.003	0.010	0.000
Males Aged 35-44	0.117	0.136	0.005	0.068	0.092	0.003	0.034	0.254	0.001	0.010	0.168	0.000	0.003	0.080	0.000	0.001	0.029	0.000
Males Aged 45-49	0.120	0.158	0.004	0.121	0.063	0.002	0.093	0.163	0.000	0.031	0.132	0.000	0.009	0.071	0.000	0.001	0.032	0.000
Males Aged 50-54	0.125	0.243	0.003	0.195	0.045	0.001	0.120	0.087	0.000	0.042	0.067	0.000	0.014	0.036	0.000	0.003	0.020	0.000
Males Aged 55-59	0.134	0.377	0.001	0.218	0.023	0.000	0.107	0.036	0.000	0.034	0.029	0.000	0.012	0.017	0.000	0.003	0.009	0.000
Males Aged 60-64	0.149	0.494	0.001	0.198	0.010	0.000	0.073	0.016	0.000	0.023	0.013	0.000	0.009	0.008	0.000	0.002	0.005	0.000
Males Aged 65-74	0.185	0.561	0.001	0.157	0.005	0.000	0.046	0.009	0.000	0.013	0.007	0.000	0.005	0.006	0.000	0.001	0.003	0.000
Males Aged 75-84	0.273	0.544	0.001	0.114	0.003	0.000	0.030	0.006	0.000	0.009	0.008	0.000	0.003	0.006	0.000	0.001	0.004	0.000
Males Aged 85+	0.397	0.424	0.001	0.095	0.003	0.000	0.029	0.006	0.000	0.010	0.011	0.000	0.004	0.010	0.000	0.001	0.007	0.000
Females Aged 0-3	-	-	0.068	-	0.196	0.059	-	0.303	0.031	-	0.186	0.013	-	0.089	0.006	-	0.046	0.002
Females Aged 4-15	-	-	0.040	-	0.066	0.063	-	0.283	0.040	-	0.253	0.017	-	0.151	0.008	-	0.077	0.002
Females Aged 16-18	0.007	0.052	0.009	0.129	0.037	0.001	0.137	0.150	0.000	0.056	0.187	0.000	0.022	0.129	0.000	0.005	0.079	0.000
Females Aged 19-24	0.037	0.144	0.066	0.141	0.058	0.021	0.165	0.063	0.004	0.082	0.073	0.000	0.034	0.060	0.000	0.010	0.041	0.000
Females Aged 25-29	0.074	0.246	0.061	0.089	0.131	0.043	0.069	0.120	0.016	0.033	0.054	0.005	0.014	0.025	0.001	0.005	0.013	0.000
Females Aged 30-34	0.071	0.152	0.048	0.042	0.139	0.053	0.022	0.236	0.027	0.008	0.118	0.011	0.004	0.046	0.005	0.001	0.015	0.001
Females Aged 35-44	0.061	0.109	0.031	0.056	0.092	0.030	0.036	0.252	0.014	0.010	0.179	0.004	0.003	0.087	0.001	0.000	0.034	0.000
Females Aged 45-49	0.080	0.182	0.019	0.154	0.068	0.007	0.110	0.137	0.002	0.038	0.105	0.001	0.011	0.056	0.000	0.002	0.029	0.000
Females Aged 50-54	0.107	0.302	0.009	0.219	0.038	0.003	0.122	0.057	0.000	0.042	0.043	0.000	0.014	0.026	0.000	0.003	0.014	0.000
Females Aged 55-59	0.144	0.433	0.003	0.222	0.014	0.000	0.094	0.018	0.000	0.030	0.014	0.000	0.010	0.009	0.000	0.003	0.004	0.000
Females Aged 60-64	0.197	0.515	0.001	0.174	0.007	0.000	0.057	0.010	0.000	0.016	0.008	0.000	0.006	0.005	0.000	0.002	0.003	0.000
Females Aged 65-74	0.336	0.481	0.001	0.116	0.004	0.000	0.029	0.007	0.000	0.008	0.007	0.000	0.003	0.005	0.000	0.001	0.002	0.000
Females Aged 75-84	0.529	0.343	0.001	0.072	0.003	0.000	0.019	0.006	0.000	0.006	0.008	0.000	0.002	0.006	0.000	0.000	0.005	0.000
Females Aged 85+	0.618	0.228	0.001	0.077	0.002	0.001	0.025	0.007	0.000	0.013	0.007	0.000	0.005	0.007	0.000	0.002	0.007	0.000

**Table A.2. 2011 Census Household Membership Probabilities**

	1 adult (no children)	2 adults (no children)	2 Person with children (1 adult)	3 adults (no children)	3 Person with children (2 adults)	3 Person with children (1 adult)	4 adults (no children)	4 Person with children (2+ adult)	4 Person with children (1 adult)	5 adults (no children)	5 Person with children (2+ adult)	5 Person with children (1 adult)	6 adults (no children)	6 Person with children (2+ adult)	6 Person with children (1 adult)	7+ adults (no children)	7+ Person with children (2+ adult)	7+ Person with children (1 adult)
Males Aged 0-3	-	-	0.085	-	0.192	0.070	-	0.311	0.035	-	0.176	0.014	-	0.075	0.004	-	0.037	0.002
Males Aged 4-15	-	-	0.057	-	0.079	0.071	-	0.301	0.041	-	0.251	0.017	-	0.124	0.005	-	0.052	0.002
Males Aged 16-18	0.005	0.068	0.000	0.153	0.045	0.000	0.159	0.168	0.000	0.063	0.169	0.000	0.023	0.095	0.000	0.005	0.045	0.000
Males Aged 19-24	0.035	0.122	0.001	0.200	0.030	0.000	0.227	0.058	0.000	0.111	0.079	0.000	0.041	0.053	0.000	0.011	0.030	0.000
Males Aged 25-29	0.096	0.253	0.003	0.179	0.079	0.001	0.148	0.064	0.000	0.071	0.035	0.000	0.029	0.021	0.000	0.008	0.014	0.000
Males Aged 30-34	0.124	0.238	0.005	0.111	0.144	0.002	0.067	0.162	0.000	0.028	0.070	0.000	0.012	0.024	0.000	0.003	0.011	0.000
Males Aged 35-44	0.140	0.158	0.007	0.079	0.103	0.003	0.038	0.240	0.001	0.012	0.143	0.001	0.004	0.053	0.000	0.001	0.019	0.000
Males Aged 45-49	0.148	0.164	0.006	0.115	0.062	0.002	0.091	0.177	0.001	0.029	0.123	0.000	0.008	0.053	0.000	0.002	0.020	0.000
Males Aged 50-54	0.155	0.219	0.005	0.178	0.041	0.001	0.135	0.089	0.000	0.049	0.063	0.000	0.015	0.031	0.000	0.003	0.015	0.000
Males Aged 55-59	0.161	0.332	0.003	0.218	0.022	0.001	0.122	0.036	0.000	0.044	0.026	0.000	0.013	0.015	0.000	0.003	0.007	0.000
Males Aged 60-64	0.168	0.466	0.003	0.198	0.010	0.000	0.083	0.015	0.000	0.025	0.011	0.000	0.007	0.007	0.000	0.002	0.005	0.000
Males Aged 65-74	0.180	0.582	0.002	0.149	0.004	0.000	0.042	0.007	0.000	0.012	0.007	0.000	0.004	0.005	0.000	0.001	0.003	0.000
Males Aged 75-84	0.247	0.583	0.002	0.110	0.002	0.000	0.028	0.004	0.000	0.007	0.004	0.000	0.004	0.004	0.000	0.001	0.003	0.000
Males Aged 85+	0.385	0.465	0.002	0.090	0.002	0.000	0.025	0.004	0.000	0.008	0.005	0.000	0.003	0.005	0.000	0.001	0.004	0.000
Females Aged 0-3	-	-	0.086	-	0.190	0.070	-	0.312	0.038	-	0.174	0.013	-	0.075	0.005	-	0.036	0.002
Females Aged 4-15	-	-	0.059	-	0.081	0.071	-	0.302	0.040	-	0.251	0.016	-	0.121	0.006	-	0.052	0.002
Females Aged 16-18	0.005	0.067	0.006	0.145	0.051	0.001	0.154	0.167	0.000	0.065	0.171	0.000	0.021	0.096	0.000	0.005	0.045	0.000
Females Aged 19-24	0.033	0.137	0.067	0.161	0.049	0.019	0.180	0.062	0.004	0.095	0.071	0.001	0.034	0.048	0.000	0.012	0.027	0.000
Females Aged 25-29	0.065	0.241	0.079	0.102	0.115	0.048	0.085	0.096	0.018	0.041	0.046	0.004	0.018	0.024	0.001	0.004	0.013	0.000
Females Aged 30-34	0.079	0.180	0.058	0.050	0.153	0.051	0.029	0.205	0.026	0.012	0.091	0.009	0.005	0.032	0.003	0.001	0.014	0.001
Females Aged 35-44	0.075	0.123	0.041	0.058	0.108	0.032	0.033	0.256	0.012	0.010	0.160	0.004	0.002	0.062	0.001	0.001	0.021	0.000
Females Aged 45-49	0.090	0.171	0.025	0.141	0.075	0.011	0.113	0.155	0.003	0.037	0.103	0.001	0.010	0.046	0.000	0.002	0.018	0.000
Females Aged 50-54	0.123	0.274	0.013	0.211	0.039	0.003	0.138	0.060	0.000	0.050	0.042	0.000	0.015	0.021	0.000	0.003	0.010	0.000
Females Aged 55-59	0.154	0.399	0.004	0.223	0.012	0.001	0.111	0.017	0.000	0.037	0.013	0.000	0.011	0.009	0.000	0.003	0.005	0.000
Females Aged 60-64	0.189	0.509	0.002	0.181	0.006	0.000	0.060	0.009	0.000	0.017	0.009	0.000	0.006	0.005	0.000	0.001	0.003	0.000
Females Aged 65-74	0.274	0.539	0.002	0.120	0.004	0.000	0.030	0.006	0.000	0.008	0.006	0.000	0.002	0.004	0.000	0.001	0.003	0.000
Females Aged 75-84	0.475	0.397	0.003	0.076	0.002	0.000	0.019	0.004	0.000	0.006	0.006	0.000	0.003	0.005	0.000	0.001	0.003	0.000
Females Aged 85+	0.617	0.253	0.004	0.069	0.002	0.000	0.022	0.003	0.000	0.009	0.005	0.000	0.005	0.004	0.000	0.002	0.004	0.000

## Annex B

## Age-sex structure of adults in households with children

The table below presents the ratios of adults per person aged under 16 by household type and age-sex of the adult, as derived from the 2011 Census. For example, for every person aged under 16 in a two-person household there are 0.217 females aged 35-44 years. Similarly, for every person aged under 16 in a four-person household with children (2+ adults) there are 0.258 males aged 35-44 years.

Note that the column total do not add up to the expected figures, as the number of adults is unknown in household types with 2+ adults and some persons aged 16-17 are not in full-time education and thus classified as adults.

**Table B.1. Age-sex distribution of household members, by household type (2011 Census)**

	2 Person with children (1 adult)	3 Person with children (2 adults)	3 Person with children (1 adult)	4 Person with children (2+ adult)	4 Person with children (1 adult)	5 Person with children (2+ adult)	5 Person with children (1 adult)	6 Person with children (2+ adult)	6 Person with children (1 adult)	7+ Person with children (2+ adult)	7+ Person with children (1 adult)
Males 16-18	0.001	0.042	0.000	0.056	0.000	0.075	0.000	0.088	0.000	0.097	0.000
Males 19-24	0.003	0.054	0.001	0.037	0.000	0.067	0.000	0.095	0.000	0.122	0.000
Males 25-29	0.008	0.114	0.002	0.033	0.000	0.024	0.000	0.030	0.000	0.047	0.000
Males 30-34	0.011	0.202	0.004	0.081	0.002	0.046	0.002	0.034	0.001	0.034	0.000
Males 35-44	0.034	0.307	0.015	0.258	0.008	0.203	0.011	0.159	0.004	0.128	0.002
Males 45-49	0.015	0.097	0.005	0.099	0.002	0.091	0.002	0.082	0.000	0.071	0.000
Males 50-54	0.012	0.057	0.002	0.044	0.001	0.041	0.001	0.043	0.000	0.048	0.002
Males 55-59	0.006	0.026	0.001	0.015	0.000	0.014	0.000	0.017	0.000	0.020	0.000
Males 60-64	0.005	0.011	0.000	0.006	0.000	0.006	0.000	0.008	0.000	0.012	0.000
Males 65-74	0.005	0.007	0.000	0.004	0.000	0.005	0.000	0.008	0.000	0.012	0.000
Males 75-84	0.002	0.002	0.000	0.001	0.000	0.002	0.000	0.003	0.000	0.005	0.000
Males 85+	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.000
Females 16-18	0.010	0.045	0.001	0.054	0.000	0.073	0.000	0.086	0.000	0.092	0.000
Females 19-24	0.197	0.086	0.050	0.039	0.020	0.058	0.007	0.083	0.004	0.109	0.000
Females 25-29	0.201	0.175	0.114	0.053	0.075	0.033	0.048	0.037	0.033	0.046	0.023
Females 30-34	0.146	0.227	0.118	0.110	0.105	0.064	0.090	0.048	0.091	0.046	0.086
Females 35-44	0.217	0.338	0.153	0.287	0.104	0.236	0.082	0.193	0.060	0.154	0.045
Females 45-49	0.067	0.121	0.027	0.089	0.011	0.078	0.007	0.073	0.006	0.066	0.003
Females 50-54	0.031	0.056	0.006	0.030	0.001	0.028	0.001	0.029	0.000	0.032	0.000
Females 55-59	0.009	0.015	0.001	0.007	0.000	0.007	0.000	0.010	0.000	0.014	0.000
Females 60-64	0.005	0.007	0.000	0.004	0.000	0.005	0.000	0.006	0.000	0.009	0.000
Females 65-74	0.008	0.008	0.000	0.004	0.000	0.005	0.000	0.008	0.000	0.014	0.000
Females 75-84	0.005	0.003	0.000	0.002	0.000	0.003	0.000	0.006	0.000	0.008	0.000
Females 85+	0.002	0.001	0.000	0.001	0.000	0.001	0.000	0.002	0.000	0.004	0.000

## Annex C Adjustment for discrepancies between aggregate LGD and Northern Ireland projections, by type and year

The coefficients in the table below are multiplied by the LGD-level household projections by household type and year. For example, the projected number of two-person (one child and one adult) households in 2016 from each LGD model is multiplied 0.999 so that the aggregate number of all LGDs equals the Northern Ireland projection of two-person (one child and one adult) households in 2016.

**Table C.1. Adjustments for discrepancies between aggregate LGD-level and Northern Ireland projections, by size/type and projection year**

Household Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1 person	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2 person (no children)	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.999	0.999	0.999	0.999
2 person (1 adult + 1 child)	0.999	1.000	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000	1.000	1.001	1.001	1.001
3 person (no children)	1.000	1.000	1.001	1.001	1.001	1.001	1.001	1.002	1.002	1.002	1.003	1.003	1.003	1.003	1.003	1.004
3 person (2 adults + 1 child)	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002
3 person (1 adult + 2 children)	0.999	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000	1.000	1.001	1.001
4 person (no children)	1.000	1.000	1.000	1.001	1.001	1.002	1.002	1.002	1.002	1.003	1.003	1.003	1.003	1.004	1.004	1.004
4 person (2+ adults + 1+ children)	1.001	1.001	1.002	1.002	1.002	1.002	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003
4 person (1 adult + 3 children)	0.999	0.999	0.999	0.998	0.998	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.998	0.998	0.999	0.999
5 person (no children)	1.004	1.004	1.005	1.005	1.006	1.006	1.007	1.006	1.007	1.006	1.006	1.005	1.005	1.005	1.005	1.004
5 person (2+ adults + 1+ children)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
5 person (1 adult + 4 children)	1.001	1.001	1.001	1.002	1.002	1.001	1.002	1.001	1.002	1.002	1.002	1.002	1.003	1.003	1.004	1.004
6 person (no children)	1.004	1.005	1.004	1.005	1.004	1.002	1.000	0.999	0.996	0.994	0.990	0.987	0.983	0.980	0.976	0.973
6 person (2+ adults + 1+ children)	1.000	1.000	1.000	0.999	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.997	0.997	0.997	0.997	0.997
6 person (1 adult + 5 children)	0.999	1.000	0.999	0.999	0.999	0.998	0.996	0.996	0.996	0.995	0.997	0.995	0.998	0.997	0.997	0.996
7+ person (no children)	0.985	0.983	0.977	0.971	0.968	0.963	0.959	0.952	0.949	0.943	0.939	0.932	0.927	0.921	0.916	0.912
7+ person (2+ adults + 1+ children)	0.999	0.998	0.998	0.998	0.998	0.997	0.997	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
7+ person (1 adult + 6+ children)	0.995	0.989	0.991	0.994	0.990	0.986	0.985	0.988	0.985	0.992	0.989	0.987	0.987	0.985	0.991	0.988
<b>All Households</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>

**Table C.2 Adjustment for discrepancies between aggregate LGD-level and Northern Ireland projections, by size, type and projection year**

<b>Household</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>
1 person household	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2 person household	1.005	1.005	1.005	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.005	1.005
3 person household	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.002	1.002	1.002	1.002	1.002	1.002	1.003	1.003	1.003
4 person household	1.001	1.001	1.001	1.001	1.002	1.002	1.002	1.002	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003
5+ person household	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	0.999	0.999	0.999	0.998	0.998	0.998	0.998
One adult without children	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Two adults without children	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.999	0.999	0.999	0.999
Other households without children	1.000	1.001	1.001	1.001	1.001	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002
One adult with children	0.999	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000	1.000	1.000	1.001
Other households with children	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
<b>All Households</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>

**Annex D Comparison of projected household change (2016-2026) between the 2012-based and 2016-based household projections, by Local Government District**

<b>Local Government District</b>	<b>2012-based household projections ('000)</b>		<b>2016-based household projections ('000)</b>		<b>Difference ('000)</b>	
	<b>2016</b>	<b>2026</b>	<b>2016</b>	<b>2026</b>	<b>2016</b>	<b>2026</b>
Antrim & Newtownabbey	55.4	58.7	55.2	58.2	-0.2	-0.5
Ards & North Down	65.7	69.1	65.9	69.3	0.2	0.2
Armagh City, Banbridge & Craigavon	79.1	87.5	79.2	87.3	0.1	-0.2
Belfast	143.9	148.4	143.5	146.4	-0.4	-2.0
Causeway Coast & Glens	55.2	57.5	55.2	57.6	0.0	0.1
Derry City & Strabane	57.3	59.6	57.5	59.4	0.2	-0.2
Fermanagh & Omagh	43.0	46.0	42.9	45.4	-0.1	-0.6
Lisburn & Castlereagh	55.4	60.9	55.3	61.3	-0.1	0.3
Mid & East Antrim	55.6	57.9	55.6	58.4	0.0	0.4
Mid Ulster	50.3	55.8	50.1	55.1	-0.1	-0.6
Newry, Mourne & Down	65.2	71.6	64.6	70.1	-0.6	-1.5
<b>Northern Ireland</b>	<b>726.2</b>	<b>772.9</b>	<b>725.1</b>	<b>768.5</b>	<b>-1.0</b>	<b>-4.5</b>