



**Northern Ireland Longitudinal Study:**  
**Linking the Northern Ireland Longitudinal Study**  
**to the 2021 Census**

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NILS Working Paper 4.0

March 2025

**NILS Research Support Unit**

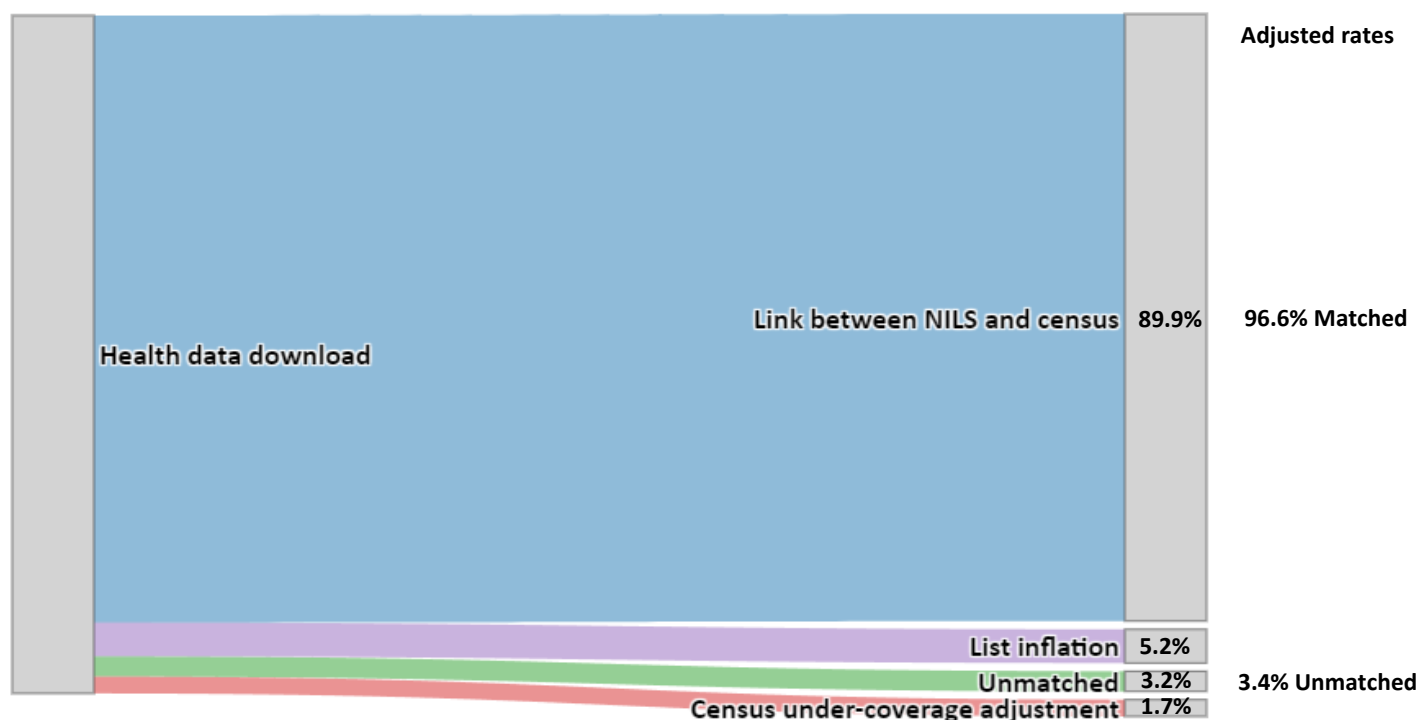
A background to the NILS is available in [NILS Working Paper 1](#) and the NILS Matching methodology is available in [NILS Matching Report and Methodology | Northern Ireland Statistics and Research Agency](#). This paper gives the matching results for the 2021 link to the NILS.

The total number of live NILS members at April 2021 was 573,811. Using the NILS matching methodology a total of 516,042 records were matched to the 2021 Census data. This figure may include some NILS members with a census link who died or emigrated between the 2021 Census and the NILS April 2021 download.

It is not possible to create links for some NILS members to the Census 2021 data for two reasons:

- (i) Health Card List Inflation, and
- (ii) Under-coverage adjustment in the census

It is therefore necessary to take these two factors into account when calculating the NILS match rate.



At April 2021 the full BSO list included 2,006,937 persons, 103,762 more people than the Census 2021 estimate of 1,903,175. This difference is known as list inflation and, as there is no census return, there is no possibility of creating a link between the census data and the NILS data. This indicates a list inflation rate of 5.2%.

Census 2021 included comprehensive processes to adjust for over coverage and under-coverage in the enumerated population, to produce an accurate estimate of the whole Northern Ireland population on Census Day. These processes are detailed in the Census 2021 coverage information paper. The under-coverage adjustment amounted to approximately 3% of census records, of these 1.7% are unsuitable for matching to the NILS due to their source.

Under-enumeration and imputation in the census is known to vary by age, sex and geographical area and will therefore affect the number of potential people that could be matched, for example, it is thought to disproportionately affect younger adult males from deprived inner-city areas.

The match rate for NILS members to Census 2021 can be calculated by taking the total number of matches as a proportion of the estimated number of potential people that could be matched.

The adjusted match rate for the NILS 2021 link is 96.6%. The corresponding match rate for 2011 was 96.7%

Table 1: Calculation of NILS match rate for Census 2021

BSO list figure at April 2021	2,006,937
Census population at April 2021	1,903,175
BSO list inflation	5.2%
Census under-coverage adjustment at April 2021	1.7%
NILS Members Live at April 2021 <b>A</b>	573,811
NILS Members matched to census records	516,042
Unadjusted/Crude match rate	89.9%
Estimate of list inflation <b>B</b>	29,838 (5.2%)
Estimate of census under-coverage adjustment <b>C</b>	9,755 (1.7%)
Estimate of matchable population <b>(A – B – C)</b>	534,218
Matched to census records	516,042
Adjusted match rate	96.6%

It should be noted that these figures relate to analysis undertaken in March 2025 and the figures will continuously change as attempts are made to link previously unmatched NILS members after each download from the BSO (in case the more up to date information facilitates a match).

### Forward linkage

The forward linkage rate measures the percentage of NILS members enumerated at Census 2011 who are also enumerated at Census 2021, excluding those who have died or emigrated from Northern Ireland in the intercensal period.

An unknown proportion of people who were in the sample at Census 2011 will never be linked due to reasons such as unreported emigrations out of Northern Ireland prior to 2021, deaths outside of Northern Ireland, delays in death registrations, date of birth discrepancies and under-enumeration in the census.

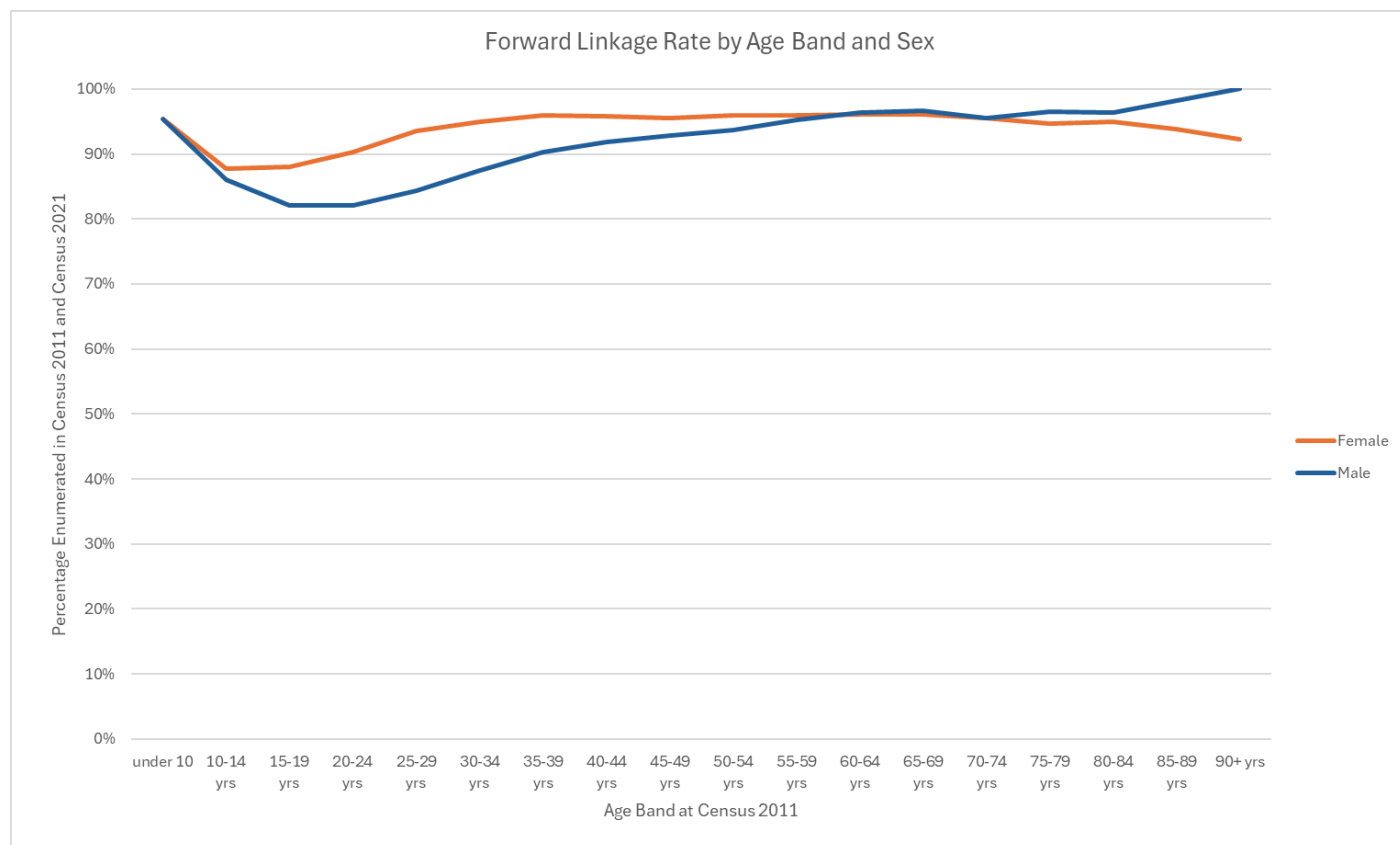
Table 2 shows that a total of 486,711 NILS members have been matched to records in Census 2011. During the intercensal period, 62,525 of these NILS members died or emigrated from Northern Ireland, leaving 424,186 expected at the 2021 Census. Of those remaining, there were 391,857 NILS members linked to census records in both 2011 and 2021. NILS members, for whom no link was found, either did not respond to the Census 2021 or have emigrated from Northern Ireland but not cancelled their GP registration. The overall forward linkage rate for 2011 to 2021 is 92.4%.

Table 2: Calculation of Forward Linkage Rates 2011 to 2021

<b>Census 2011 - NILS members enumerated</b>	486,711
Excluding deaths and emigrations prior to Census 2021	62,525
<b>Eligible to be in Census 2021</b>	424,186
Not found at Census 2021	32,329
<b>Enumerated at Census 2021</b>	391,857
<b>Forward linkage rate (%)</b>	92.4

Figure 1 shows there is some variation in the NILS forward linkage rates between the male and female sex particularly within age bands from 10 years to 55 years where females have a higher forward linkage rate between Census 2011 and Census 2021. Around age 55 years, any difference is less pronounced and an opposite effect is observed in the higher age bands from 70 years and above.

Figure 1: Distribution of Forward Linkage Rates 2011 to 2021 by Age band and Sex



## Backward linkage

The backward linkage rate measures the percentage of NILS members who were enumerated in the Census 2021 and also enumerated in the Census 2011, excluding those who have been born or migrated to Northern Ireland after Census 2011.

Table 3 shows that there were 516,042 NILS members enumerated in Census 2021. During the intercensal period, a total of 98,185 new NILS members joined the sample through birth or immigration to Northern Ireland. These members would not be expected to have a Census 2011 record as they joined during the 10 year period after the census, leaving 417,857 eligible to be in the Census 2011. Of those members eligible to be in Census 2011, a total of 391,124 linked to census records in both 2021 and 2011. The overall backward linkage rate for 2021 to 2011 is 93.6%.

Table 3: Calculation of Backward Linkage Rates 2021 to 2011

<b>Census 2021 - NILS members enumerated</b>	516,042
NILS member after Census 2011	98,185
<b>Eligible to be in Census 2011</b>	417,857
Not found at Census 2011	26,733
<b>Enumerated at Census 2011</b>	391,124
<b>Backward Linkage rate (%)</b>	93.6

Figure 2 also shows some variation in the NILS backward linkage rates between the male and female sex particularly within age bands from 30 years to 70 years where females have a higher backward linkage rate between Census 2021 and Census 2011.

Figure 2: Distribution of Backward Linkage Rates 2011 to 2021 by Age band and Sex

