



Department for
Communities and
Local Government

2011-based Interim Household Projections

Quality Report

© Crown copyright, 2013

Copyright in the typographical arrangement rests with the Crown.

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, www.nationalarchives.gov.uk/doc/open-government-licence/ or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.

This document/publication is also available on our website at www.gov.uk/dclg

If you have any enquiries regarding this document/publication, email contactus@communities.gov.uk or write to us at:

Department for Communities and Local Government
Eland House
Bressenden Place
London
SW1E 5DU
Telephone: 030 3444 0000

April 2013

ISBN: 978-1-4098-3858-6

Contents

Summary	4
How the output is created	5
Quality of the outputs	6
Relevance.....	6
Timeliness and punctuality.....	7
Accuracy	8
Comparability.....	9
Coherence	10
Accessibility and clarity	11
Output quality trade-offs	13
Assessment of user needs and perceptions	14
Sources for further information or advice	14

Summary

This report provides a summary of the methodology used to compile the household projections for England¹ and its local authority districts and key information on the various dimensions of quality for those statistics. Household projections are National Statistics which provide indicative figures of likely levels of the future number of households and types of household that might result if past demographic trends were to continue.

The projections for geographies within England are generally produced every two years following the publication of updated mid-year estimates of population by the Office for National Statistics (ONS), but occasionally an interim set of projections is produced to meet user needs, for example after census results are published. The 2011-based household projections are 'interim' because they are based on the 2011-based interim sub-national population projections, which incorporate valuable information available from the Census 2011, and project forward 10 years instead of the usual 25 years.

This document provides a brief summary of how the household projections are produced² and of the modifications to the existing methodology that were needed to incorporate valuable Census 2011 data. This report also provides key points about the quality of the household projections that should be taken into account when using the data, in relation to the indicators of quality recommended by the European Statistical System:

:

- *Relevance*- The degree to which statistical outputs meet users' needs.
- *Accuracy*- The degree of closeness between an estimate and the true value.
- *Timeliness and punctuality*- Timeliness refers to the lapse of time between publication and the period to which the data refer. Punctuality refers to the gap between planned and actual publication dates.
- *Comparability* - The degree to which data can be compared over time and domain (for example geographic level).
- *Coherence*- The degree to which data that refer to the same topic but are derived from different sources or methods, are similar.
- *Accessibility and clarity*- Accessibility is the ease with which users are able to access the data, also reflecting the format in which the data are available and the

¹ Household projections for other countries of the UK are the responsibility of the devolved administration. Further details about projections by the devolved administrations can be found in the overview of the methodology used to produce household projections across the four UK countries, published 27 January 2011 and available from the Welsh Government website.

² This report only provides a brief outline of the methodology used to produce the 2011-based projections. A full methodology report is also available.

availability of supporting information. Clarity refers to the quality and sufficiency of the release details, illustrations and accompanying advice.

The document also explains the extent to which these different dimensions of quality have been balanced against each other in the production of the 2011-based interim household projections, and explains the processes for assessing the user needs against possible options and their views on the outputs.

How the output is created

The work to produce the 2011-interim household projections was undertaken by Experian on behalf of the Department for Communities and Local Government (DCLG). The methodology for the 2011-based interim projections was based on the methodology used for the 2008-based projections, which was agreed after a review of the previous methodology and a public consultation. For the 2011-based interim household projections some changes needed to be made to the methodology in order to incorporate valuable information from the Census 2011 where available.

The key data sources used are:

- Sub-national population projections
- Census data
- Labour Force Survey data

The household projections are compiled using a two stage process.

Stage one produces the national and local projections for the total number of households by age group and marital status over the projection period. These are calculated by applying projected household representative rates³ (HRRs) to a projection of the private household population by age, sex and relationship status.

The household projection methodology uses time-series modelling which weights together simple and logistic trends, projecting forward from past census data. The previous (2008-based projections) used data from the 1971, 1981, 1991 and 2001 Census. For the 2011-interim household projections not enough detail from the Census 2011 was yet available to derive estimates for 2011 HRRs by age, gender and marital status. At the England level the change in HRRs by age in the LFS between 2002 and 2011 was therefore imposed onto the 2011 Census data available, and previously projected 2008 HRRs (from the 2008-based projections) were used to disaggregate by marital status and gender.

Stage 2 disaggregates household projections from Stage 1 into 17 detailed household types, providing information on the size of the household, particularly the number of adults and the number of dependent children in each household.

³ The household representative rate is the probability of anyone in a particular demographic group being classified as being a household representative, and can take any value between 0 and 1.

In Stage 2 the 2008-based methodology used a two-point exponential method that calculated the annual average growth between 2 points (1991 and 2001 Census) and extrapolated that forward. The production team, in agreement with the Steering Group, decided after some testing that for the 2011-based update the projections would still be based on two data points (2001 and 2011 available Census data) rather than incorporating a third point into the projection.

Through these two stages the process of producing household projections involves a series of steps, each of which needs to be completed before moving on to the next step. The sequential nature of this process enables checks to be carried out on the data at each step before moving on to the next step until a final set of projections is produced. The final projections are themselves subjected to further checking procedures. These checks ensure that the various dimensions of quality outlined in this report are met.

All stages of the household projections work are quality assured by an independent Steering Group. This group includes national experts from Cambridge University, Reading University, Oxford Economics, Department for Communities and Local Government, Experian, Greater London Authority, independent advisors (formerly from Nottingham council and Birmingham council), ONS, Cambridge Centre for Housing and Planning Research, Welsh Assembly Government, Northern Ireland Statistics and Research Agency and the General Register Office for Scotland.

Quality of the outputs

Relevance

Household projections are demographic, trend-based projections indicating likely levels of the future number and types of households, and provide consistent projections for England and its local authorities. Household projections are used by local authorities in preparation of development plans as the National Planning Policy Framework specifically requires local authorities to take into account household and population projections in their local plans. The projections are also used by house builders and utility providers to assess future requirements. They also provide key evidence to inform housing and planning policies in DCLG, and for long term planning in other Government Departments such as Transport, Health and Education.

Uses include, but are not limited to:

- local assessments of future housing requirements
- local resource planning
- business development (including construction of new developments)
- reviews of housing and planning policy by officials and ministers
- academic research
- market research

The household projections build a time frame into the modelling so that past trends in household formation are projected forwards to provide a long term view of housing requirements, required for modelling and planning. There are also important advantages in having fully consistent population and household projections, and fully consistent projections at both England and local authority level. To make the projections as relevant as possible for the uses above, the methodology used for the 2008-based projections was modified to incorporate the most up to date information from the census 2011 data.

The household projections are quality assured by an independent group of expert advisors and user representatives. Throughout the production of the 2011-based update, the outputs were quality assured by the group, including the consideration of national and sub-national results and trends in household formation by age group. The Steering Group provided comments on the final aggregate results for Stage 1 and the complete dataset for Stage 2 across all geographical levels. Given the tight schedule for production of these interim household projections, the group also provided help in identifying those outputs that were most important to users, keeping the household projections as relevant as possible to meet user requirements.

However, there are limitations in the use of these projections, as these are demographic and trend-based only and do not take into account any policy changes that may affect actual household formation in future. Therefore users of the household projections should consider the projections alongside other local information available that may help interpret better those projections in the particular context of the use of the data.

There are also particular limitations in the use of the 2011-based interim household projections. The projections only span for a 10-year period so users that require a longer time span would need to judge whether recent household formation trends are likely to continue. Also, although data available at the time of the production from the Census 2011 has been used where possible, where data was not available (for example, household representative rates by age and marital status) information has been used from LFS data or from previous projections instead.

The household projections are derived from sub-national population projections, so any limitations with the interim population projections would also need to be taken into account when interpreting household projections. For example, population projections generally update underlying demographic assumptions on fertility and migration in line with new available data, but for the 2011-based sub-national population projections trends from the 2010-based projections were used.

The next set of household projections is planned to project the usual 25 years and will be fully consistent with the Census 2011, in line with the next set of sub-national population projections (expected in 2014). This will overcome some of the limitations above.

Timeliness and punctuality

Household projections are typically published two years after the reference period. They are generally published in autumn following the publication in spring of sub-national population projections. The time between the publication of sub-national population

projections and household projections is needed for reviewing the projection methodology in line of the new data, production of the projections and extensive quality assurance.

Given the publication of key Census 2011 data, the ONS published a set of sub-national population projections in September 2012 and the 2011-based interim household projections were published in April 2013. The special circumstances of an interim set of sub-national population projections led to some modifications to the methodology and best trend data available, which led to the slight delay to the original planned publication for March 2013 until April 2013 in order to extend the quality assurance period.

Accuracy

Household projections are demographic, trend-based projections indicating the likely number and types of future households if the underlying trends and demographic assumptions were realised. They also provide a long-term view of trends, so any recent changes to trends will be projected forward in a dampened fashion that takes also into account trends going as far back as 1971. They provide long-term trajectories that they should be considered as long-term, so users are discouraged to give too much weight to household growth estimates for particular years and advised to focus instead in growth averages through the projection period.

The household projections have been previously rounded to the nearest thousand whilst unrounded data was provided for modelling purposes. The approach for the 2011-based interim projections was changed and data was only presented in thousands for presentational purposes, but data was provided in all tables up to three decimal places so that information was not lost through rounding. Whilst at the England level it makes sense to discuss changes in thousands, for certain local authorities the use of data in thousands means that most of the information is lost, particularly when looking at changes. It was decided that it would be left to the user to decide the level at which to use the data, and if a user decides to round data for presentational purposes this should be done at the end of all the calculations, to maximise accuracy of the data and have consistent results. The use of data at unit level does not make any data disclosive as the data is modelled data.

Sometimes data for certain local authorities has been presented alongside another local authority as numbers were considered too small to be presented alone.

The household projections use the latest population projections and are inevitably dependent on the accuracy of those estimates. The projection methodology for the population projections does not enable calculations of probability, standard errors or confidence intervals and, similarly, we cannot calculate these for the household projections.

When users compare the household projections with actual estimates of the number of households from other data sources, users need to understand that the projections will always be proved wrong to a greater or lesser degree by actual household formation because of the uncertain nature of demographic behaviour and as a result of the effect of any policies and social and economic circumstances that may affect those behaviours.

Comparability

Comparability over time

Each set of household projections is unique, comprising trends made using the best information available at that point in time, thus each new set of projections replaces in its entirety the previous set. The 2011-based projections span until 2021 in order to be consistent with the 2011-based sub-national population projections. Users are discouraged to use the 2008-based projections to estimate changes beyond 2021 as these are not consistent with the data from the 2011 Census that have been incorporated in the 2011-based projections. Instead, if users need to assess housing requirements beyond 2021 they should make an assessment of whether the household formation rates in that area are likely to continue.

The household projection tables present data up to 2001 to show changes in the number and types of households between 2001 and 2011. The period between 2001 and 2011 is not provided as the revised mid-year population estimates for 2002-2010 that take the Census 2011 into account, which have now been published, were not available in time to incorporate into the 2011-interim household projections. The next set of projections will provide a back series of estimates between those periods in line with the planned back series of sub-national projections (expected in 2014).

As part of the production and quality assuring process, the 2011-based projections were compared with the previous (2008-based) projections. In Stage 1, comparisons were particularly useful for checks on household and institutional population. In Stage 2, analysis was undertaken to match available data from the 2011 Census with that used for the 2008-based in order to use consistent data where available.

Although useful as an element of the production and quality assurance process of the projections, the changes in methodology from previous projections imply that direct comparisons between 2011-based projections and previous projections need to be made with care.

Comparability over different geographic levels

The household projections incorporate a number of controls to ensure the consistency of data at different geographic levels. These controls are necessary because of the non-linearity of the projection methodology and the use of LFS data at national level. Although DCLG does not publish data at regional level⁴ the projection methodology used for the 2011-based update still imposed regional controls to local authority level data to maximise comparability with previous projections and coherence with other available data at regional level.

⁴ As outlined in the Written Ministerial Statement of 18 September 2012, Official Report, Column 32WS, DCLG no longer publishes statistics by government office region.

Stage 1 projections are produced initially at the national level, then at the regional level and finally at local authority district level, with the regional projections being controlled to the national projections and the local authority projections controlled to the regional projections. This process ensures consistency across spatial levels and in the age/sex/relationship status composition of the population of the ONS population projections.

A key check for Stage 1 therefore was to ensure that these controlling procedures had been completed successfully and that the sum of the projections across components matched the control targets at each geographical level.

In Stage 2 initial estimates of number of households by age group and household type were constrained to Stage 1 total households at local authority level. England totals were then derived from those local authority totals.

Coherence

Internal coherence

A number of checks and controls ensure that the data derived from Stage 1 is consistent with the data derived in Stage 2.

The Stage 2 projections were produced by applying projections of headship rates⁵ by broad age band and household type to population by broad age and gender. The results are then controlled to Stage 1 total households. Although Stage 1 takes into account a longer time frame (data going back to 1971) and Stage 2 focuses on the household type information from the last 2 Census, checks are also made between the uncontrolled Stage 2 totals and Stage 1 totals in order to check that they follow similar trajectories.

The Stage 2 household projections were also tested to ensure the minimum number of adults required to fill the projected household for any year was not greater than the projected private adult household population for any year. This was not found to be an issue at the local authority level and subsequent regional and national level checks.

A further check for Stage 2 was run to ensure that the minimum number of dependent children as suggested by the projected household types did not exceed projections of dependent children in the population for any year. An adjustment was made to the number of households with children so that the ratio of the actual number of children was constant in the future.

Coherence with other published data

Where possible the projections produced at each step of the methodology were also compared with published statistics.

⁵ For a particular age band and local authority, headship rates are the proportion of heads of households across the different household types, and they sum up to 1 across all the household types.

A key input into the household projections is the ONS 2011-interim sub-national projections. The household projections are consistent with the sub-national population projections of the same base year and these in turn are consistent with the mid-year population estimates for that same base year. The household population projections are produced by subtracting the estimated institutional population from the total population projections. A check was included to ensure that household population is always lower or equal to total population in a given area by age, gender and relationship status.

Household projections are also consistent with data from the Census 2011. Estimates of the total institutional population for 2011 for each local authority were derived from the Census 2011. A check ensured that the total institutional population in 2011 was consistent with the figures derived from the 2011 Census. The household projections were also controlled to the aggregate household representative rate from the Census 2011 at regional and local authority level.

DCLG encourages users to complement the household projections with other relevant local information available that may help interpret the data in a more localised context. However care need to be taken when attempting to compare DCLG projections with projections created by other organisations and careful attention must be paid to any different methodologies, assumptions and definitions used.

Accessibility and clarity

Household projections are available online from the DCLG website at

<https://www.gov.uk/government/organisations/department-for-communities-and-local-government/series/household-projections>

The statistics release, live tables and supporting charts can all be downloaded free of charge (in EXCEL format) and are provided as part of the release. Detail unrounded data is also available in zipped folders for further analysis, with health warrants on their use. For the 2011-based projections DCLG published household representative rates and headship rates to allow users to undertake further analysis using their own data if they wish to. The new update also provided the link to a new and experimental on-line interactive application developed by DCLG that helps users understand how the distribution of households across various household types is changing over time, and allows users to compare data from different areas of their choice.

Users are also encouraged to direct any further queries regarding the projections via email to HOUSING.STATISTICS@communities.gsi.gov.uk

Important information regarding the access of the data is provided below.

Terms and conditions to access the data

- DCLG has made considerable efforts of quality assurance to ensure that the statistics are as accurate and robust as possible. However, DCLG does not accept

any liability for error or omission in the publication. DCLG reserves the right to change the data at any time without notice.

- DCLG is not responsible for how these statistics are used, interpreted or what reliance is placed on them. DCLG does not guarantee that these statistics are fit for any particular purpose.
- DCLG uses security measures to protect the data against misuse and alteration. However, DCLG cannot accept responsibility for any alteration or manipulation of the data once it has been released on the website.
- DCLG cannot guarantee that the DCLG website will be available at all times, or that the website is free of viruses. Users wishing to download any material related to the household projections are advised to do so at their own risk.
- The statistics release for the household projections and supporting documentation includes links to other websites. DCLG is not responsible for the content of those websites or cannot guarantee that those links will be available.

Copyright and reuse of published data

- DCLG household projections are subject to Crown Copyright. Reproduction of information is subject to the terms of the [Open Government Licence](#)⁶ and the [UK Government Licensing Framework](#)⁷.
- The statistics release for the household projections includes maps to highlight key messages from the data. These maps are produced using Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. Any reproduction of those maps need to abide to the terms of the Crown copyright or may face prosecution or civil proceedings.

Pre-release access

For the purposes of quality assuring the projections, all members of the Steering Group were given access to the household projections datasets prior to release, although not to the final outputs. For transparency of the quality assurance process, all the members of the Steering Group are listed below:

Neil Blake (Oxford Economics)
John Hollis (independent advisor –formerly GLA)
Geoff Meen (independent advisor –formerly Reading University)
Greg Ball (independent advisor- formerly Birmingham Council)
Richard Cooper (independent advisor –formerly Nottingham Council)
Ludi Simpson (Manchester University)
Alan Holmans (CCHPR⁸)
Tony Whiffen (WAG⁹)
Jos Ijpelaar (NISRA¹⁰)

⁶ <http://www.nationalarchives.gov.uk/doc/open-government-licence/open-government-licence.htm>

⁷ <http://www.nationalarchives.gov.uk/information-management/government-licensing/the-framework.htm>

⁸ Cambridge Centre for Housing and Planning Research

⁹ Welsh Assembly Government

Valerie Hale (GROS¹¹)
Suzie Dunsmith (ONS)
Baljit Bains (GLA)
Ben Corr (GLA)
David Fry (DCLG)
Bob Garland (DCLG) -
Paul Chamberlain (DCLG)

The official statistics in their final form, and any accompanying written commentary, were also made available to some eligible persons in advance of their publication, listed below:

DCLG Secretary of State
DCLG Parliamentary Under-Secretary for State
DCLG Minister for Housing
DCLG Minister for Planning
DCLG Special Advisors
DCLG Housing policy lead
DCLG Local Plans policy lead
DCLG Planning for housing policy lead
DCLG Chief planner
DCLG Chief Planning Inspector
DCLG Press Office
DCLG Communications Officials

Output quality trade-offs

For the 2011-based interim household projections there have been some modifications to the existing methodology to be able to make use of available 2011 Census data where possible, as explained in other sections in this report. This has been done because there was a significant user demand to incorporate the Census data and keep the projections as relevant as possible. Keeping the data as consistent as possible with available Census 2011 data has also increased the coherence with available population projections. This had a detrimental effect in the comparability dimension as the projections are less comparable to previous projections and household formation effects are harder to disentangle. To understand better the effect of this trade-off and the household formation effects alone, an exercise was done where the 2011-based projections were applied to the 2008-based population projections, so that the results may be compared to the 2008-based projections and the 2011-based projections and allow a better interpretation of the household formation effect alone. This exercise also provides a measure of the sensitivity of the projections to varying population basis.

DCLG had the option to wait until full data was released from the Census 2011 to allow a projection using the existing methodology, allowing better comparison with past projections. However this would have had a great detrimental effect on the timeliness of the projections and also led to having inconsistent population and household projections,

¹⁰ Northern Ireland Statistics and Research Agency

¹¹ General Register Office for Scotland

so DCLG decided that producing the interim 2011-based projections was in the best interest for users.

DCLG also made the decision to delay slightly the publication date from the pre-announced publication March date. This was after careful consideration of the trade-off between the detrimental effects on timeliness in favour of an extended quality assurance process.

Assessment of user needs and perceptions

As stated in the Relevance section above, the methodology for the household projections was designed in consultation with key users, and for each update there is an Expert Steering Group that helps quality assure any changes to the methodology, and the relevance and usefulness of the outputs.

DCLG regularly provides advice and support for users attempting to find and use the household projection datasets, and DCLG keeps record of these requirements and considers new requirements during the production of subsequent updates of the projections. For example, for the 2011-based interim household projections DCLG published data for all the years of the projections and also published household representative rates and headship rates, all of which had been identified as useful for users for their own analytical work.

DCLG also actively consults more widely when there is a requirement to review the methodology. The last consultation took place in advance of the 2008-based update. Stakeholders were asked to provide views on different proposed methodologies and provide details of the uses of the data and the types of household that would find most useful for those uses. In the interim period between those wide consultations, DCLG also requests user feedback via their statistics releases.

Sources for further information or advice

- DCLG 2011-based household population projections for England, reports and methodology report are available at:
<https://www.gov.uk/government/organisations/department-for-communities-and-local-eries/household-projections>
- DCLG 2008-based household population projections for England are available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6395/1780763.pdf
- Household projections for Scotland are available from the National Records of Scotland (NRS, formerly General Register Office for Scotland & National Archives of Scotland) at:

<http://www.gro-scotland.gov.uk/statistics/theme/households/projections/index.html>

- Household projections for Wales are available from Stats Wales at:
www.statswales.wales.gov.uk
- Household projections for Northern Ireland are available from the Northern Ireland Statistical Research Agency at:
<http://www.nisra.gov.uk/demography/default.asp21.htm>
- The ONS 2011-based Sub-national Population Projections, reports and methodological documents are available at:
<http://www.ons.gov.uk/ons/rel/snpp/sub-national-population-projections/Interim-2011-based/index.html>
- Guidelines for Measuring Statistical Quality of official statistics, published by the ONS, are available at:
<http://www.ons.gov.uk/ons/guide-method/method-quality/quality/guidelines-for-measuring-statistical-quality/index.html>
- UK National Statistics Publication Hub
www.statistics.gov.uk/hub/index.html
- Code of Practice for Official Statistics
www.ons.gov.uk/ons/guide-method/the-national-statistics-standard/code-of-practice/index.html