

# POPGROUP

## Frequently Asked Questions

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## Part One: Starting Out

## 1. Thinking of purchasing POPGROUP?

Each module: POPGROUP, HOUSEGROUP and LABGROUP cost £1,000 +VAT for the first module, and £500+VAT for each further module.

Each includes:

- Full Reference Manual
- User Guide with worked examples
- On-screen notes
- Telephone support for twelve months
- Email discussion list
- Independent user group
- Free updates and quick resolution of any program faults

Orders for software should be sent with official order number by post or email to:

Leonie Hylton  
Local Government Association  
Smith Square,  
London, SW1P 3HZ.  
Tel: 020 7664 3161  
[leonie.hylton@lga.gov.uk](mailto:leonie.hylton@lga.gov.uk)

Telephone enquiries about orders, to Leonie on +44 (0) 161-275-4721 and about functionality of the software to Edge Analytics (Pete Boden or Richard Culf) on +44 (0) 113 384 6087

## 2. Is there any limit on the number of users per licence?

For local authority licensees there is no limit on the number of users who can use the POPGROUP suite of models once purchased.

## 3. What user support is available to me?

Technical support is available from Edge Analytics using the following contact details:

Peter Boden & Richard Culf

Edge Analytics Ltd  
Leeds Innovations Centre  
103, Clarendon Road  
Leeds  
LS2 9DF

Tel: +44 (0) 0113 384 6087  
email: [popgroup@edgeanalytics.co.uk](mailto:popgroup@edgeanalytics.co.uk)

POPGROUP users are encouraged to use the email network to share thoughts and raise queries regarding the application of the POPGROUP suite of models. To register with the network and/or to use it if already registered: [User Group network](#)

Reference Manuals are provided for each of POPGROUP, HOUSEGROUP and LABGROUP plus a supplementary User Guide for POPGROUP. These can be accessed from the following link: [Reference Manuals](#)

#### **4. Are training courses available?**

Training courses are run on an annual basis and are currently held at the University of Manchester.

Additional courses can be provided at users' request. All enquiries should be forwarded to the User Support team:

Tel: +44 (0) 0113 384 6087

email: [popgroup@edgeanalytics.co.uk](mailto:popgroup@edgeanalytics.co.uk)

#### **5. Is POPGROUP compatible with MSEXcel 2007?**

POPGROUP and HOUSEGROUP are compatible with MSEXcel 2003 and MSEXcel 2007 and fully supported for them. To run them, Excel macro security is best set to medium (see FAQ 7 below) so that each time a POPGROUP file is opened the user can allow the macros to operate. The boxes in the same menu dialog box that allow trusted publishers should also be ticked. There are no other requirements to run the software.

#### **6. How do I install POPGROUP?**

POPGROUP, HOUSEGROUP and LABGROUP are each installed from a CD.

All that is required in advance of installation is for the user to give some thought to the directory structure for the storing of data input and model output workbooks, and to decide on a name for the directory that will hold the model 'SETUP' workbook in each case

To install the system, Place the CD in your disk drive. Using Windows Explorer, go to the CD drive, double click on the "POPGROUP\_v3.exe" file (or equivalent HOUSEGROUP/ LABGROUP file).

A dialog box will ask you to confirm the directory in which the program should reside.

In addition to placing the 'Model-Setup' workbook in the chosen directory, installation will create a sub-directory 'SysFiles'. The user will never directly access any workbook in the 'SysFiles' directory.

No other files from the CD are needed for installation

#### **7. Run-time error when I set-up a model**

On your initial run of the 'Model\_Setup' workbook, you may get the following error message:

'Run-time error '9' Subscript out of range'

The cause of this problem is an MSEXcel setting which needs to be set before the POPGROUP software will work correctly. MSEXcel must have the configuration setting 'Trust access to Visual Basic Project' enabled. To do this, on the MSEXcel menu click on Tools - Macro - Security and tick the 'Trust Access to Visual Basic Project' box. This will enable subsequent runs of the 'Model\_Setup' workbook.

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## Part Two: Methodology

## 1. Could you briefly describe POPGROUP's methodology?

POPGROUP incorporates a **cohort component** methodology for its population projection model. This is a standard approach to population projection that is applied by most national statistical agencies. A population in a base period (with single year of age) is projected forward (one year at a time) taking account of the impact of births, deaths and migration (internal migration and international migration). Assumptions about future fertility, mortality and migration trends are typically derived from recent historical evidence, combined with intelligence on likely changes in policy or health outcomes, for example.

The **headship rate** methodology is the current standard for producing household projections. This approach is used by CLG, GROS, NISRA and WAG for its household projections and is replicated in the POPGROUP-HOUSEGROUP methodology.

Headship rates measure the proportions of household residents in an age/sex group that 'represent' a household of a particular type (couple, lone-parent, other multi-person, one-person, for example). The forecast number of households is calculated as the product of the population resident in households multiplied by the headship rate (for each age, sex, household type combination). A new POPGROUP module, the Derived Forecast Model, is due for release in Autumn 2010 and will provide a facility to enter data from any variable that is closely related to the age-sex structure of the population including household structure, economic activity and disability, and to prepare projections from these data.

The POPGROUP-LABGROUP methodology operates in a similar way to the headship rate model, except that **economic activity rates** provide the multiplier by which population forecast are converted to forecasts of the size of the labour force.

A more detailed description of the population and household projection methodologies is available from the User Guide and Reference Manual on the POPGROUP website. The mathematical calculations for each method are documented at the end of each of the manuals.

[Reference Manuals.](#)

## 2. What is 'Natural Change'?

Natural change is the difference (in any given time-period) between the number of births and the number of deaths. To understand the drivers of population growth and decline, it is necessary to understand the relative importance of the 'natural change' and 'net migration' components. POPGROUP output files provides summary and detailed statistics on these key components of population change for each area being considered and for each year of the designated projection period.

A 'natural change projection' is one that ignores migration and shows the future population when only births and deaths affect it.

## 3. What is a 'Headship Rate'?

A Headship Rate identifies the percentage of each age-sex population category that are 'head' of a household. Headship rates by age and sex are applied to the population by age and sex to derive a total number of households (by household type).

Communities and Local Government (CLG) and GRO Scotland, for example, have derived Headship Rates by household type for each local authority district which underpin the 2006-31 household forecasts in England and Scotland respectively.

Headship Rates and Household Representative Rates are inter-changeable terminology and you will find both used in the literature. Household Membership Rates are an alternative measure of population residing within households and are used in WAG's household projections

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## Part Three: Data issues

## 1. Where do I get my data from?

Data will typically be sourced from a variety of different locations but primarily from datasets available from national statistical agencies (ONS, GROS, WAG and NISRA in the UK). These datasets will provide inputs for population, households, births, deaths and migration plus additional intelligence on fertility, mortality, migration age-schedules, headship rates and economic activity rates.

To assist with the initial sourcing of datasets to populate POPGROUP model files a [Data Guidelines](#) document has been compiled which provides a description of data inputs and relevant datasets and a link to availability where appropriate. Users should refer to this document for more information.

## 2. What should I use as my base year?

You should use a year for which you have a good estimate of the population for each single year of age 0 to 89 and 90+, for males and females separately.

Some users make the base year the most recent year for which a good estimate is available. But there are good reasons for using a base year from some years before. The work of entering past data is worthwhile because it provides a context for the forecasts which helps interpretation and POPGROUP uses the extra data to provide good estimates of past migration and demographic rates. For further information see the Guidance Note. [FAQ - Guidance Note 1](#)

## 3. What if I don't have a base population all the way up to age 90+

POPGROUP requires a base population of single years of age from 0, 1, ... 88, 89, and all aged 90 or over ('90+'). If the data available are only available to a lower age, for example stopping at 75+, or 85+, then the user must find a plausible way of dividing the top age group into single years of age and 90+.

The usual method is to apply the distribution of elderly up to 90+ from a similar area, for example a larger area containing the area of interest. The file 'engl91age85plus.xls' demonstrates how to do this, using the example of using the England elderly age structure to distribute a local area's total elderly in 1991. The file is contained in the online training materials at [Online Training Material](#): once downloaded, look in the folder \Training Materials\Forecast\FIuteshireRawData\.

## 4. Can I use net migration rates or counts in POPGROUP?

Yes, but it involves some simple extra work. POPGROUP requires gross flows: at least one in-flow and out-flow for each area. With net figures (rates or counts, and whether for all ages or by age and sex), you can either:

- (a) put the positives in the IN file and the negatives in the OUT file, leaving the other flows as zero, or
- (b) estimate gross flows that are consistent with the net flows that you have. For example, take some sensible gross flows for the OUT file (perhaps from the Census), then add the net figure to them to give figures for the IN file. A positive net figure will make the IN file more than the OUT file, while a negative net figure will make the IN file less than the OUT.

## 5. What are 'Special Populations'?

Special populations are a sub-set of the population which might exhibit distinctly different characteristics to the main resident population. A large Armed Forces base in a locality for example. A good description is provided in Part Five of the POPGROUP User Guide.

Special populations are deducted from the population at the start of each year of the forecast. The population is not 'aged and is not subject to the assumptions on fertility, mortality and migration during

the year. The population is added again (optionally a different number) at the end of each year's forecast.

More information is provided in Part 5 of the POPGROUP User Guide.

## 6. What is a constraint?

A constraint is sometimes called a 'control' and provides forecast information about the population size or other development from an independent source. A POPGROUP forecast is made consistent with an independent source by adjusting the migration flows until the constraints are met. In any year of the forecast a constraint could take a number of forms:

Population constraint: total population or population by sex and age

Housing constraint: change in total households or change in total dwellings

Labour force constraint: change in total labour force or change in total employment

More information is provided in Part 5 of the POPGROUP User Guide.

## 7. What is 'Population not in households'?

Population not in households is a count of those people living in 'communal establishments'. This population is excluded from the application of Headship Rates in the POPGROUP-HOUSEGROUP mode.

## 8. What is a dwelling-household conversion?

A conversion between households and dwellings is necessary to ensure that vacancy rates, second premises and holiday accommodation are correctly accounted for when evaluating housing forecasts.

The conversion from households to dwellings (and vice versa) is achieved using a households/dwellings ratio. Unoccupied household spaces include second residences, holiday accommodation and vacant premises.

Users should refer to the POPGROUP Reference Manual for a more formal definition of the conversion factor and should refer to the additional Data Guidelines document which provides more information on the data inputs to the calculation.

## 9. What are fertility differentials?

A fertility differential provides a weighting' factor to account for differences between standard age-specific fertility and local fertility. Age-specific birth rates for a local area will be the product of the rates on the schedule sheet and all differentials on the other sheets, which usually reflect local variations or variations in the future. For example, to produce a local forecast of births, a POPGROUP model might specify the national age specific fertility profile for females aged 15-49 to the female population aged 15-49, but also specify first a local differential on the sheet for each local area, and second a differential for each future year on the 'All-Groups' sheet, which will apply to every group. Differentials can be provided as a total figure or by age and/or sex. A differential of 1 leaves the age-specific schedule of fertility rates unchanged. A differential of more or less than 1 increases or decreases the schedule of fertility rates.

See section 3.2 of POPGROUP Reference Manual for a description of the rules governing the use of counts, rates and differentials in the Fertility, Mortality and Migration input files.

## **10. What are mortality differentials?**

A Mortality differential provides a weighting factor to account for differences between national age-specific mortality and local trends. Age-specific death rates for a local area will be the product of the rates on the schedule sheet and all differentials on the other sheets, which usually reflect local variations or variations in the future. For example, to produce a local forecast of deaths, a POPGROUP model might specify the national age specific mortality profile for all ages, but also specify first a local differential on the sheet for each local area, and second a differential for each future year on the 'All-Groups' sheet, which will apply to every group. Differentials can be provided as a total figure or by age and/or sex. A differential of 1 leaves the age-specific schedule of mortality rates unchanged. A differential of more or less than 1 increases or decreases the schedule of mortality rates.

See section 3.2 of POPGROUP Reference Manual for a description of the rules governing the use of counts, rates and differentials in the Fertility, Mortality and Migration input files.

## **11. Input files show differentials, but where are the actual rates held?**

The final rates are not stored in the input files, but the output files produced by POPGROUP provide full projected birth and death counts, and the TFR and SMR rates each year.

## **12. What does the 'trend' option do?**

Within the POPGROUP input files, the trend option can be chosen for an individual year if a value has been provided for a previous year. If a value is also provided for a future year, the value for the year for which the trend option is chosen is linearly interpolated between the two values. If no future year is provided the last provided value (before the trend year) is used. Trending is available for each of the model input components.

The on-sheet notes on each of the relevant workbooks explain how the trending works and the rules by which it may be applied. There is also more detail on how trending works in the POPGROUP Reference Manual (Section 3.2.4).

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## Part Four: Using the models

## **1. Can I use POPGROUP files prepared elsewhere?**

Yes, but you will probably need to use the routines in 'Update\_Model-DirectoryChange.xls'.

You have to modify POPGROUP (and HOUSEGROUP and LABGROUP) files to tell them where the programs are kept on your computer.

You will need to do this when you get files from another user, or when you move your work from one computer or server to another. You will not need to do this only if the paths to the program 'Sysfiles' directories are the same for the new files as for your own computer.

For further information users should refer to section 3.7.3 in the POPGROUP Reference Manual.

## **2. Can I get the number of children in each type of household, from HOUSEGROUP?**

HOUSEGROUP uses a 'headship' approach, as do CLG and GRO(S) for areas in England and Scotland respectively, and many other countries' statistical agencies. Sometimes the term 'representative' is used instead of 'headship'. Only the proportions of the household population at each age-sex who are HEADS of each type of household are needed. Only these are estimated and projected. So there is no information in HOUSEGROUP about the division of the population of each age into types of household.

The new DERIVED\_FORECASTS module due later in 2010 will additionally allow a 'household membership' approach (as used by WAG and NISRA for areas in Wales and N Ireland). This estimates and project the proportions of the household population at each age-sex who are MEMBERS of each type of household, whether heads or not. This will give the number of people of particular ages who are in each type of household.

## **3. Why do no additional dwellings lead to a decrease in population?**

A constraint of no extra dwellings implies a stable number of households, at least if the dwelling/household conversion is constant over time which is usual. However, most projections expect increased headship rates in the future (ie smaller households on average). Additionally, in most areas the changing age structure, in particular an increase in the number of elderly, also implies more small households. For both these reasons the same number of households will house fewer people - a decrease in population.

The assumption is that without more housing some extra people will be forced to move away, or fewer move in. A planner may also wish to consider the possibility that there will be crowding - ie that the expected reduction in household size will not in fact occur if insufficient housing is built. This consideration is usually made outside the software; it could be entered in the software by lowering the headship rates.

## **4. Can I link a population forecast to the number of jobs in an area?**

Yes. You can use POPGROUP with LABGROUP to find the implications for labour force and employment, *or* to find the population change implied by a particular increase or decrease in number of jobs. This is described briefly in the POPGROUP Reference Manual at sections 3.4 and 3.6.

It is described more fully in a Guidance Note: [FAQ - Guidance Note 2](#)

## **5. Should I put the same differential in each Group sheet, or put it once in the All-Groups sheet?**

It makes no difference to the forecast.

There is a very slight difference in the calculation, after the forecast, of the TFR for the All-Groups. It involves the fertility differentials on the All-Groups sheet (see POPGROUP Reference Manual, section 6.2.1). The difference will be very small. However, the preference is to put the differential in the All-Groups sheet rather than to repeat it in each sheet. There are no differences when computing mortality or migration summary measures.

## **6. How are new dwellings populated in a dwelling-led model?**

A migration led scenarios will estimate a population for each year of the forecast, by age and sex. The number of households will subsequently be derived by applying Headship Rates to this age-sex population profile.

In a dwelling-led scenario, the estimated number of households is compared to the designated number of dwellings (using a 2001 Census household-dwellings conversion factor).

The dwelling totals act as a constraint so, if there are too many households for the defined number of dwellings, then 'net out-migration' must result. Similarly if projected population growth is insufficient to fill the designated number of new dwellings with households then the model will generate increased net in-migration (some more in-migration and some less out-migration).

The model makes no assumptions who will go into the new dwellings, either migrants or population from existing stock.

## **7. Why do small area projections not sum to my single aggregated projection total?**

This is to be expected. Think of two wards, one has grown 10% in a year, the other has reduced 10% in a year, and starting with the same population. Projecting this forward as a whole, there's no change. But projecting the two wards, the growing ward comes to dominate the change and there will be growth in the county: Area 1 increases by 10% from say 1000 to 1100 to 1210 to 1331 and so on, while the smaller Area 2 reduces by 10% from 1000 to 900 to 810 to 729; the total has risen from 2000 to 2060 in just 3 years.

Areas with different rates will continue to diverge and the growing ones will come to contribute more to population growth.

There are those that suggest that constraining to a projection for larger populations is not advisable and that the bottom-up approach should be more accurate. On the other hand, the information for smaller populations is usually less reliable, and there are often social reasons for thinking that a local system of groups (areas, or ethnic groups) won't continue to diverge with constant rates, i.e. that some equilibrium will reduce the divergence. Those counter-arguments suggest that the forecast for a single larger group might be more accurate. And for this reason migration flows are often projected as numbers rather than rates. This remains a continuing discussion, always judged locally.

## **8. What is the explanation for recent fertility trends?**

In the UK, fertility rates have risen steadily since 2001 but appear to have peaked in 2008. ONS has compiled its own series of FAQ which relate directly to the interpretation of fertility trends and provides an excellent overview of the issues involved. Users should consult this for further guidance:

[ONS: Fertility FAQs](#)