

Census flow data workshop

Handout instructions

8/12/20

Getting started

- Start up a browser
- Screenshots of process

UK Data Service website

- Go to: <https://ukdataservice.ac.uk/>
- Click 'Census data'

Explore the UK's largest collection of social, economic and population data resources

Search data

How to cite data correctly

Why cite data? #CiteTheData

CITE THE DATA

University of Essex UK Data Service

Guides and resources

- Dataset guides
- Topic guides
- Methods and software guides
- Guides to exploring online

More resources >

Video tutorials
See our range of training videos

See data from all over the world

Browse our data map

Data types

- Census data**
- International macrodata
- Longitudinal studies
- Qualitative/mixed methods
- UK surveys

More data types >

MAKE THE DATA COUNT
CITE THE DATA

Remember to cite the data
Citing a dataset correctly is just as important as citing articles, books, images and websites.

Our impact

Find out how data from the UK Data Service collection are used to inform research, influence policy and develop skills.

Read our Impact Blog

Latest data

More latest data >

Census Service website

- Select 'Flow data'

The screenshot shows the UK Data Service Census Support website. The main header includes navigation links: 'About Census Support', 'Get census data', 'Use census data', and 'News and events'. The central banner features the title 'Census flow data' and a description: 'Data which have an origin and destination, such as migration and commuting'. Below this, there are sections for 'LATEST TWEETS', 'LATEST NEWS', and 'UK DATA SERVICE CENSUS SUPPORT'. The 'QUICK ACCESS TO' menu is located at the bottom right, with 'Flow data' highlighted by a red box and a red arrow pointing to it. A red arrow also points from the 'Flow data' link to the 'QUICK ACCESS TO' menu.

UK Data Service
Census Support

About Census Support Get census data Use census data News and events

Census flow data

Data which have an origin and destination, such as *migration* and *commuting*
[Read more](#)

STOP

We expect to run as normal a service as possible during this COVID-19 (Coronavirus) emergency. Please [visit our COVID-19 page](#) for the latest information.

LOGIN / REGISTER

DATA CATALOGUE

Search and browse the UK Data Service Census Support data collection.

GO

Want to search wider? [Search the whole of the UK Data Service](#)

LATEST TWEETS

These data are available from
[@UKDataService](#)
<https://t.co/or7122Cwyp>
<https://t.co/cirBr0Tlgl>

RT @PolScionic: In 1969 the National Child Development Study @CLScohorts asked 11 year olds to imagine life at 25. Their thoughts on ageing...

@UKDataService enables research into the social & economic context of COVID. Visit our theme page:....
<https://t.co/kYmJQ9eede>

LATEST NEWS

UK DATA SERVICE CENSUS SUPPORT

The Census Support service is composed of data specialists who focus on making a wide range of data from the contemporary censuses from 1971 to 2011 as accessible as possible to research users.

We provide access to census counts for areas, data on migration and commuting between areas, samples of anonymised census records and the boundary files necessary to map them.

Want to know more? [see about us](#)

PROGRESS TOWARDS 2021 AND BEYOND

QUICK ACCESS TO

- UK Data Service
- Aggregate data
- Flow data
- Microdata
- Boundary data

Flow data summary at Census Support

The screenshot shows the 'Census flow data' page on the UK Data Service website. The page includes a navigation menu with 'About Census Support', 'Get census data', 'Use census data', and 'Census news and events'. A sidebar on the left lists 'Aggregate data', 'Flow data', 'Microdata', 'Boundary data', 'Related data', and 'Explore online'. The main content area features a 'SHARE' button, a description of census flow data, a photograph of light trails on a road, and a section titled 'ACCESS CENSUS FLOW DATA' which highlights 'WICID' as a flexible interface. A red arrow points from the 'WICID' text in the screenshot to the 'WICID' text in the adjacent list. The footer contains information about funding, copyright, and contact links.

UK Data Service home Site Search FAQ Help

UK Data Service
Census Support


About Census Support Get census data Use census data Census news and events

Census > Get data > Flow data

Census flow data

SHARE

Census flow data (also known as interaction data) are data that relate to flows of people between places. Whereas most census data relate to counts of people at single locations, flow data describe interactions between two locations - origins and destinations.



The most common flow data relate to migration and commuting flows, although data from the latest 2011 Census also include information on movements between main and second addresses.

Currently migration and commuting data from the 1981, 1991, 2001 and 2011 Censuses are available through WICID, as well as some annual migration data derived from NHS patient registers.

- [Guide to census flow data](#)

ACCESS CENSUS FLOW DATA

WICID is a flexible interface providing access to flow data. These data contain counts which are linked to an origin and destination, such as migration or commuting flows.

NEW USERS
Advice for new users
Get in touch

MOST POPULAR PAGES
Get census data
Explore census data online

CONNECT WITH US
Contact Twitter Facebook

The UK Data Service is funded by the ESRC with contributions from the University of Essex, the University of Manchester and Jisc.
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Home Terms and conditions Cookies

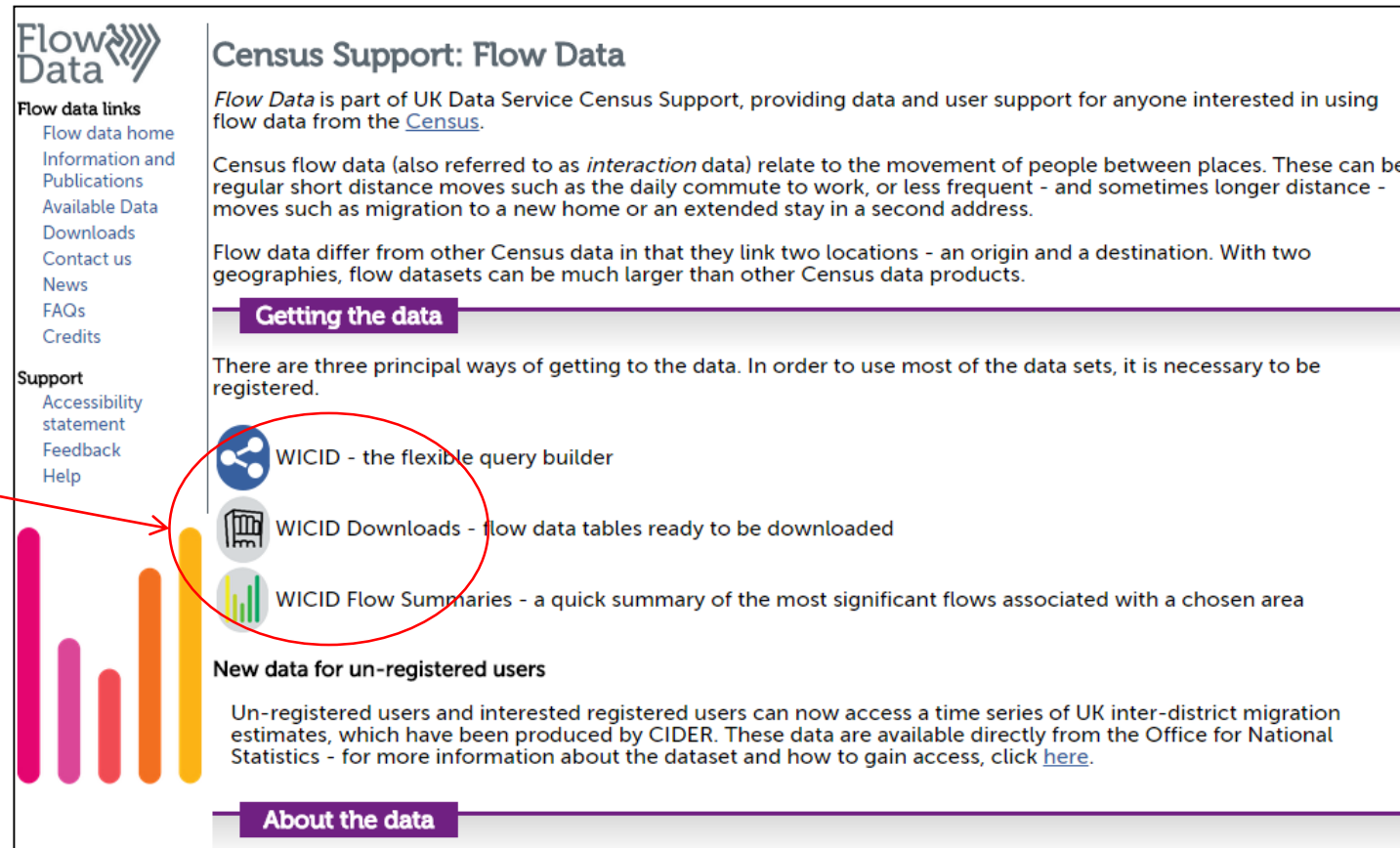
- 'Flow data' is the top level
- 'WICID' is part of the Flow Data site

Flow data website

- For quicker access you can also follow the link to
 - <https://wicid.ukdataservice.ac.uk/>
- Technically, WICID is just one part of our site
 - It is the most commonly used part
 - We are sometimes collectively referred to as 'WICID'
- WICID is an acronym
 - **W**eb **I**nterface to **C**ensus **I**nteraction **D**ata

Flow data homepage (i)

- Three main routes to data
 - Flexible queries
 - Downloads
 - Summaries



Flow Data

Flow data links

- Flow data home
- Information and Publications
- Available Data
- Downloads
- Contact us
- News
- FAQs
- Credits

Support

- Accessibility statement
- Feedback
- Help

Census Support: Flow Data




Flow Data is part of UK Data Service Census Support, providing data and user support for anyone interested in using flow data from the [Census](#).

Census flow data (also referred to as *interaction* data) relate to the movement of people between places. These can be regular short distance moves such as the daily commute to work, or less frequent - and sometimes longer distance - moves such as migration to a new home or an extended stay in a second address.

Flow data differ from other Census data in that they link two locations - an origin and a destination. With two geographies, flow datasets can be much larger than other Census data products.

Getting the data


There are three principal ways of getting to the data. In order to use most of the data sets, it is necessary to be registered.

-  WICID - the flexible query builder
-  WICID Downloads - flow data tables ready to be downloaded
-  WICID Flow Summaries - a quick summary of the most significant flows associated with a chosen area

New data for un-registered users

Un-registered users and interested registered users can now access a time series of UK inter-district migration estimates, which have been produced by CIDER. These data are available directly from the Office for National Statistics - for more information about the dataset and how to gain access, click [here](#).

About the data



WICID Query builder

- The WICID general query builder allows users to identify and extract a subset of flows in which they are interested
 - It also provides built-in support for area code labelling
 - Select '**WICID – the flexible query builder**' button

Flow Data

Flow data links

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About the data

Login screen

- For use with OGL/Public data, we can use 'Standard Login'
- Registered access offers open data AND safeguarded data

Select 'Standard login'



Census Support: [WICID Login](#)

Standard login (public access datasets)



[Start a new session - no username or password required](#)

Registered access for academic and most other users



[Login using Shibboleth / UK Federated Access Management](#)

WICID query home page

- The query builder steps you through the selection of data and of areas of interest
- A traffic light metaphor is used in the icons to show how far you have progressed through the query
- We start with data selection; there are several ways of selecting data
- Click on the '**Data**' tab

WICID query home page

General query interface

UK Data Service
Census Support

[Home] > General query builder

Logged in as: guest [Logout now]

Flow Data

Flow data links

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WICID Data Geography Finalise Run Output

General query interface

WICID is the Web-based Interface to Census Interaction Data. It allows you to flexibly construct queries to extract data, then analyse it and produce output tables.

The tabs above will guide you through the query process - when you have a set of green lights, your query is complete.

Return to this page to see the progress of your query by clicking on the WICID tab

Summary of current query

Geography

Origins 0 Nothing selected yet

Destinations 0 Nothing selected yet

Interaction data

Data items 0 Nothing selected yet


Options

Select 'Data'


WICID data selection


- There are three main forms of data selection
 - Using Nomis table-finder
 - Quick selection – provides access to various totals
 - Selection by dataset and table – browse through all tables
 - Selection by variable – find tables featuring a preferred variable
 - We will start with the 'Quick selection' mode...


WICID Data Geography Finalise Run Output


Data  Status: 0 data items currently selected
[\[Unselect all\]](#) [\[Show list\]](#)

General selection tools


 **Table - Finder:** The easiest way to locate a 2011 Census flow-data table. Search using free text, multiple parameters and criteria. It will redirect to an external website (NOMIS) which will lead back to WICID if you select a data set available through UKDS. - ***new***

 **Quick Selection:** Some data sets include predefined totals - total migrants for example - that can be easily selected using this method.


 **Select by Dataset and Table:** This method allows you to select cells within tables as described in published documentaion.


 **Select by Variable:** This method allows you to select from a list of variables; you will then be presented with a list of all tables in which your chosen variables appear

Other data

 **Population Data** Select population counts - ***if you wish to calculate migration or commuting rates you will need a population denominator. Only select population data AFTER you have selected your flow data. Consult the WICID help system for a full guide to downloading populations with your flows.***

Data manipulation tools

 **Edit list** Edit a list of selected variables. This option will become active when you select some data to tabulate.
















 **Derive** Derive new variables by combining variables that you have already selected This option will become active when you select some data to tabulate.

WICID: Quick data selection

- The quick selection method lists a number of totals
- For some data sets, there is more than one total offered
 - As shown in the previous slide, data sets for which you do not currently have permission are shown grayed out
- Select the total '**2011 SMS Merged LA/LA [Origin and destination of international migrants (expanded country origin)] - MF02UK - Open**'
 - This is the same Local Authority level SMS (international migration) data for the UK, and is an 'Open' or public data set
- You will then be shown a confirmation page; click on the '**Select geography origins**' button

WICID: Quick data selection

Quick data selection

| Sample data sets | | |
|--|---|--|
| Data period | Data set | Total |
| 1991 |  Sample data | Total migrants |
| Migration data | | |
| Data period | Data set | Total |
| Census 2010-11 |  2011 SMS Merged LA [Origin and destination of migrants by ethnic group (detailed)] - MU01AEW_all - Safeguarded | All usual residents who were living at a different address one year ago |
| |  2011 SMS Merged LA [Origin and destination of migrants by ethnic group (grouped)] - MU01BEW_all - Safeguarded | All usual residents who were living at a different address one year ago |
| |  2011 SMS Merged LA [Origin and destination of migrants by passport held (detailed)] - MU06AEW_all - Safeguarded | All usual residents who were living at a different address one year ago |
| |  2011 SMS Merged LA [Origin and destination of migrants by passport held (grouped)] - MU06BEW_all - Safeguarded | All usual residents who were living at a different address one year ago |
| |  2011 SMS Merged LA [Origin and destination of migrants by passport held by sex] - MM06EW_all - Safeguarded | All usual residents who were living at a different address one year ago |
| |  2011 SMS Merged LA [Origin and destination of migrants by religion] - MU05EW_all - Safeguarded | All usual residents who were living at a different address one year ago |
| |  2011 SMS Merged LA [Origin and destination of migrants by Welsh language skills] - MU03W_all - Safeguarded | All usual residents in Wales aged 3 and over who were living at a different address one year ago |
| |  2011 SMS Merged LA [Origin and destination of migrants by whether in a wholly moving household] - MU02EW_all - Safeguarded | All usual household residents who were living at a different address one year ago |
| |  2011 SMS Merged LA/LA [Origin and destination of international migrants (expanded country origin)] - MF02UK - Open | All usual residents who were living outside the UK one year ago |
| |  2011 SMS Merged LA/LA [Origin and destination of international migrants by age (broad grouped) by sex] - MM01CUK - Open | All usual residents who were living outside the UK one year ago |
| |  2011 SMS Merged LA/LA [Origin and destination of migrants by age (broad grouped) by sex] - MM01CUK_all - Open | All usual residents who were living at a different address one year ago |
| |  2011 SMS Merged LA/LA [Origin and destination of migrants by age (grouped - mid) by sex (including those aged under 1)] - MM01BUK_all - Safeguarded | All usual residents who were living at a different address one year ago (including those aged under 1) |
|  2011 SMS Merged LA/LA [Origin and destination of migrants by age (grouped) by sex] - MM01AUK_all - Safeguarded | All usual residents who were living at a different address one year ago | |
|  2011 SMS Merged LA/LA [Origin and destination of migrants by age (grouped)] - MU01BUK_all - Open | All usual residents who were living at a different address one year ago | |



Data selection – confirmation page

UK Data Service
Census Support

[\[Home\]](#) > [Query](#) > [Data](#) > Quick selection



Logged in as: guest [[Logout now](#)]



Flow data links

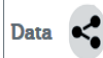
- [Flow data home](#)
- [Information and Publications](#)
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WICID Data Geography Finalise Run Output



Status: 1 data items currently selected
[\[Unselect all\]](#) [\[Show list\]](#)

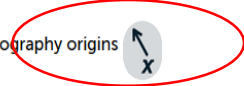
Click this button

Quick data selection

→ Added 'All usual residents who were living outside the UK one year ago(2011 SMS Merged LA/LA [Origin and destination of international migrants (expanded country origin)] - MF02UK - Open)' to list of selected data.

You have not yet selected any origins
You have not yet selected any destinations
You have successfully selected some data

Recommended next move - select geography origins



Alternative options

- [Return](#) to list of data totals for quick selection
- [Return](#) to general data selection page
- [Return](#) to general query interface

Census Support Flow Data (formerly The Centre for Interaction Data Estimation and Research), now based at UCL forms part of the UK Data Service Census Support Service, and provides access to Census Interaction Data through services running at the University of Essex



WICID: Geography selection

- As with selecting data, there are various ways of selecting areas
 - Sometimes we want to select many areas, sometimes only a few...
- Quick selection: select all areas in a given geography
- List selection: select from a list of choices
- Type-in selection: enter a full or wild-carded name
- Map selection: select desired areas through a modern interactive environment (only available for 2011 data).
- For this practical, select '**Quick Selection**'

WICID: Geography selection

Select 'Quick selection'

UK Data Service
Census Support



[\[Home\]](#) > [Query](#) > [Geography](#) > Select origins

Logged in as: guest [[Logout now](#)]



Flow data links


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Support







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WICID | **Data** | **Geography** | Finalise | Run | Output

Origins  Status: 0 origins currently selected
[Unselect all][[Show list of selected areas](#)] [Switch](#) to selection of destinations

General selection tools

-  **Quick selection** This method allows you to select all areas in a particular geography in one go.
-  **List selection** This method shows a list of all areas in your selected geography. It is useful if you do not know the code numbers to use the type-in method; but the list is cumbersome for geographies that have a large number of components.
-  **Copy selection** Set origins to be the same as currently selected destinations, or *vice versa*.
-  **Type-in box** This method allows you to select areas by typing their sequence numbers, OPCS codes or names into a text box. It is quick if you already know the OPCS codes of areas in which you are interested, or if you want to search the whole country by placename.
-  **Postcode selection** This method allows you to select an area by typing in its postcode. At present only a limited set of geography types are directly selectable.
-  **Map selection** This method allows you to select areas via a map interface. ***NEW for 2011 data***

Manipulation tools



-  **Edit list** Edit a list of selected areas. This option will become active when you select some areas.

[Help](#)

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Example of geography selection








- We are going to use the **quick selection** approach
 - You will be shown a list of all known geographies
 - Those that are not compatible with your current data selection (or, can only be used with data to which you do not have access) will be greyed out
 - The geographies supported for the selected data will be on top and will be selectable
 - Notice the icon next to the available geographies.
-  The green flag indicates that the geography is natively supported. A table may contain multiple native geographies.
-  The red cubes indicate that the geography is generated by aggregating flows to a higher level compatible geography so users' won't have to do the conversion themselves.

Selecting from all known geographies

- Select **'2011 SMS Foreign origins – expanded'** as origins. Notice that in WICID origins and destinations for migration tables have been swapped to their 'natural' order.

| Geography | | Number of areas |
|---|--|-----------------|
| Main Geographies | | |
|  2011 SMS Foreign origins - expanded  | | 184 |
|  Great Britain ^{†‡} | | 1 |
|  GB Countries 1991 ^{†‡} | | 3 |
|  GB Standard Regions 1991 ^{†‡} | | 10 |
|  GB Counties 1991 ^{†‡} | | 67 |

- Confirm and proceed to destinations. Select quick selection again and then **'UK Location Authorities (merged) 2011'**

| Geography | | Number of areas |
|--|--|-----------------|
| Main Geographies | | |
|  UK Local Authorities (merged) 2011  | | 404 |
|  2011 English Regions plus rest of UK  | | 12 |
|  Great Britain ^{†‡} | | 1 |
|  GB Countries 1991 ^{†‡} | | 3 |
|  GB Standard Regions 1991 ^{†‡} | | 10 |

Output: extracting records

- Our query is now ready – we have identified data and geography that we want to use, but we have not yet executed the query
- Click on the '**Produce output**' button
- The 'Run' screen allows us to carry out the query
- It also has a number of other options to store the query (if we are logged in) and to modify it – we'll ignore these for today
- Click the '**Run your query**' icon
- This loads a new page after the query is complete; from here click '**Continue to output pages**'
- The three pages that follow visualise the steps above

Produce output

UK Data Service
Census Support

[\[Home\]](#) > [Query](#) > [Geography](#) > [Destinations](#) > Quick selection

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Destinations



Status: 404 destinations currently selected

[switch](#) to selection of origins

Selected all areas from geography 'UK Local Authorities (merged) 2011' as destinations

You have successfully selected some origins
You have successfully selected some destinations
You have successfully selected some data

Recommended next move - Produce Output



Alternative options

- [Return](#) to list of geographies for quick selection
- [Return](#) to general destinations selection
- [Return](#) to general query interface

[Help](#)

Click this button

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About to extract data...

WICID

UK Data Service
Census Support

[Home] > Query > Refine query

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WICID Data Geography Finalise Run Output

Refine and review query

This page is used to refine and review your query

Refine options

[Intra-area](#) flow filters

Review options

[Show](#) a summary of your query
[Save](#) your query

Next...

[Run your query](#)

[Return to query start](#)

Help

Click this button

Query complete

The screenshot shows a web browser window with the URL <https://wicid.ukdataservice.ac.uk/cider/wicid//query/run.php>. The page header includes the UK Data Service logo and navigation links: [Home] > Query > Run. The user is logged in as 'guest' with a 'Logout now' link. A progress bar at the top right shows the 'Run' step is completed. Below the progress bar is a breadcrumb trail: WICID > Data > Geography > Finalise > Run > Output. The main content area is titled 'Run query' and features a central box with an hourglass icon and the text 'Query Complete! Your data has now been extracted. Please choose the **continue** option below to select output options, or alternatively select one of the other options.' Below this box, it states 'Extraction took 0.55 seconds'. Under the heading 'Options', there is a button with a right-pointing arrow and the text 'Continue to output pages', which is circled in red. Below the button are two links: 'WICID query homepage' and 'CIDER homepage'. A sidebar on the left contains 'Flow Data' links and 'Support' links. A small bar chart is visible in the bottom left corner.

Click this button

Output options

- The output pages offer two sets of pages
 - Tabular output: for viewing and downloading extracted data
 - Analysis pages: for carrying out certain tests
- We'll look at tabular output
- Click the **'Tabular output'** icon

The screenshot displays the 'Output' page of the UK Data Service WICID interface. The browser address bar shows the URL: <https://wicid.ukdataservice.ac.uk/cider/wicid/output/index.php>. The page header includes the UK Data Service logo and navigation links: [Home] > Query > Output. The user is logged in as a guest, with a [Logout now] link. A breadcrumb trail shows: WICID > Data > Geography > Finalise > Run > Output. The main content area is titled 'Output' and contains two options: 'Tabular Output' (circled in red) and 'Analysis'. The 'Tabular Output' option is described as: '- This is the general output section, where you can generate tables of output. These can be viewed on-screen or downloaded in a variety of formats.' The 'Analysis' option is described as: '- Use a number of analytical tools to generate statistical summaries of your data, and produce a variety of indices.' A pink 'Help' button is located below the 'Analysis' option. The left sidebar contains 'Flow data links' (Flow data home, Information and Publications, Available Data, Downloads, Contact us, News, FAQs, Credits) and 'Support' (Accessibility statement, Feedback, Help). A decorative bar chart is visible at the bottom left of the page.

Tabular output planner

- The planner allows you to choose the form of output, and then preview and download output
- There are several output styles
 - **Matrix output:** creates an origin-destination matrix
 - **Pair-list output:** creates a set of output records, with one line for each origin-destination pair (similar format to the download files)
 - **Framework layout:** creates a separate table for each pair of origin and destination areas
- We will look at the **matrix mode**
- Leave all options as they are and make sure '**comma separated values**' is selected in the '**output format**' section.
- Click the '**Preview Output and Download**' button

Planning tabular output

WICID

Data

Geography

Finalise

Run

Output

Tabular output - plan

This page allows you to alter the characteristics of the output.

Data items to output

You currently have 1 items selected for output

[Change selection](#) of variables to output.

Layout options

Output layout

- Origin - destination matrix
- Origin - destination pair list [\[Advanced settings...\]](#)
- Published table frameworks [\[Advanced settings...\]](#)
- Export data (fast but inflexible)

Output format

- HTML table [\[Advanced settings...\]](#)
- Comma separated values

Preview Output and Download



Options



Return to Output page

General options

Origin and destination labels

Current labels to use in output [\[Change\]](#)

UK Local Authorities (merged) 2011:LA label
2011 SMS Foreign origins - expanded:Country/ies label

Preview output

- The preview screen shows part of the output data
- You can then decide whether to display (or download) the whole table, or whether to modify the appearance
- The default output uses place names, but you can add area codes as well
- For the purposes of this practical, leave the labels as is.

Full output

- When you are happy with the preview, you can view the data on screen or download
- Output is formatted as either HTML or comma separated values (CSV)
- CSV is recommended for import into Excel etc., or for use with statistical packages etc.
- Click on the '**Download output file**'

Full output

UK Data Service
Census Support

[\[Home\]](#) > [Query](#) > [Output](#) > Tabular output

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Flow Data

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Tabular output - preview

This is a preview of part of your selected output.

Only the first 5 origins are shown
Only the first 5 destinations are shown

Output size estimate

Output will contain up to 74,336 values


Output size estimated to be around 581.19 KB


```
"2011 SMS Merged LA/LA [Origin and destination of international migrants (expanded country origin)] - MF02UK - Open"  
"Origin geography: 2011 SMS Foreign origins - expanded","Destination geography: UK Local Authorities (merged) 2011"  
"Layer","All usual residents who were living outside the UK one year ago"  
"Origins","Destinations",,,,  
"Hartlepool","Middlesbrough","Redcar and Cleveland","Stockton-on-Tees","Darlington"  
"Guernsey",0,2,0,2,0  
"Jersey",0,0,0,1,1  
"Channel Islands not otherwise specified",0,0,0,2,1  
"Isle of Man",0,0,6,2,2  
"Ireland",5,42,4,36,15  
Notes:
```


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Click this button


Output options

 - tabulate on screen (only for small amounts of output)

 - download output file

 - return to output planner

Options

 Return to Output page

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Census Support Flow Data (formerly The Centre for Interaction Data Estimation and Research), now based at UCL forms part of the UK Data Service Census Support Service, and provides access to Census Interaction Data through services running at the University of Essex



Download data

The screenshot shows a web browser window with the URL https://wicid.ukdataservice.ac.uk/cider/wicid/output/tabular/output_tab_dload.php. The page is titled "UK Data Service Census Support" and shows the user is logged in as a guest. A navigation bar includes "WICID", "Data", "Geography", "Finalise", "Run", and "Output". The main content area is titled "Tabular output download" and shows "File download details" with a filename input field containing "wicid_output.csv". A green "Download now" button with a downward arrow icon is circled in red. A red arrow points from the text on the right to this button.

Click the **'Download now'** button to download the data

Output in WICID. Open data in Excel

Open the CSV file in Microsoft Excel

The image shows a screenshot of Microsoft Excel with a data table. The table has columns for origins (A-Z) and destinations (AA-AC). The data represents the number of international migrants from various countries to different local authorities in the UK in 2011. A large text overlay asks: "Research question: What are the top two countries people migrated from for each local authority in the UK?".

| Origins | Hartlepool | Middlesbrough | Redcar and Cleveland | Stockton-on-Tees | Darlington | Halton | Warrington | Blackburn | Blackpool | Kingston upon Hull | East Riding of Yorkshire | North East Lincolnshire | North Yorkshire | Derby | Leicester | Rutland | Nottingham | Herefordshire | Telford and Wrekin | Stoke-on-Trent | Bath and North East Somerset | Bristol, City of | North Somerset | South Gloucestershire | Plymouth | Torbay | Bournemouth | Poole | |
|-------------------------------------|------------|---------------|----------------------|------------------|------------|--------|------------|-----------|-----------|--------------------|--------------------------|-------------------------|-----------------|-------|-----------|---------|------------|---------------|--------------------|----------------|------------------------------|------------------|----------------|-----------------------|----------|--------|-------------|-------|----|
| Guernsey | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 8 | 0 | 0 | 6 | 0 | 1 | 0 | 7 | 5 | 0 | 4 | 20 | 24 | 2 | 9 | 14 | 2 | 14 | |
| Jersey | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 0 | 3 | 1 | 1 | 0 | 3 | 42 | 1 | 2 | 6 | 6 | 1 | 2 | 4 | 26 | 24 | 2 | 7 | 31 | 4 | 34 | |
| Channel Islands | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | |
| Isle of Man | 0 | 6 | 2 | 2 | 3 | 1 | 4 | 8 | 4 | 6 | 0 | 3 | 13 | 9 | 6 | 7 | 11 | 0 | 14 | 6 | 5 | 7 | 2 | 9 | 7 | 0 | 5 | 0 | |
| Ireland | 20 | 13 | 8 | 13 | 76 | 70 | 53 | 2 | 73 | 39 | 23 | 54 | 78 | 140 | 16 | 59 | 41 | 20 | 58 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 0 | |
| Austria | 1 | 0 | 0 | 11 | 2 | 9 | 1 | 27 | 1 | 2 | 4 | 20 | 29 | 5 | 3 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 0 |
| Belgium | 24 | 3 | 2 | 37 | 12 | 4 | 1 | 37 | 14 | 1 | 4 | 43 | 36 | 3 | 9 | 12 | 2 | 15 | 2 | 15 | 2 | 15 | 2 | 15 | 2 | 15 | 2 | 15 | 0 |
| Denmark | 0 | 1 | 3 | 0 | 0 | 1 | 1 | 0 | 8 | 6 | 1 | 2 | 8 | 0 | 15 | 0 | 15 | 5 | 0 | 8 | 14 | 22 | 4 | 2 | 6 | 0 | 22 | 0 | 22 |
| Finland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| France | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Germany | 7 | 22 | 17 | 41 | 65 | 9 | 33 | 23 | 91 | 110 | 39 | 45 | 239 | 95 | 67 | 37 | 213 | 114 | 100 | 60 | 134 | 223 | 48 | 101 | 109 | 37 | 89 | 0 | |
| Gibraltar | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 4 | 0 | 1 | 0 | 7 | 0 | 0 | 8 | 8 | 5 | 1 | 4 | 19 | 2 | 7 | 0 | |
| Greece | 5 | 5 | 4 | 4 | 2 | 5 | 2 | 11 | 13 | 8 | 14 | 8 | 8 | 14 | 14 | 14 | 69 | 54 | 70 | 16 | 22 | 30 | 9 | 26 | 9 | 26 | 9 | 26 | 0 |
| Italy | 3 | 3 | 3 | 9 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 0 |
| Luxembourg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Netherlands | 6 | 8 | 11 | 8 | 4 | 1 | 16 | 9 | 8 | 25 | 20 | 7 | 7 | 57 | 11 | 46 | 1 | 39 | 13 | 7 | 67 | 20 | 97 | 12 | 29 | 25 | 4 | 48 | 0 |
| Portugal (incl. Azores and Madeira) | 1 | 6 | 1 | 3 | 3 | 0 | 10 | 10 | 3 | 13 | 11 | 0 | 20 | 15 | 22 | 117 | 1 | 50 | 15 | 9 | 11 | 21 | 56 | 9 | 22 | 22 | 7 | 50 | 0 |
| Spain (incl. Canary Islands) | 18 | 32 | 37 | 47 | 38 | 31 | 83 | 56 | 90 | 113 | 135 | 46 | 36 | 130 | 82 | 103 | 28 | 201 | 34 | 43 | 69 | 198 | 486 | 137 | 114 | 111 | 65 | 224 | 0 |
| Sweden | 0 | 7 | 4 | 7 | 1 | 0 | 2 | 0 | 0 | 13 | 8 | 6 | 4 | 22 | 10 | 9 | 0 | 38 | 1 | 4 | 8 | 14 | 43 | 7 | 9 | 12 | 4 | 27 | 0 |
| Other EU countries | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Bulgaria | 0 | 2 | 1 | 6 | 2 | 1 | 4 | 3 | 4 | 16 | 12 | 6 | 4 | 15 | 7 | 16 | 2 | 65 | 26 | 4 | 14 | 25 | 41 | 20 | 14 | 13 | 7 | 7 | 0 |
| Cyprus (EU) | 9 | 8 | 3 | 24 | 8 | 8 | 18 | 3 | 14 | 44 | 37 | 8 | 12 | 44 | 36 | 168 | 12 | 145 | 29 | 11 | 15 | 48 | 54 | 27 | 18 | 36 | 8 | 28 | 0 |
| Czech Republic | 2 | 10 | 0 | 7 | 6 | 2 | 25 | 1 | 0 | 15 | 5 | 3 | 1 | 15 | 17 | 18 | 0 | 28 | 13 | 3 | 8 | 42 | 5 | 14 | 11 | 2 | 10 | 0 | |
| Estonia | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 6 | 5 | 0 | 1 | 6 | 8 | 5 | 1 | 0 | 6 | 0 | 0 | 2 | 9 | 0 | 1 | 0 | 0 | 0 | 10 | 0 |
| Hungary | 2 | 7 | 0 | 1 | 2 | 13 | 75 | 1 | 6 | 12 | 5 | 4 | 0 | 39 | 12 | 18 | 8 | 60 | 33 | 18 | 19 | 19 | 104 | 18 | 61 | 5 | 6 | 37 | 0 |
| Latvia | 8 | 7 | 0 | 3 | 2 | 21 | 36 | 15 | 25 | 184 | 91 | 57 | 39 | 32 | 203 | 165 | 3 | 38 | 22 | 43 | 7 | 7 | 97 | 15 | 46 | 35 | 0 | 31 | 0 |
| Lithuania | 1 | 18 | 2 | 4 | 21 | 17 | 34 | 16 | 8 | 167 | 36 | 4 | 188 | 42 | 52 | 70 | 0 | 103 | 122 | 14 | 12 | 15 | 110 | 32 | 25 | 15 | 6 | 44 | 0 |
| Malta | 0 | 4 | 0 | 0 | 0 | 1 | 1 | 7 | 5 | 1 | 4 | 2 | 0 | 4 | 0 | 8 | 2 | 11 | 1 | 3 | 10 | 18 | 7 | 4 | 2 | 6 | 0 | 4 | 0 |
| Poland | 26 | 54 | 6 | 23 | 72 | 28 | 119 | 117 | 89 | 466 | 108 | 79 | 194 | 192 | 181 | 503 | 2 | 532 | 282 | 229 | 103 | 138 | 401 | 91 | 106 | 134 | 56 | 205 | 0 |
| Romania | 4 | 6 | 7 | 17 | 26 | 1 | 13 | 4 | 12 | 51 | 14 | 4 | 5 | 37 | 12 | 84 | 2 | 66 | 30 | 9 | 16 | 26 | 105 | 22 | 35 | 92 | 8 | 44 | 0 |
| Slovakia | 1 | 8 | 0 | 2 | 3 | 12 | 130 | 7 | 5 | 57 | 3 | 1 | 14 | 9 | 36 | 44 | 1 | 37 | 22 | 6 | 18 | 8 | 29 | 17 | 19 | 11 | 6 | 6 | 0 |
| Slovenia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Czechoslovakia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Albania | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 0 | 0 | 2 | 4 | 0 | 6 | 0 | 1 | 0 | 0 | 6 | 1 | 1 | 0 | 5 | 1 | 0 |

Exercises with download data

- While in cell B194, start typing **=LARGE(**
- Using your keyboard arrow keys go up to **B189** which is the last row with data. Press **CTRL+Shift+UP** simultaneously and Excel will select all rows up to the top.
- We don't want the 5 top rows as they do not contain any census data. While holding **Shift** key use your **down arrow** until the selection reaches **B6**.
- The formula should now be **=LARGE(B6:B189** . Large function accepts a final argument which allows to select the first largest, second largest etc. Type **,1)** and press **Enter**.
- The complete formula must be **=LARGE(B6:B189,1)** and the result in B194 should be **26**.

Exercises with download data

- We need to find an easy way to repeat this formula for all columns.
- Click on any column in row **189** (the last row containing data). While holding **CTRL** use the **right arrow key**. The active cell should now be the last one **OO189**.
- Move your cursor a bit further down to **OO194** which is the same row with the formula we created earlier. Type anything in, e.g. a number like 1. Press **CTRL+Left key** and the cursor should be move back to our formula cell **B194**.

Exercises with download data

- Use **CTRL+SHIFT+Right key** to select all columns in row 194 up to column OO.
- Press **F2** to enter Edit mode and Excel will automatically move the cursor back to B194 while keeping the cells selection active. Use **CTRL+Enter** to apply the formula. All columns in row 194 should now contain the largest number for each column (local authority).
- Repeat the process in B195 finding the second largest head count. The initial formula should be **=LARGE(B6:B189,2)**. Expand the formula to OO195 as before.

Exercises with download data

- We now need to match the numbers to the countries. For this purpose we will use a slightly more complex Excel formula.
- We will combine two Excel functions into one formula:
 - **INDEX**: returns a value based on the intersection of a row and column position within a given range
 - **MATCH**: returns the relative position of an item within a given range


Exercises with download data

- Go to cell B196 and type in the following formula:
=INDEX(\$A\$6:\$A\$189,MATCH(B194,B6:B189,0))



An array of values that contain the labels of the countries.

Notice the dollar sign. It instructs Excel to treat the values as fixed. It can become especially handy in situations when we want to apply auto-fill but want to keep this part of the formula fixed.



B194 is the look-up value which we want to match against the look-up array.

B6:B189 is the look-up array defined as a range of cells.

0 is the match type. Zero tells Excel to find the first value that is exactly equal to look-up value.

Exercises with download data

- Apply the auto-fill for formula in B196 in the exact same way as we did before to find the largest number.
- Go to cell B197 and repeat the process with B195 as our look-up value in order to find the second most popular countries of origin. **=INDEX(\$A\$6:\$A\$189,MATCH(B195,B6:B189,0))**
- Apply the auto-fill

