

# Census flow data workshop

Handout instructions #1

Retrieving 2011 census flow data using WICID and analysing it in Excel

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# Getting started

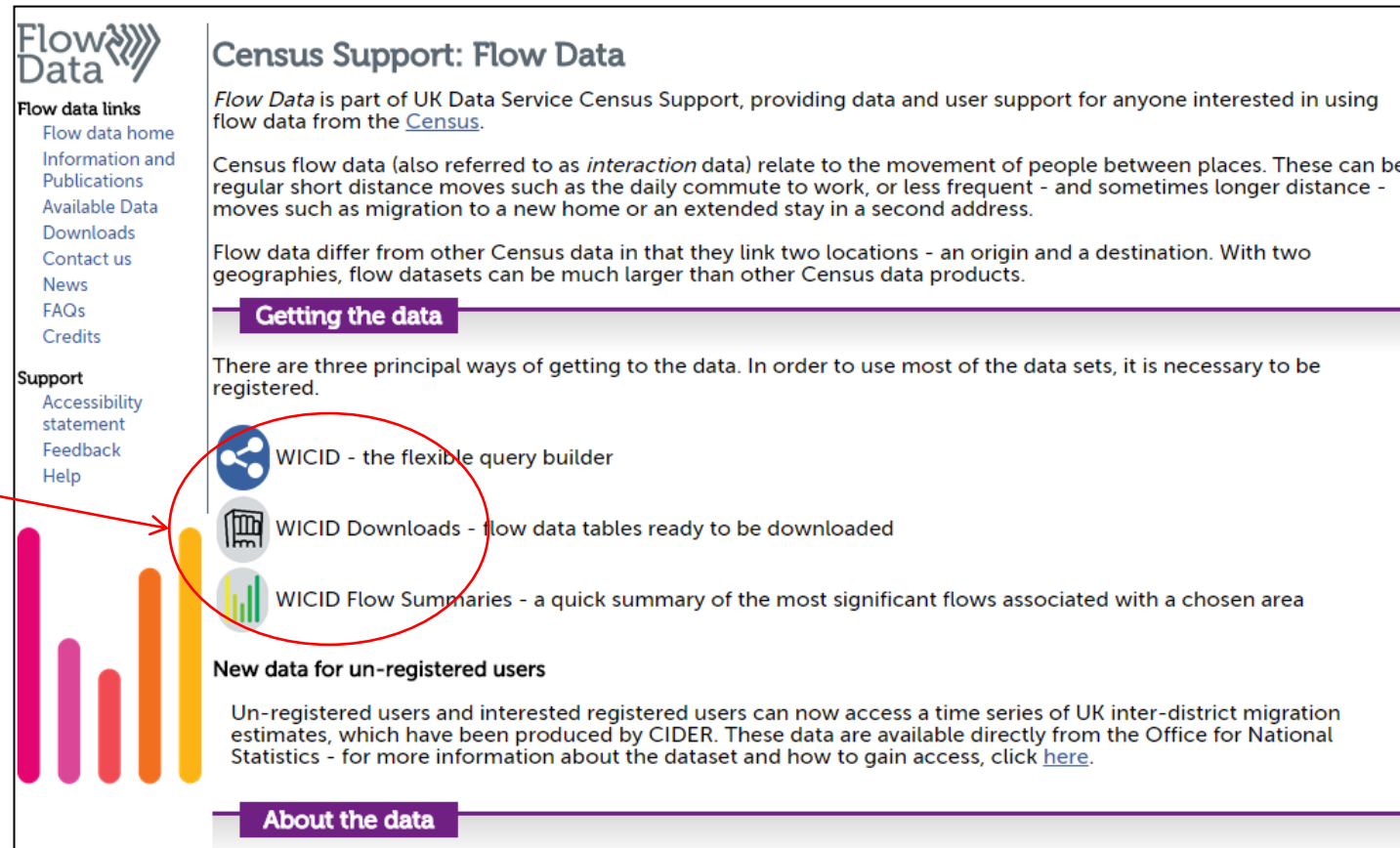
- Start up a browser
- Screenshots of process

# 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**

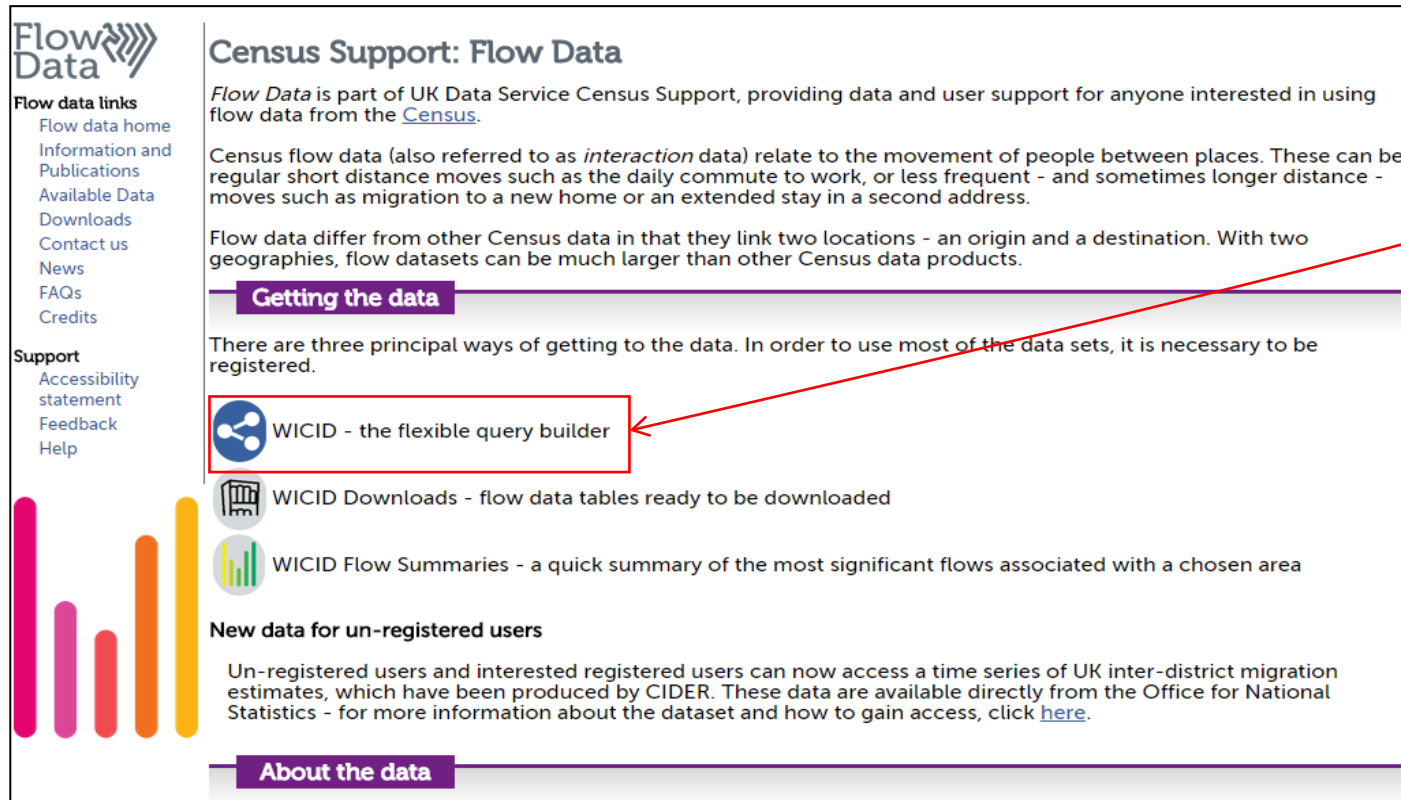
Un-registered users and interested registered users can now access a time series of UK inter-district migration estimates, which have been produced by CIDER. These data are available directly from the Office for National Statistics - for more information about the dataset and how to gain access, click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



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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

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

Support

- Accessibility statement
- Feedback
- Help

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

Status: 0 data items currently selected  
[Unselect all][Show list]

Data

### 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	<a href="#">Total migrants</a>
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	<a href="#">All usual residents who were living outside the UK one year ago</a>
	 2011 SMS Merged LA/LA [Origin and destination of international migrants by age (broad grouped) by sex] - MM01CUK - Open	<a href="#">All usual residents who were living outside the UK one year ago</a>
	 2011 SMS Merged LA/LA [Origin and destination of migrants by age (broad grouped) by sex] - MM01CUK_all - Open	<a href="#">All usual residents who were living at a different address one year ago</a>
	 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	<a href="#">All usual residents who were living at a different address one year ago</a>	



# Data selection – confirmation page

UK Data Service  
Census Support

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



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## Flow data links

- [Flow data home](#)
- [Information and Publications](#)
- [Available Data](#)
- [Downloads](#)
- [Contact us](#)
- [News](#)
- [FAQs](#)
- [Credits](#)

## Support

- [Accessibility statement](#)
- [Feedback](#)
- [Help](#)



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

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## Flow data links


- [Flow data home](#)
- [Information and Publications](#)
- [Available Data](#)
- [Downloads](#)
- [Contact us](#)
- [News](#)
- [FAQs](#)
- [Credits](#)

## Support







- [Accessibility statement](#)
- [Feedback](#)
- [Help](#)




**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		
 <a href="#">2011 SMS Foreign origins - expanded</a> 		184
 Great Britain <sup>†‡</sup>		1
 GB Countries 1991 <sup>†‡</sup>		3
 GB Standard Regions 1991 <sup>†‡</sup>		10
 GB Counties 1991 <sup>†‡</sup>		67

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

Geography		Number of areas
Main Geographies		
 <a href="#">UK Local Authorities (merged) 2011</a> 		404
 <a href="#">2011 English Regions plus rest of UK</a> 		12
 Great Britain <sup>†‡</sup>		1
 GB Countries 1991 <sup>†‡</sup>		3
 GB Standard Regions 1991 <sup>†‡</sup>		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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- Flow data links**
- [Flow data home](#)
  - [Information and Publications](#)
  - [Available Data](#)
  - [Downloads](#)
  - [Contact us](#)
  - [News](#)
  - [FAQs](#)
  - [Credits](#)

- Support**
- [Accessibility statement](#)
  - [Feedback](#)
  - [Help](#)

- WICID
- Data
- Geography
- Finalise
- Run
- Output

## 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...

The screenshot shows a web browser window with the URL <https://wicid.ukdataservice.ac.uk/cider/wicid//query/refine.php>. The page is titled "UK Data Service Census Support" and "Flow Data". The main content area is "Refine and review query", which includes sections for "Refine options", "Review options", and "Next...". The "Next..." section contains a button labeled "Run your query" with a right-pointing arrow, which is circled in red. A red arrow points from the text "Click this button" to this button. The navigation bar at the top includes buttons for "WICID", "Data", "Geography", "Finalise", "Run", and "Output".

Click this button

# Query complete

WICID: Tabular output pla x

https://wicid.ukdataservice.ac.uk/cider/wicid//query/run.php

UK Data Service  
Census Support

[Home] > Query > Run

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Flow Data

Flow data links


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

Support

- Accessibility statement
- Feedback
- Help

WICID Data Geography Finalise Run Output


Run query

 **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.

Extraction took 0.55 seconds

**Options**

 [Continue to output pages](#)

[WICID query homepage](#)

[CIDER homepage](#)

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

UK Data Service  
Census Support

[Home] > Query > Output

Logged in as: guest [Logout now]

Flow Data

WICID Data Geography Finalise Run Output


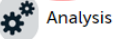
Flow data links

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

Support

- Accessibility statement
- Feedback
- Help

## Output

-  **Tabular Output** - 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.
-  **Analysis** - Use a number of analytical tools to generate statistical summaries of your data, and produce a variety of indices.

Help

# 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

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

- Support
- Accessibility statement
- Feedback
- Help

- WICID
- Data
- Geography
- Finalise
- Run
- Output

## 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:
```

\*\* Census output is Crown copyright and is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland Source: 2011 SMS Merged LA/LA [Origin and destination of international migrants (expanded country origin)] - MF02UK - Open\*\*

### Output options

- tabulate on screen (only for small amounts of output)
- download output file
- return to output planner

### Options

- Return to Output page

[Help](#)

Click this button

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# 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](https://wicid.ukdataservice.ac.uk/cider/wicid/output/tabular/output_tab_dload.php). The page header includes the UK Data Service logo and navigation links: [Home] > Query > Output > Tabular output > Download. The user is logged in as 'guest' with a 'Logout now' link. A progress bar at the top right shows the current step is 'Output'. Below the progress bar, a breadcrumb trail reads: WICID > Data > Geography > Finalise > Run > Output. The main content area is titled 'Tabular output download' and contains a section for 'File download details'. A text input field labeled 'Filename' contains the text 'wicid\_output.csv'. Below this field is a green button labeled 'Download now' with a downward arrow icon. This button is circled in red. A red arrow points from the text 'Click the 'Download now' button to download the data' to this button. 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.

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 local authorities (A-C) and rows for various countries (1-39). A large text overlay asks: "Research question: What are the top two countries people migrated from for each local authority in the UK?".

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC		
1	2011 SMS Merged LA/LA [Origin and destination of international migrants (expanded country origin)] - MF02UK - Open																														
2	Origin geography: UK Local Authorities (merged) 2011																														
3	Layer: All usual residents who were living outside the UK one year ago																														
4	Origins: Destinations																														
5		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		
6	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		
7	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		
8	Channel Islands	0	0	0	2	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	1	2	0	1	0		
9	Isle of Man	0	6	2	2	3	1	4	0	4	6	0	3	13	9	6	7	11	0	14	6	5	7	2	9	7	0	5	0		
10	Ireland	0	20	43	8	13	76	70	53	2	73	39	23	54	78	140	16	59	41	20	58										
11	Austria	0	0	0	11	2	9	1	27	1	2	4	20	29	5	3	5	1	5												
12	Belgium	0	0	0	24	3	2	37	12	4	1	37	14	1	4	43	36	3	9	12	2	15									
13	Denmark	0	1	3	0	0	1	0	0	0	0	6	1	2	8	0	15	0	15	5	0	8	14	22	4	2	6	0	22	0	
14	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	13	0
15	France	0	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	1
16	Germany	7	22	17	41	65	9	33	23	3	91	110	39	45	239	95	67	37	213	114	100	60	134	223	48	101	109	37	89	0	
17	Gibraltar	0	0	0	2	0	0	0	0	1	0	1	0	2	4	0	1	0	7	0	0	8	8	5	1	4	19	2	7	0	
18	Greece	0	0	0	4	0	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Italy	0	0	0	9	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
20	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	0
21	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	
22	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	
23	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	
24	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	
25	Other merged	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	
26	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	
27	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	
28	Czech Republic	2	10	0	7	6	2	25	1	0	15	5	3	1	15	17	18	0	28	13	3	3	8	42	5	14	11	2	10	0	
29	Estonia	0	1	0	0	1	0	2	0	6	5	0	1	6	8	5	1	0	6	0	0	0	2	9	0	1	0	0	10	0	
30	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	
31	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	
32	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	
33	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	
34	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	
35	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	
36	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	
37	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	0
38	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	0
39	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	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

