

Exploring Scottish Census

Edinburgh University
30 June 2016

2011 Census in Scotland

History

- ▶ Census day - 27 March 2011
- ▶ 23rd census since 1801
- ▶ Lots of planning and preparatory activity
- ▶ “Traditional” census approach: 95% of census questionnaires hand-delivered, 5% by post
- ▶ 94% response rate
 - 20% questionnaires completed online

Overview

- ▶ To arrive at a population figure we:
 - Capture and clean the data
 - Impute missing characteristics
 - Estimate the returns we didn't get
 - Derive variables for output
 - Assign output areas
 - Apply Disclosure Controls

Data Cleaning – Initial Validation

- ▶ Load and Validation – right types of values/ranges etc
 - Check data received as expected
 - Load into SAS database
 - Referential integrity
 - Range checks

- ▶ Remove false Persons – (2 of 6 rule)
 - Occur due to: crossings out/mistakes or dust on scanner
 - Reject person records without a response to at least 2 of:
 - name
 - sex
 - marital/civil partnership status
 - date of birth

Data Cleaning – Filter rules

- ▶ Not everyone should answer every question, e.g. own accommodation (skip landlord question), born in UK (skip date of arrival) under 16 (skip employment questions)
- ▶ Resolve inconsistent responses
- ▶ Deterministic
- ▶ Which response do we believe?

Imputation

- ▶ Some records have missing/inconsistent data, we need to identify and correct or complete these.
- ▶ CANCEIS – Canadian Census Edit and Imputation Software
 - Probabilistic approach – preserve distributions
 - Minimum change
 - Decision Logic Tables (DLT)

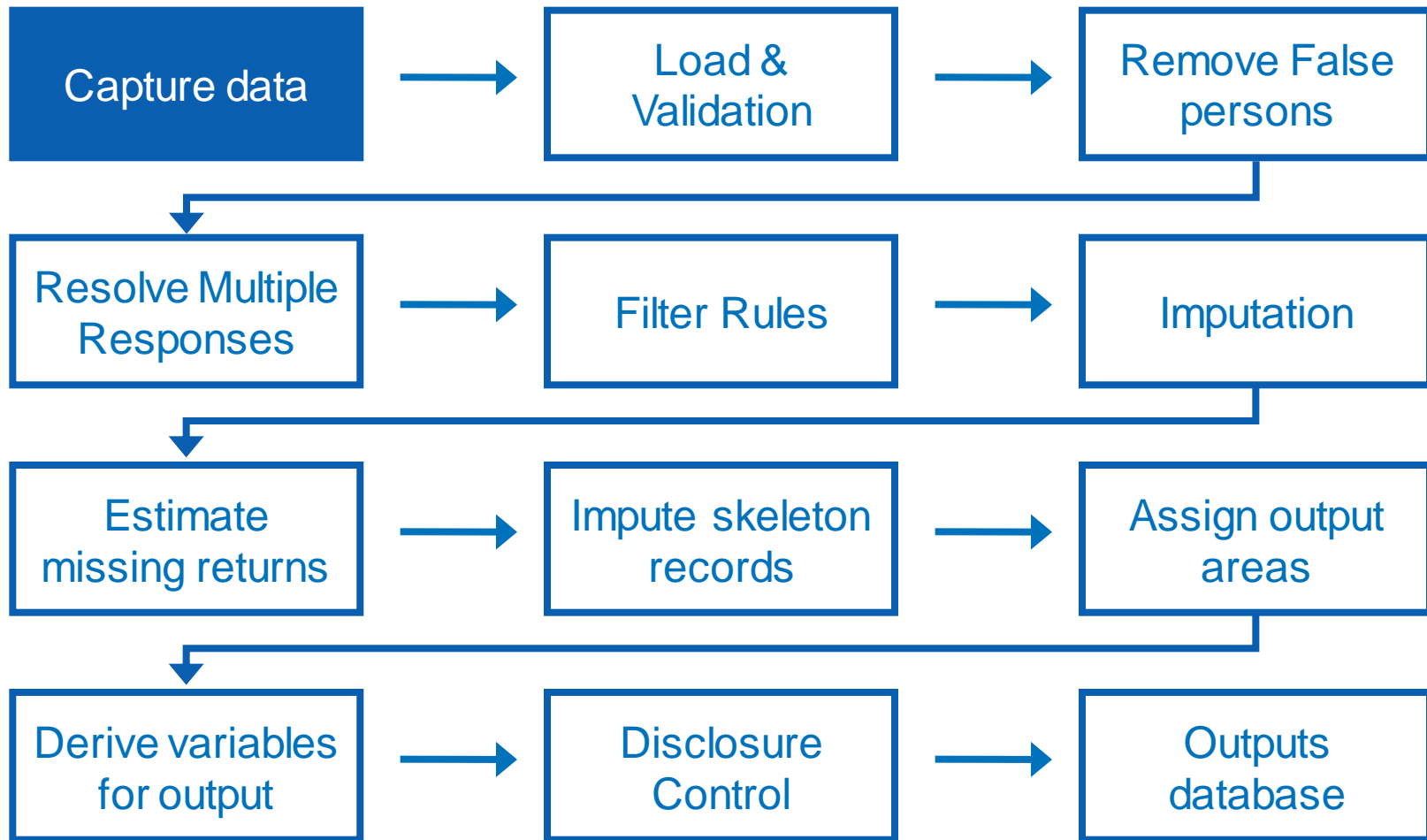
Coverage estimation

- ▶ Estimate numbers of missing people and households
- ▶ Uses the Census Coverage Survey
 - Asked a subset of same questions
 - Carried out after the census cut off date
 - Interviewers rather than paper form.
 - Approx 40,000 Households

Disclosure control

- ▶ Protect individual-level data by introducing uncertainty
- ▶ We are using a pre-tabular method - record swapping
- ▶ Swap level not made public
- ▶ Important to strike a balance between protection & utility

From 94% to 100%...



Quality Assurance Overview

- ▶ Preliminary stages
- ▶ Quality assurance of population and household estimates
- ▶ Dissemination of results of quality assurance
- ▶ Quality assurance of further releases

What did we do about it?

- ▶ Carried out more in-depth checks , prioritising key data used in first release
- ▶ Analysed data for issues which would cause problems in later processes, in particular edit and imputation
- ▶ Recoded some text responses including ethnic group and language
- ▶ Sometimes nothing – but will need to report quality to users

Core checks

- Age distributions by gender
- Household size
- Implied fertility rates
- Students
- Migration
- Ethnic groups
- Large communals
- Small area counts

QA panels

- Met with internal quality assurance working group to discuss approach to quality assurance
- External panel
 - provided knowledge and comparator data
 - provide a source of local contact
 - provide insights to NRS on final results

Quality assurance pack

- ▶ To accompany the first release of population and household statistics, ONS published detailed data used in the quality assurance process
- ▶ NRS are considering using the same tool for publishing QA material relating to the first release.
- ▶ This can be accessed via ONS website
- ▶ The following slides are extracts from the pack

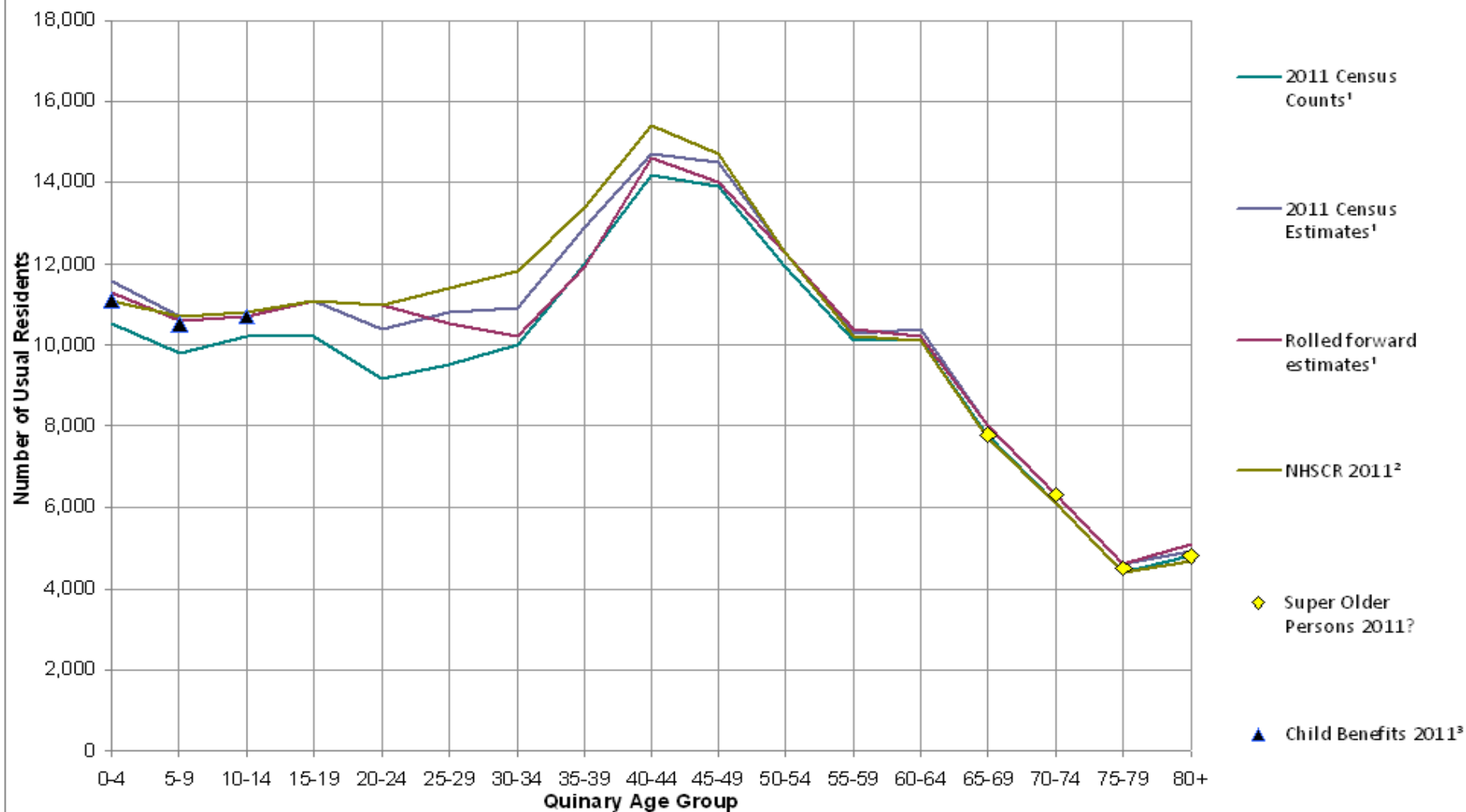
All persons - West Lothian

Age	2011 Census Counts ¹	2011 Census Estimates ¹	Rolled forward estimates ¹	NHSCR 2011 ²	Child Benefits 2011 ³	Super Older Persons 2011 ⁴	Response Rates
0-4	10,500	11,600	11,300	11,100	11,100		90%
5-9	9,800	10,700	10,600	10,700	10,500		92%
10-14	10,200	10,800	10,700	10,800	10,700		94%
15-19	10,200	11,100	11,100	11,100			92%
20-24	9,200	10,400	11,000	11,000			89%
25-29	9,500	10,800	10,500	11,400			89%
30-34	10,000	10,900	10,200	11,800			92%
35-39	12,000	12,900	11,900	13,400			93%
40-44	14,200	14,700	14,600	15,400			96%
45-49	13,900	14,500	14,000	14,700			96%
50-54	11,900	12,300	12,300	12,300			97%
55-59	10,100	10,300	10,400	10,200			98%
60-64	10,100	10,400	10,200	10,100			98%
65-69	7,800	8,000	8,000	7,700		7,800	97%
70-74	6,100	6,300	6,300	6,100		6,300	97%
75-79	4,400	4,600	4,600	4,400		4,500	97%
80+	4,800	4,900	5,100	4,700		4,800	97%
Total	164,700	175,100	172,900	177,000	32,300	23,300	94%

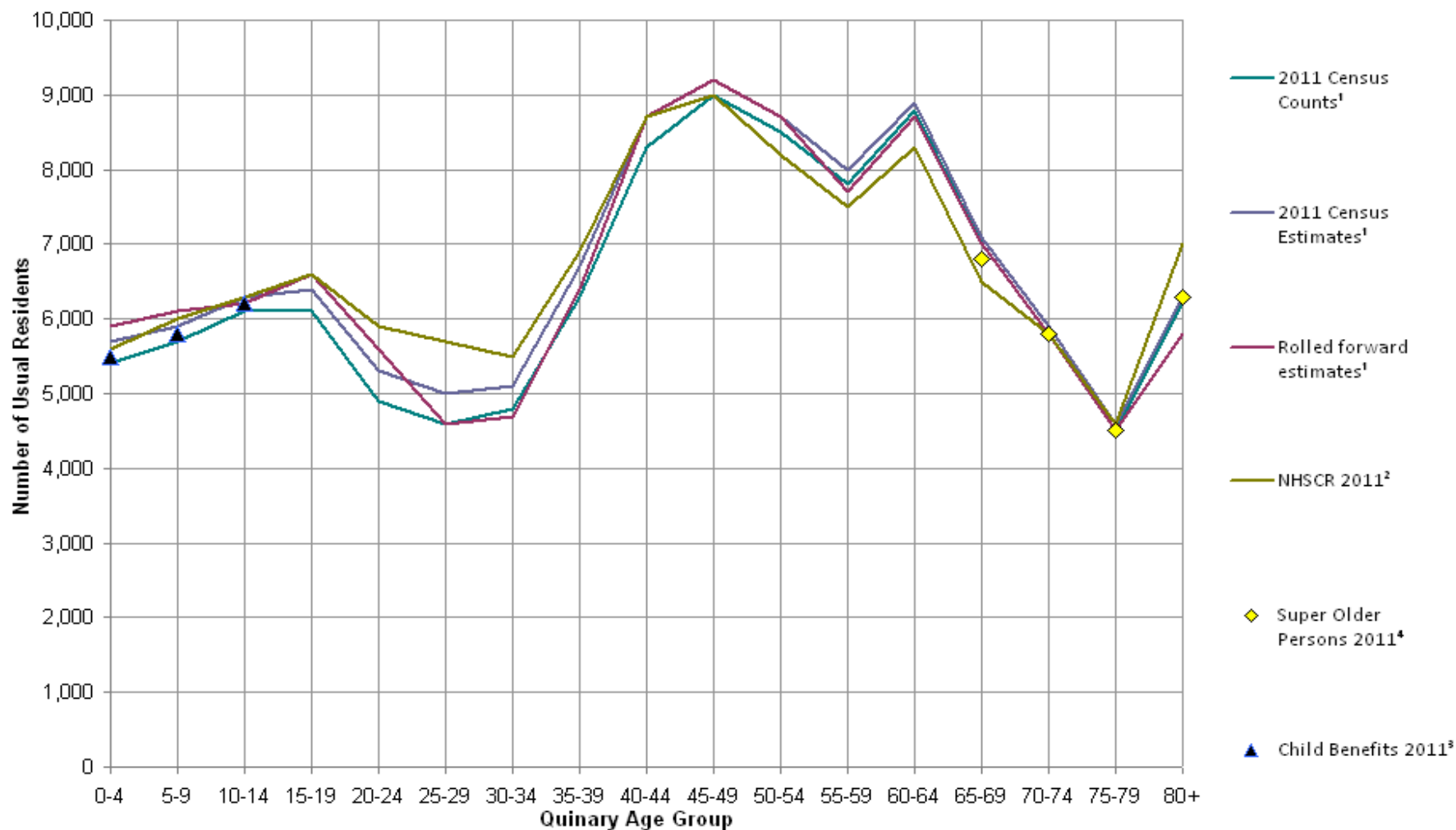
Source: National Records of Scotland¹, National Health Service², HM Revenue and Customs³, Department for Work and Pensions⁴

Descriptive metadata for tables in this pack is provided in the Explanatory Materials tab

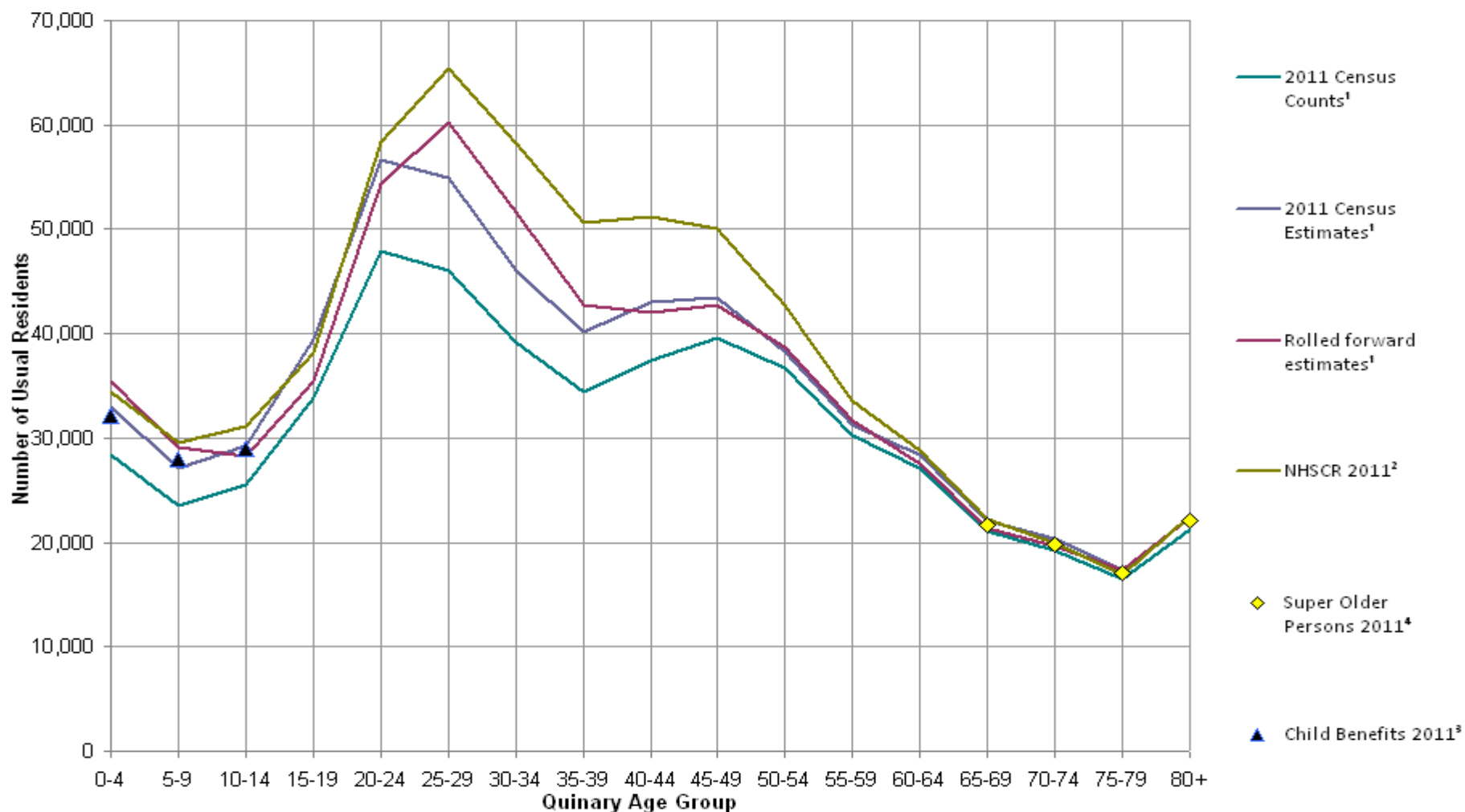
All persons - West Lothian



All persons - Scottish Borders



All persons - Glasgow City

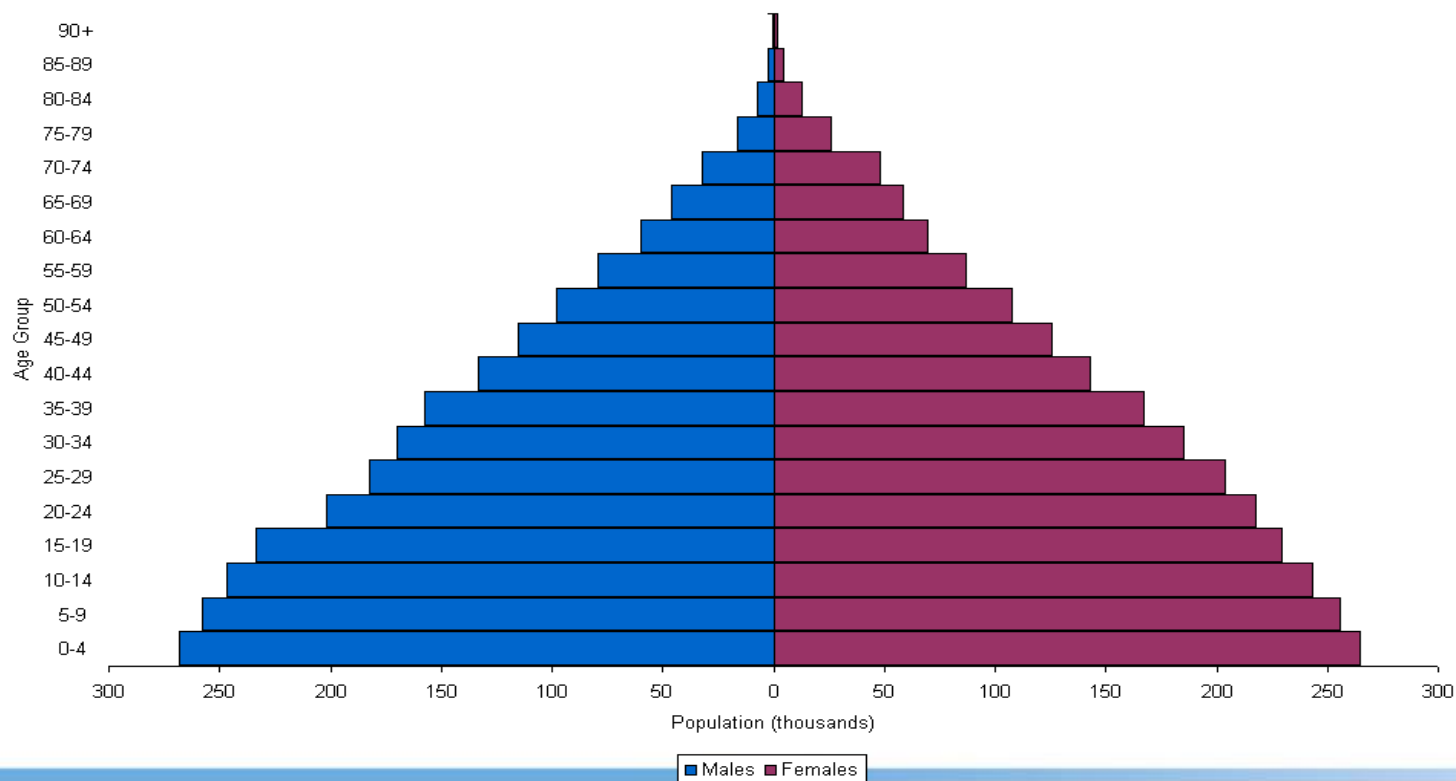


**Scotland's
Census 2011**
Shaping our future

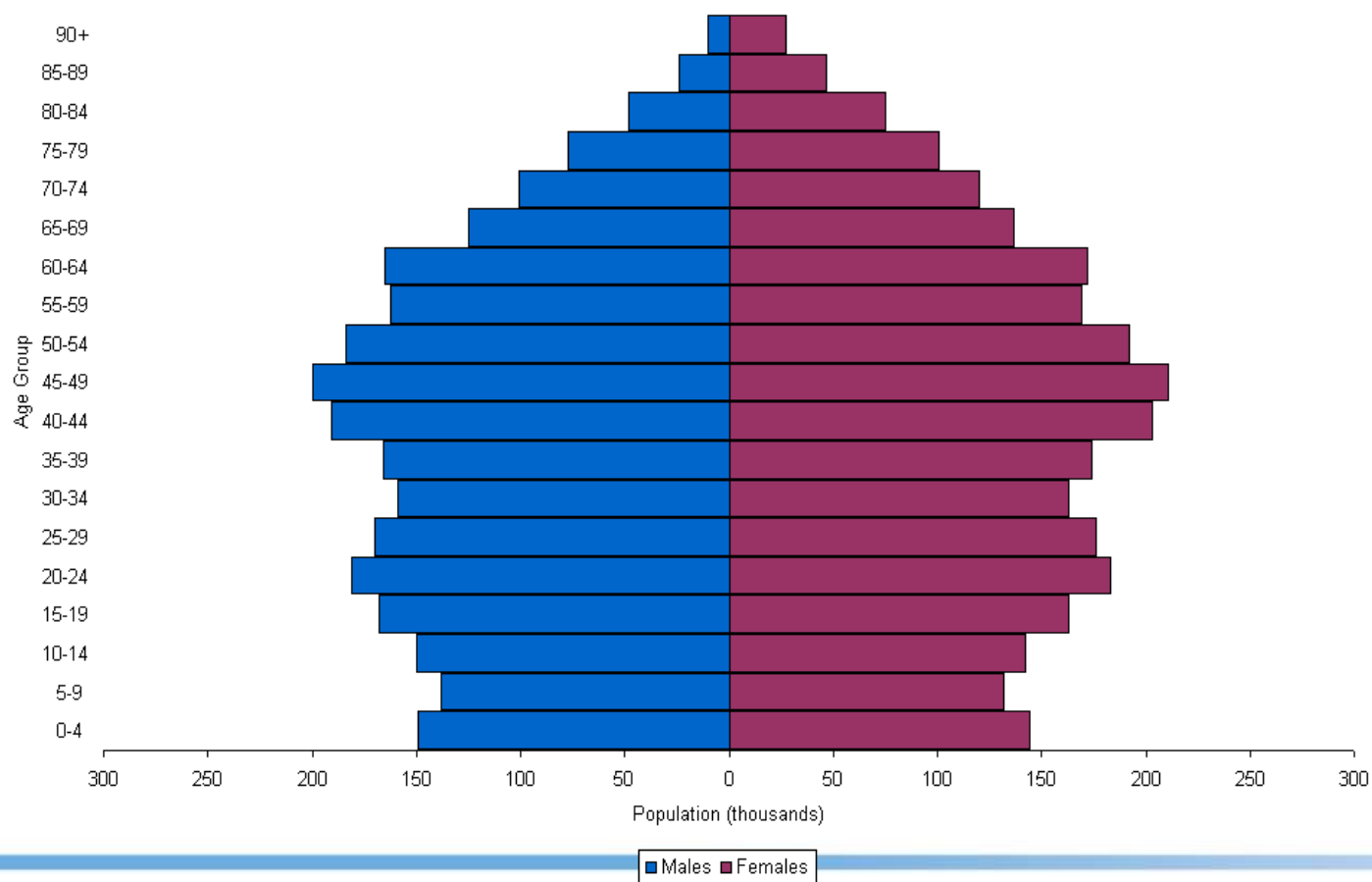
Census 2011 – Key population facts

- ▶ Scotland's population was 5,295,400 the highest ever recorded
- ▶ 2,567,000 men and 2,728,000 women.
- ▶ Population has increased by 233,000 (5 per cent) since 2001 Census
- ▶ More children under 5 (+ 6 per cent) since 2001
- ▶ Fewer children aged 5 to 14 (-11 per cent) since 2001
- ▶ More people aged 65 and over (+11 per cent) since 2001
- ▶ More people aged 80 and over (+19 per cent) since 2001
- ▶ More people aged 15 to 64 (+6 per cent) since 2001

1911 population by age and sex

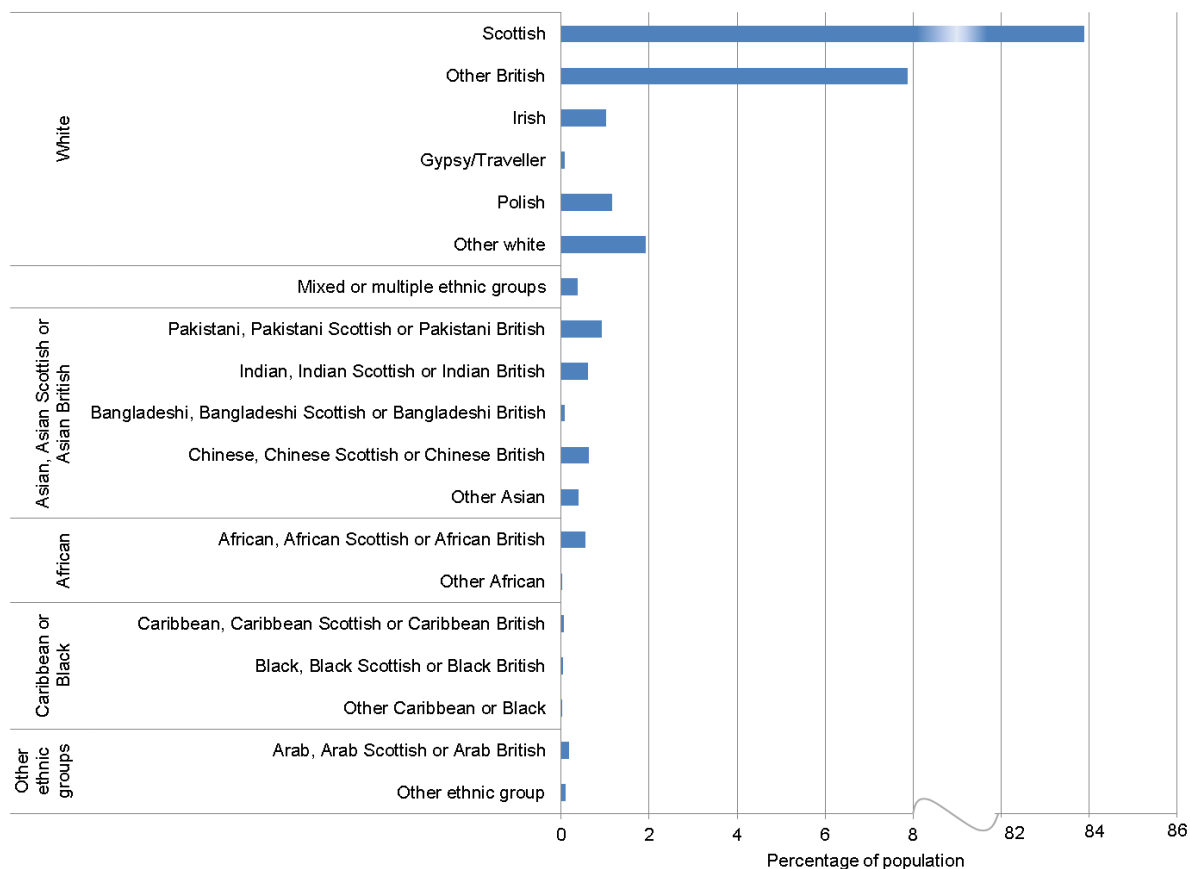


2011 population by age and sex



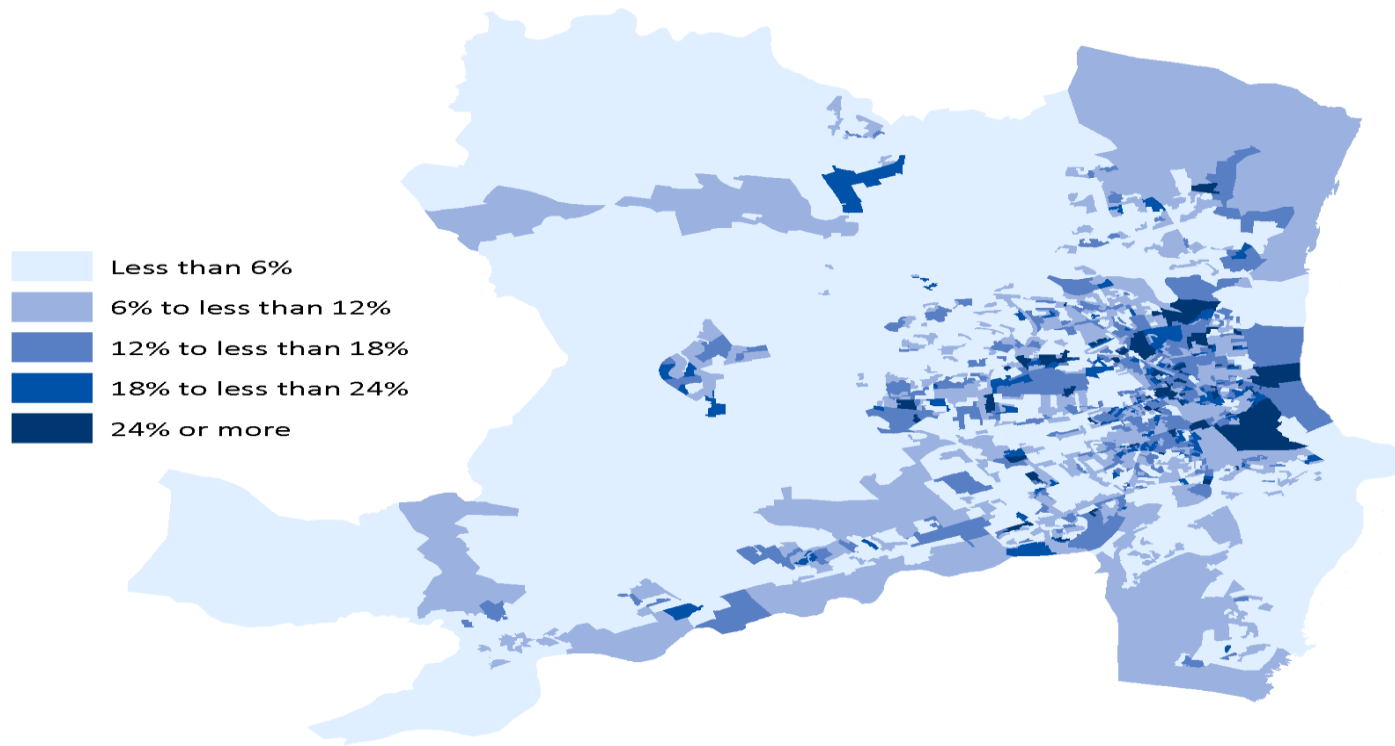
Ethnicity

Proportion of population by ethnicity, 2011



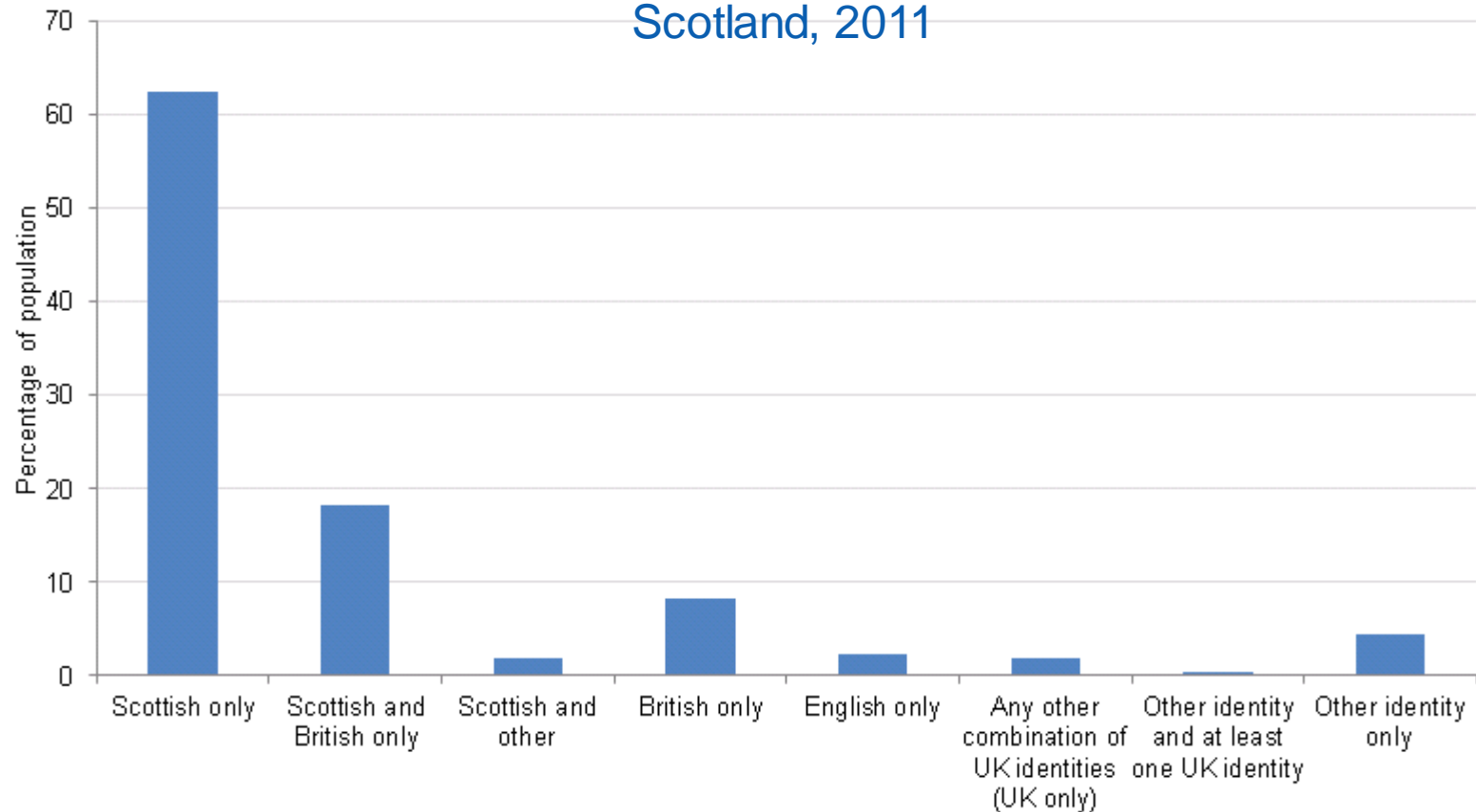
Growing ethnic diversity

Proportion of people reported as belonging to minority ethnic group in 2011, Aberdeen City

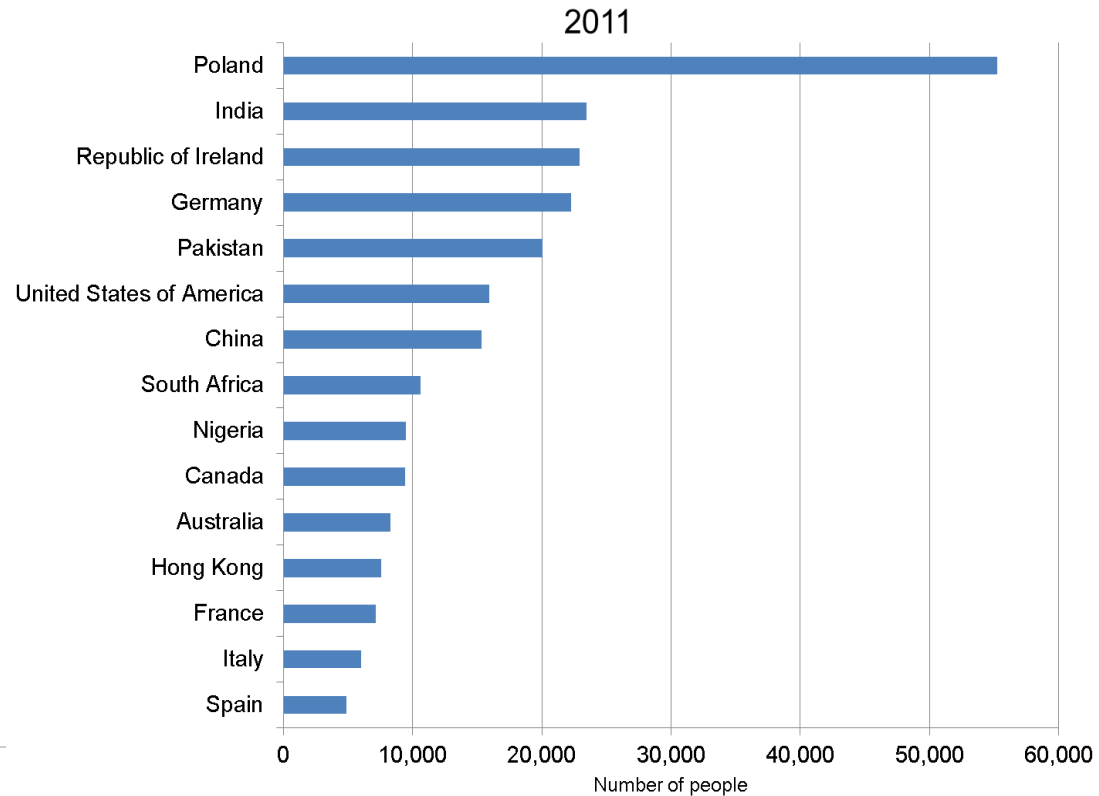
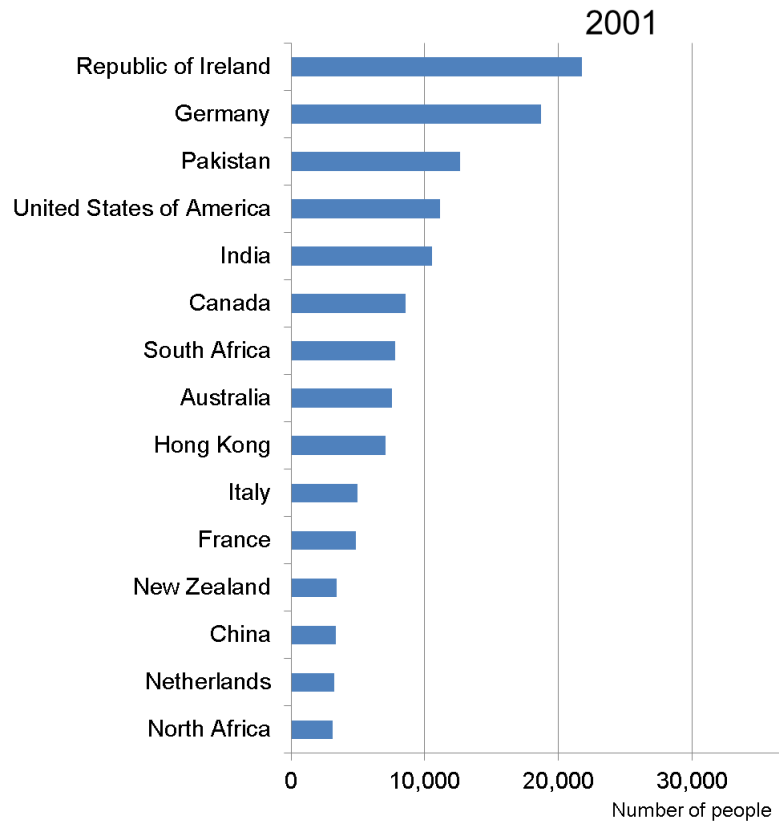


National identity (New question in 2011)

Proportion of population by national identity,
Scotland, 2011



Countries of birth outside of the UK

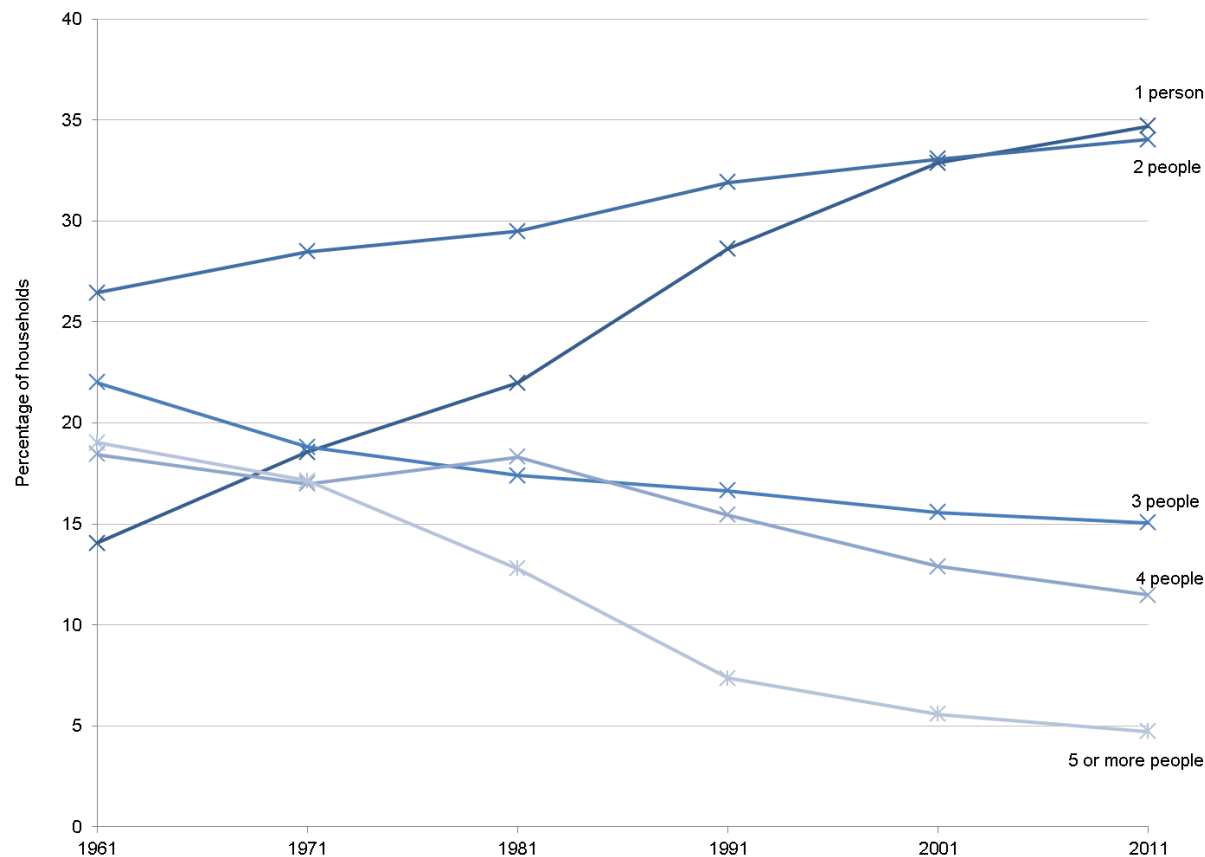


Census 2011 - Key household results

- ▶ The number of households in Scotland with at least one usual in 2011 was 2,372,780 - the highest ever.
- ▶ In 2011, one-person households accounted for 35 per cent of all households in Scotland, ranging from 27 per cent in Aberdeenshire to 43 per cent in Glasgow City.
- ▶ Between 2001 and 2011 average household size from 2.27 to 2.19 people per household.
- ▶ In 1961, one-person households were the least common household type and accounted for 14 per cent of all households. By 2011 they had become the most common household type and accounted for 35 per cent of all households.

Long-term trends - Household size

- ▶ One person households now most common household type – accounts for 35 per cent of all households.



What Census data is available?

- Population and household estimates for various geographies.

- Tables of the following topics at all census geographies:

Population and Households

Housing and Accommodation

Health

Ethnicity, Identity, Language and Religion

Education

Labour Market

Transport

2011 Census Results

- ▶ Release 1 – headline figures on census population and household estimates
- ▶ Release 2 – univariate tables: Key Statistics and Quick Statistics
- ▶ Release 3 – multi-variate tables: Local and Detailed Characteristics tables (LC tables provide less detail than DC tables but for lower geographies – down to output area)
- ▶ Origin-destination (flow) statistics
- ▶ Census microdata files (Samples of Anonymised Records)
- ▶ Alternative population statistics: workplace and ‘daytime’ population
- ▶ Commissioned tables service
- ▶ Analytical reports

Census Data Explorer

- ▶ Quick, easy (and FREE!) online access to the results from Scotland's 2011 Census
- ▶ Area profiles
- ▶ Data visualisations and maps online
- ▶ All the standard output tables for all the available geographies
- ▶ Range of supporting information

Capturing uses and benefits of census data

- ▶ NRS are seeking input from you:
 - How are/ do you intend to use the data?
 - What are you using the data for?
 - What can NRS do to ensure you get the most out of it?
 - What is in the way of your making best use?
- ▶ Feeds Benefits Realisation for Census 2011 and also looking ahead to the future of census statistics.

Practical using 'Census Data Explorer'

2011 Census Products

- ▶ Census releases
- ▶ Results at a glance
 - [Housing and Accommodation](#)
 - [Population and Households](#)
 - [Parliamentary Profiles for Scotland](#)
- ▶ Analytical reports
 - [Household composition for specific groups of people in Scotland](#)
- ▶ Census data explorer
- ▶ DataShine Scotland

Census Data Explorer

Time for the practical session

► www.scotlandscensus.gov.uk

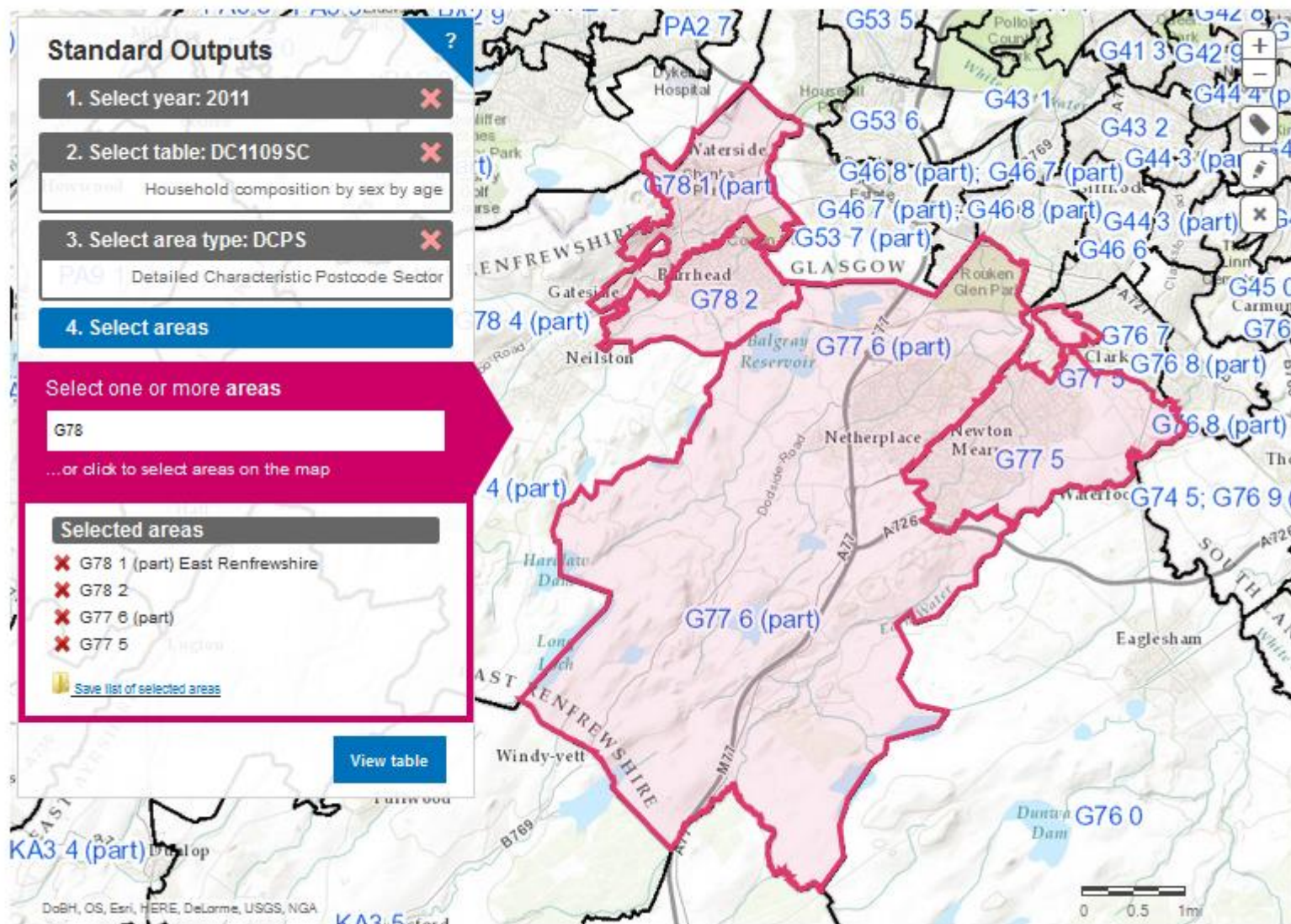
Exploring Census Data

Problem: People living alone (one-person households) –
Who are they? Where are they?
Social and policy implications?

- ▶ Area profiles
- ▶ DataShine (*G78 2SJ*)
- ▶ Standard outputs (+ Census Table Search tool)
- ▶ Excel tables & charts
- ▶ Analytical report

Household Composition using Census Table Search Tool

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	
1	Scotland's Census Table Search Tool																	
2	*This search tool is currently not compatible with Mac OS X.																	
3																		
4	Search by variable		Household composition										Search table title or reference number				Search	
5																		
6	Add a second variable		Age										2011		Year		Reset Form	
7																		
8	2011 AT_182a_2011 All people aged 0 to 17 living with no parent(s) in the household by age																	
9	2011 AT_182b_2011 All people aged 0 to 17 in households by age																	
10	2011 AT_187a_2011 Migrant status by household composition																	
11	2011 AT_187b_2011 Migrant status by household composition																	
12	2011 AT_215_2011 Household composition for people in households by sex by age																	
13	2011 AT_219_2011 Household composition for dependent children in households by sex and age																	
14	2011 CT_0021e_2011 Household composition by age by sex																	
15	2011 DC1109SC Household composition by sex by age																	
16	2011 LC1109SC Household composition by age																	
17																		
18	<div> <div> 2011 Census Table DC1109SC </div> <div> Household composition by sex by age </div> </div>																	
19																		
20																		
21																		
22	Base Population: All people in households																	
23																		
24	Table DC1109SC is available in Standard Outputs																	
25																		
26	Options for downloading large volumes of Scotland's Census 2011 data can be found in the Data Warehouse																	
27																		
28																		
29	Click on the links below to view variable metadata																	
30	Age																	
31	Household composition																	
	<div> <div> Available Geographies </div> <div> Community Health Partnership 2012 Council Area 2011 Detailed Characteristic Postcode Sector Electoral Ward 2007 Health Board Area 2006 Health Board Area 2014 Scotland Scottish Parliamentary Constituency 2011 Scottish Parliamentary Region 2011 UK Parliamentary Constituency 2005 </div> </div>																	



**Scotland's
Census 2011**
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Example analysis of household composition + other Census data

- ▶ Household composition by age and sex
http://bit.ly/household_age_sex

Blog entry from Talking About Statistics
www.celiamac58.blogspot.co.uk

 @celiamac58

Further information

- ▶ All data available at: <http://www.scotlandscensus.gov.uk>
Sign up there for our e-newsletter
- ▶ Enquiries: Customer@gro-scotland.gsi.gov.uk
- ▶  @NatRecordsScot

2011 Census Geographies

Standard outputs

For KS, LC and QS tables, geographical area types available are:

- ▶ All seven area types cited for Area Profiles, plus ...
- ▶ Civil Parish 1930
- ▶ Community Health partnership 2012
- ▶ Electoral Wards 2007
- ▶ Inhabited Island 2011
- ▶ Local Characteristic Postcode Sector
- ▶ National Park 2010
- ▶ Scottish Neighbourhood Statistics (SNS) data zone 2001
- ▶ Scotland
- ▶ Settlement 2010
- ▶ UK Parliamentary Constituency

Standard Outputs ?

1. Select a table: QS606SC

Occupation

2. Select your areas

Choose an **area type**

Select an Area Type

- Select an Area Type
- Civil Parish 1930
- Community Health Partnership 2012
- Council Area 2011
- Electoral Ward 2007**
- Health Board Area 2006
- Inhabited Island 2011
- Local Characteristic Postcode Sector
- Locality 2010
- National Park 2010
- Output Area 2011
- SNS Data Zone 2001
- Scotland
- Scottish Parliamentary Constituency 2011
- Scottish Parliamentary Region 2011
- Settlement 2010
- UK Parliamentary Constituency 2005

Area profiles: Religion

Comparison of different geographies

Find out about an area ?

Select an **area type**

Scottish Parliamentary Constituency 2011

Select an **area**

Edinburgh Southern

...or click to select an area on the map

Select a **second area type**

Council Area 2011

Select a second **area**

edinburgh

...or click to select an area on the map

Remove comparison

Get data

Map showing Scotland and surrounding regions (Ulster, Northumberland National Park, Newcastle, Hartlepool). Key locations marked include London, Inverness, Aberdeen, Dundee, Glasgow, Edinburgh, Carlisle, and Newcastle. The map includes a scale bar (0 to 20 miles) and a compass rose.

Population

Identity

Comparison of different geographies, at general level

Labour

Ethnicity, Identity, Language and Religion

[Ethnicity](#)

[National Identity](#)

Religion

[Country of Birth](#)

[Length of Residence in UK](#)

[Language](#)

[Interesting Facts](#)

	Edinburgh Southern SPC	Edinburgh City of Council Area	Scotland
All people	77561	476626	5295403
Percentage Church of Scotland	22.1	24.3	32.4
Percentage Roman Catholic	11.2	12.1	15.9
Percentage Other Christian	8.2	6.9	5.5
Percentage Muslim	2.6	2.6	1.4
Percentage Other religions	2.1	2.1	1.1
Percentage No religion	45.8	44.8	36.7
Percentage Not stated	7.9	7.1	7.0

Print **Religion data**

Print **Ethnicity,
Identity, Language
and Religion data**

Download **Ethnicity, Identity, Language and Religion data**



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Maps and Charts

Choose a *topic*

Ethnicity, Identity, Language and Religion

Choose a *map* or *chart*

Religion Chart
National Identity Map
Language Map
Ethnicity Map
Religion Map

View data

Maps and charts are a very useful way to bring statistics to life, aiding interpretation and understanding of what the statistics mean. They can be used to highlight patterns and trends and make statistics more accessible to a wide variety of people.

Topic based maps and charts

View data on Ethnicity, Identity, Language, Religion, Health, Population, Housing & Accommodation, Education and Labour Market using the options provided opposite. Results are available at national and council area level. For charts, the default display is Aberdeen City, Dundee City, City of Edinburgh and Glasgow City but users can select / de-select from the full set of council areas using the table beneath the chart.

Change over time

Our [population chart comparator tool](#) illustrates differences in the population age by sex profiles between different areas and between 2001 and 2011.

Take a journey through [A century of census](#) how Scotland's population has changed since 1911.

Links open in new windows. These tools use Adobe Flash, please ensure you install the latest version for your device from [Adobe](#).

Maps and Charts: Map of Religion



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M

Main Menu

Area Profiles

Maps and Charts

Standard Outputs

Data Wa

Religion

Choose a variable

% Church of Scotland

% Church of Scotland

% Roman Catholic

% Other Christian

% Muslim

% All other religions

% No religion

% Not stated

30% to less than 40%

40% or more

40% or more

40% or more

40% or more

40% or more

40% or more

40% or more

40% or more

40% or more

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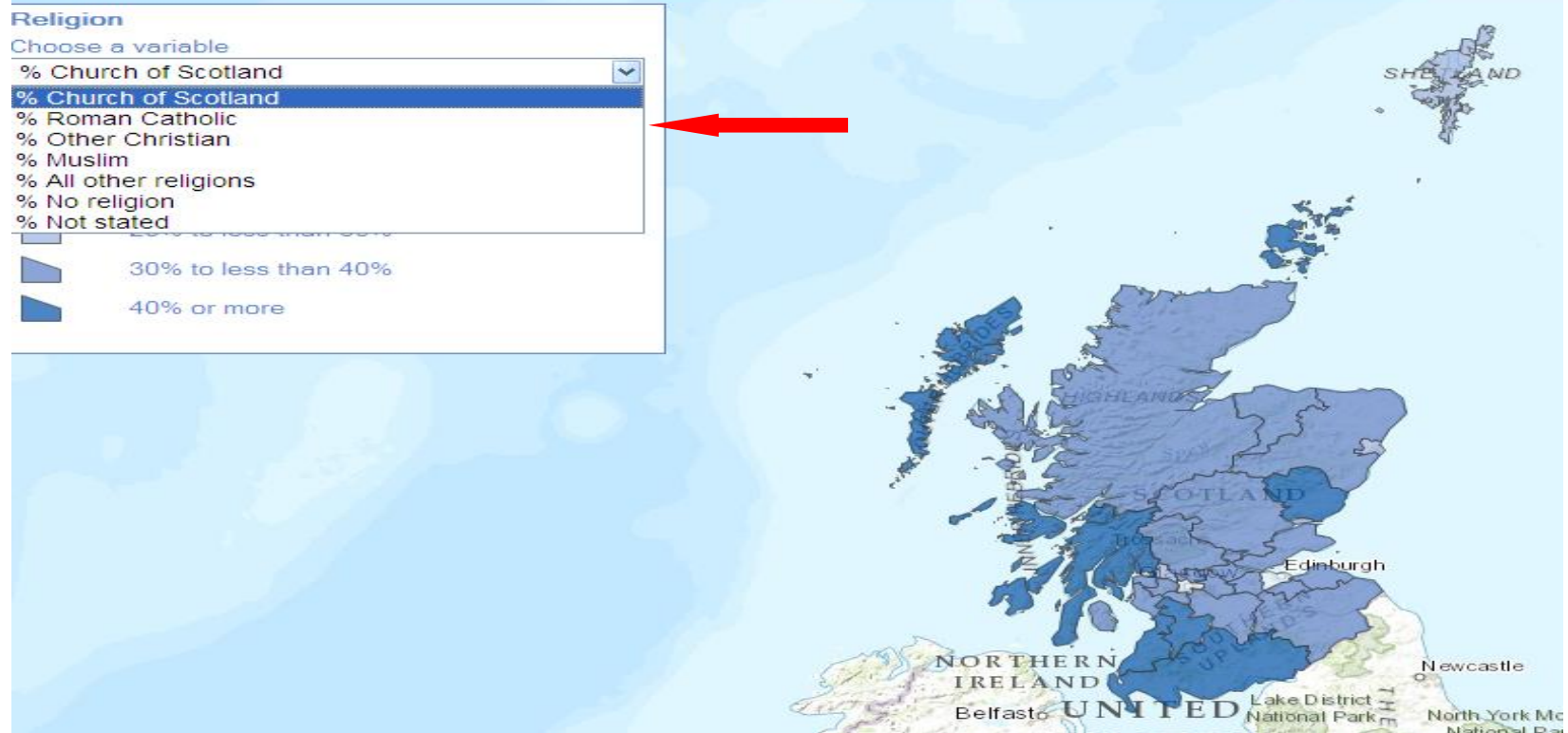
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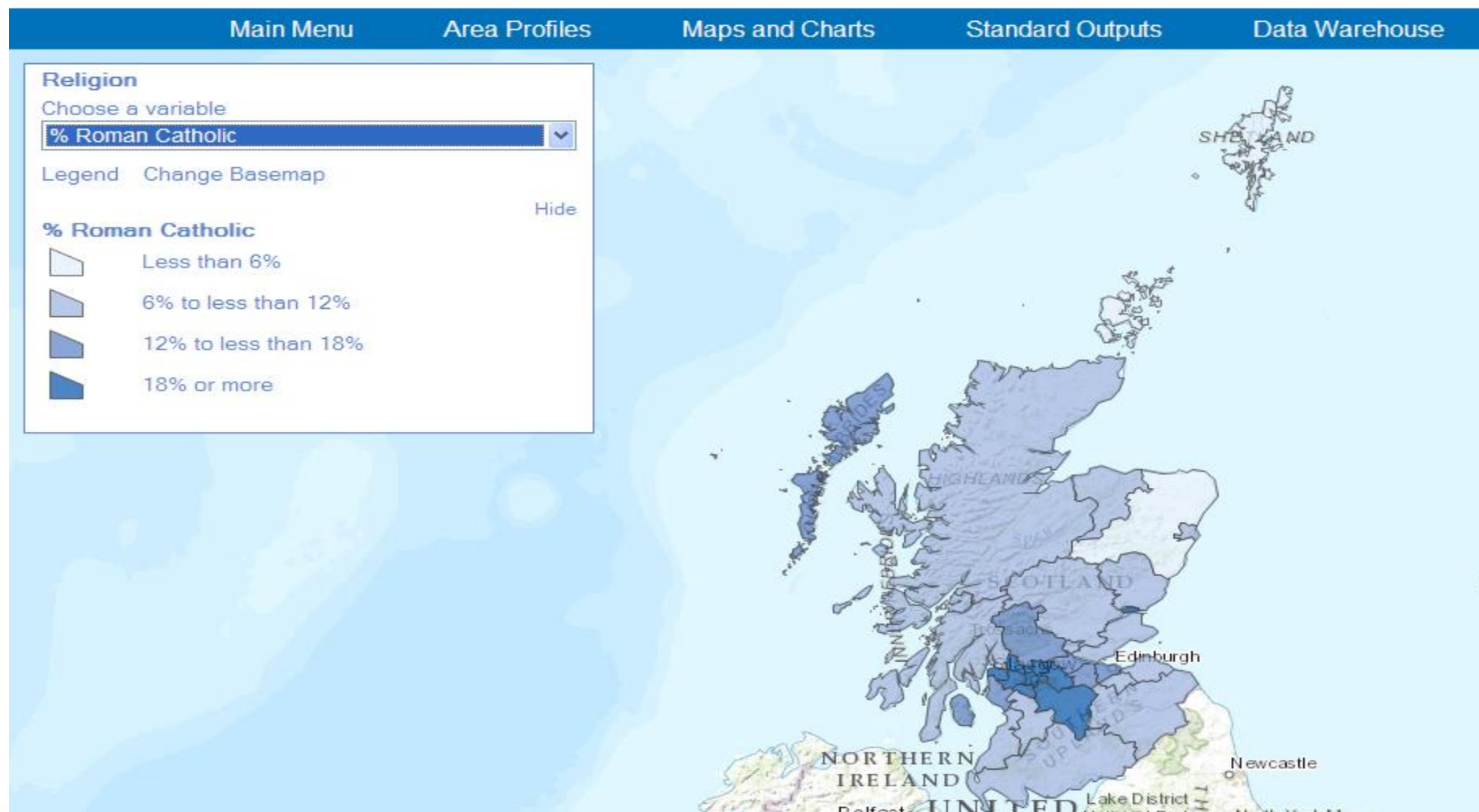
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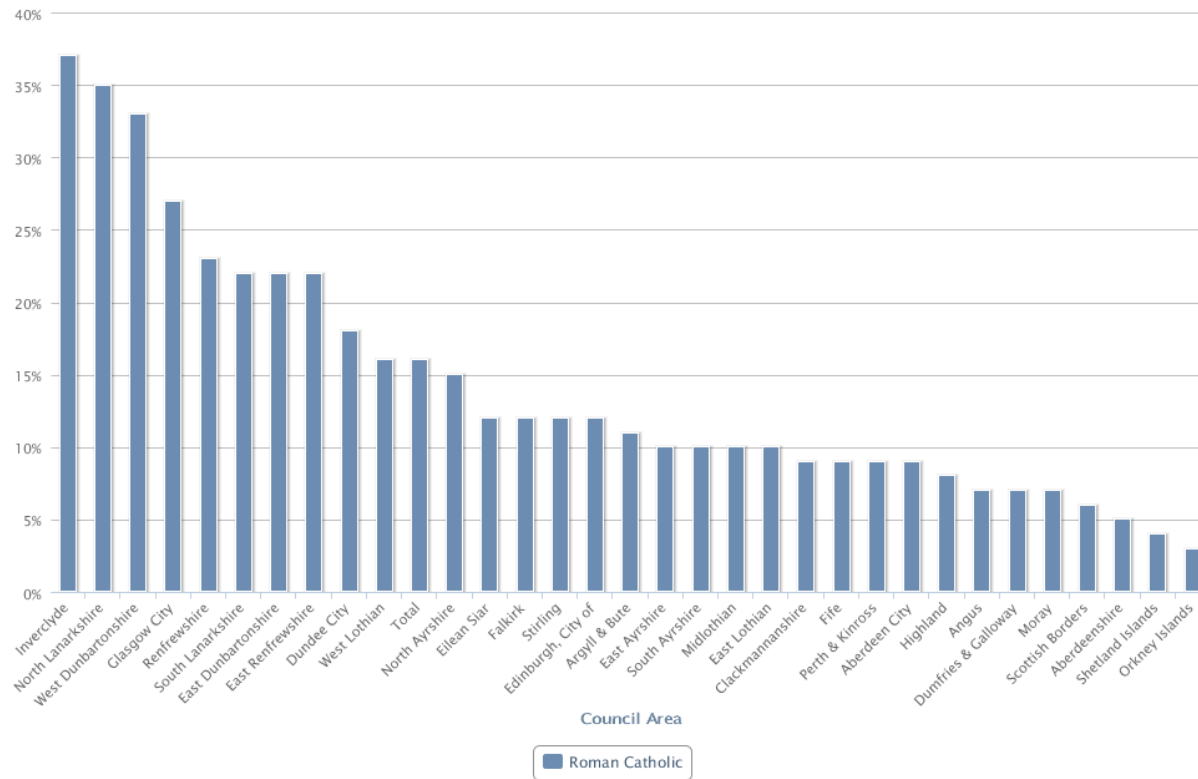


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Maps and Charts: Distribution of Roman Catholic religion by council area



Maps & Charts: Religion chart



Standard outputs: Select a table

Standard outputs

1. Select a table

Choose a *topic*

Ethnicity, Identity, Language and Religion

Select a *table*

DC2107S - Religion by sex by age

DC2101S - Ethnic group by sex by age

DC2102S - National identity by sex by age

DC2105S - Proficiency in English by sex by age

DC2107S - Religion by sex by age

DC2121S - Scots language skills by sex by age

DC2201S - Ethnic group by religion

DC2202S - National identity by ethnic group

DC2204S - National identity by religion

DC2205S - Country of birth by ethnic group

KS201SC - Ethnic group

KS202SC - National identity

KS204SC - Country of birth

KS206SC - Language

KS209SCa - Religion (UK harmonised)

KS209SCb - Religion

QS202SC - Multiple ethnic groups

QS205SC - Proficiency in English

QS211SC - Gaelic language skills

QS212SC - Scots language skills

QS213SC - English language skills

QS801SC - Year of arrival in UK

QS802SC - Age of arrival in UK

QS803SC - Length of residence in the UK



SHEPHERD

ISLANDS

SCOTLAND

Trossachs

Glasgow

Edinburgh

RN

SOUTHERN
UPLANDS

Newcastle

North Sea



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Standard outputs: Select an level of geography

Standard outputs ?

1. Select a table: DC2107S

Religion by sex by age

2. Select your areas

Choose an *area type*

Select an Area Type

Select an Area Type

Community Health Partnership 2012

Council Area 2011

Electoral Ward 2007

Health Board Area 2006

Scotland

Scottish Parliamentary Constituency 2011

Scottish Parliamentary Region 2011

UK Parliamentary Constituency 2005

Reset selections

View table

Select an area



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Standard Outputs

[Main Menu](#)[Area Profiles](#)[Maps and Charts](#)[Standard Outputs](#)[Data Warehouse](#)[Supporting Information](#)

Standard outputs ?

1. Select a table: DC2107S

Religion by sex by age

2. Select your areas

Choose an *area type*

Scottish Parliamentary Constituency 2011

Select one or more *areas*

...or click to select areas on the map

Selected areas

- ✗ Edinburgh Southern

Reset selections

View table

Edinburgh Northern and Leith

Edinburgh Central

Edinburgh Southern

Edinburgh Eastern

Midlothian North and Musselburgh

h Pentlands

Add/remove labels



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Select area/s of interest and view or download data

Table View

Download Table:

Excel 2007 (.xlsx)(max 16,384 columns x 65,000 rows and < 100,000 cells)
Excel 2007 (.xlsx)(max 16,384 columns x 65,000 rows and < 100,000 cells)
Excel 2003 (.xls)(max 255 columns x 65,000 rows)
Comma Separated Value (.csv)
CSV String Value (.csv)
SDMX Structure Definition (.xml)
SDMX Archive (.zip)

Scotland's Census 2011 - National Records of Scotland

Table DC2107SC - Religion by sex by age

All people

Table cell count, including totals: 756 (12 columns x 63 rows).

Percentage:

Select an area:

Religion (Scotland)		All people	Church of Scotland	Roman Catholic	Other Christian	Buddhist	Hindu	Jewish	Muslim	Sikh	Other religion	No religion	Religion not stated
Sex	Age												
All people:	Total	83,867	14,143	10,140	7,937	812	1,342	276	2,038	161	470	39,992	6,556
	0 to 4	2,876	299	336	196	5	86	3	200	9	4	1,382	356
	5 to 9	1,908	308	259	159	4	41	6	145	13	5	828	140
	10 to 14	2,015	362	249	161	16	15	5	81	10	6	936	174
	15	480	81	49	28	2	2	0	14	0	2	269	33
	16 to 17	1,148	188	97	113	11	5	1	33	0	5	609	86
	18 to 19	5,124	580	529	513	44	47	23	67	9	38	2,890	384
	20 to 24	16,001	1,138	1,963	1,843	198	274	102	319	45	96	8,809	1,214
	25 to 29	11,961	999	1,727	1,075	143	412	36	341	24	61	6,377	766
	30 to 34	8,113	827	1,165	690	76	262	19	280	24	43	4,210	517
	35 to 39	5,882	707	658	519	101	112	14	203	3	48	3,118	399
	40 to 44	4,762	818	578	418	55	25	10	113	1	31	2,351	362
	45 to 49	4,529	976	483	421	40	16	8	80	8	35	2,110	352
	50 to 54	3,922	1,004	424	347	39	17	11	45	6	24	1,673	332
	55 to 59	3,490	950	375	297	27	8	6	43	5	20	1,398	363

Census Data Explorer

(1) Area profiles

Compare the national identity for your Council Area with another area in Scotland



- Select areas; Get Data

Data on Population, Identity, Health etc. can be selected from tabs (system defaults to 'Population')

- Select 'Identity' and then 'National identity' from next menu; Discuss in relation to *Social Justice* agenda in CfE

Ethnicity, Identity, Language and Religion

[Interesting facts](#)
[Ethnicity](#)
[National identity](#)
[Religion](#)
[Country of birth](#)
[Length of residence in UK](#)
[Language](#)


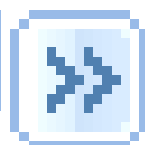
 [Print National identity data](#) | [Print Ethnicity, Identity, Language and Religion data](#)
 [Download Ethnicity, Identity, Language and Religion data](#)

	Aberdeenshire Council Area	Aberdeenshire East SPC	Scotland
All people	252973	77427	5295403
% Scottish identity only	61.3	62.5	62.4
% British identity only	9.0	8.9	8.4
% Scottish and British identities only	17.7	17.7	18.3
% Scottish and any other identities	1.9	1.8	1.9
% English identity only	3.6	3.6	2.3
% Any other combination of UK identities (UK only)	2.7	2.7	2.0
% Other identity	3.6	2.6	4.4
% Other identity and at least one UK identity	0.2	0.2	0.3

Census Data Explorer

(2) Maps and Charts

Compare the national identity for your Council Area with all other Councils in Scotland

- Choose topic 'Ethnicity, Identity, Language and Religion'; choose 'National Identity Chart'; View Data
- Check Council Area for all councils; uncheck 'National Identity new' to deselect all, and then choose 'Scottish identity only'
- Order by 'Scottish identity only' (toggle header to get increasing or decreasing order); hide menus using   to maximize size of chart

Census Data Explorer

(3) Standard Outputs

Compare the national identity for neighbouring Council Areas *using the map* to select councils

- Choose topic 'Ethnicity, Identity, Language and Religion'; select table KS202SC – National identity (Key Statistics); Select table
- Choose Council Areas as area type; click on map to select 4-5 neighbouring councils; View table
- Standard output has raw totals by default; choose Row percentages for discussion of findings

Census Data Explorer

(4) Standard Outputs (continued)

Have more control over outputs ...

- Download a standard table in Excel format using raw totals for maximum flexibility; tailor to own needs and reformat in Excel to produce suitable tables and charts in response to area of interest
- Choose All topics; select table DC1109SC – Household composition by sex by age (Detailed Characteristics); Select table; select area as Scotland; View Table; Download Table in Excel 2007 (or 2003); Go!

Census Data Explorer

(4) Standard Outputs (continued)

- Repeat for table DC1104SC – Residence type by sex by age (Detailed Characteristics); Download table to extract data on communal establishment; add to totals for people living on their own
- Manipulate data in Excel; select desired columns; compute totals and percentages of 16-65 in single dwelling situation; create a chart to illustrate finding