The UK’s Census: Past, Present & Future

What is a census?
Census data types & geographies
Sample topics
• Age-sex structure & ethnicity
• Health & care
Census future: What if no census?

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What is a census?

• Population statistics are a wide-ranging collection of counts of the people living within a country
• Primary source of population data is a census
  • ‘Total process of collecting, compiling, evaluating, analysing and publishing demographic, economic and social data pertaining, at a specified time, to all persons in a country, or a well delimited part of the country’ (UN 1998)
  • The aim of a census is to enumerate 100% of the population

• Information usually obtained through a questionnaire ‘enumeration’ form which contains a mix of write in sections and tick box answers
• A census of population is the biggest and most expensive ‘survey’ that a country undertakes
What is a census?

- Collection of comprehensive data on every person in the country is an expensive, time-consuming and complicated task
- The taking of a census of population is a function of a country’s government and the execution of a census is the responsibility of an official organisation
- For accuracy & comparability, information must be provided by every person in the country
- To ensure 100% enumeration it is not sufficient to rely on voluntary cooperation
- Powers of compulsion, a legislative act, have to be given to the census-taking organisation
- The census relates to a well-defined area at a specified time and is thus regarded as a population ‘cross-section’ or ‘snapshot’

What is a census? Census history

- Censuses date back to ancient times (the word ‘census’ is from Latin)
- Domesday Book (c. 1086)
- Italy & Spain had periodic censuses in the 16th to 18th centuries plus Quebec (1666) and Sweden (1749)
  - To solve particular administrative problems
  - The USA began taking regular censuses in 1790 with other ‘developed’ countries soon doing the same
- In Great Britain since 1801 there has been a population census every ten years
  Two exceptions:
  - No census in 1941 during the second world war
  - An additional census in 1966 which was a 10% sample
- First electronic records contemporary with census in 1971
- Last Census March 2011 (might be the last!)
What is a census? Census history

- Early censuses in England and Wales were simple inquiries
- ‘Registrars’ appointed to undertake this work were also given the responsibility for collecting the census data
- 1801-1831 Censuses in England and Wales undertaken by ‘Overseers of the Poor’ in each parish
- Information collected somewhat basic:
  - Number of houses inhabited, the number of families occupying them & the number of uninhabited houses
  - Number of persons & their sex, including men in the armed forces & at sea
  - Number of persons engaged in agriculture, trade, manufacturing or handicrafts & other persons
- In 1841 the duty of filling in the enumeration form was delegated by the Registrar to the ‘head of the household’
- Self-completion questionnaire and the filling in of all the forms on the same day across the whole country. Format effectively persists

What is a census? Content

- Scope of censuses in Britain was widened by the addition of other questions which have continued to be included on the census forms

- Asking questions of particular interest at the time but which were not always subsequently repeated
  - In 1911 there was a detailed inquiry into fertility (including infant mortality) but fifty years elapsed before fertility data were collected similarly

- Census topics / questions tend to be repeated, since results become more informative as the length of the time-series increases
What is a census? The 1911 Census

What is a census? The legal basis

- The legal basis set out in the Census Act of 1920 authorises Censuses of Population to be taken
- Within the scope permitted by the Act, the ‘Order in Council’ prescribes the questions to be asked at a particular census:
  - Name, sex, age
  - Occupation, profession, trade, employment
  - Nationality, birthplace, race, language
  - Place of abode, character of dwelling
  - Condition as to marriage, relation to head of family, issue born in marriage
  - Provisions to enable any other suitable questions for ascertaining the social and civil conditions of the people to be asked
What is a census? Which questions?

Much wrangling over questions …
• Questions proposed to be asked in UK’s census have to be put before House of Parliament
  • If little value for policy-making purposes or research information questions likely to be excluded
  • General interest have greater likelihood of inclusion than questions relating to a restricted demand
  • Considered in relation to the budget set aside for the census (length of form)
  • No unreasonable demand on respondents, which might jeopardise public cooperation

Collecting census data

• Household census form is a fairly lengthy:
  • Questions about each individual: sex, date of birth, marital status, relationship in household, ethnic group, religion, address, address one year ago, country of birth, health, economic activity, hours worked weekly, occupation, address of place of work, means of travel to work, qualifications
  • Questions about each Household: type of accommodation, extent of sharing, tenure, number of rooms, availability of bath and WC, central heating, number of cars and vans

• Communal establishments are also required to complete a census form
  • boarding schools, halls of residence, hotels, hospitals, care homes, prisons
Collecting census data

- Traditionally, to operationalise census data collection, persons were employed as ‘enumeration officers’ to contact individual households
- They deliver and collect the census form and check that it had been fully completed
- The country divided into census districts & into ‘Enumeration Districts’ (EDs)
- In 2001 there was a ‘hand-out’ of forms by enumeration officers and ‘post-back’ by householders
- In the 2011 Census a mix of both hand- and post-out and of post-back plus internet
- The census agencies organise collection (and dissemination)
  - Office for National Statistics (ONS), General Register Office for Scotland (GROS) & Northern Ireland Statistics & Research Agency (NISRA)
  - Strategic targeting of ‘hard to enumerate’ areas to ensure the best possible coverage of the population

Census confidentiality

- The census is compulsory but requires the willing participation of the population
- Assurance that all information treated in the strictest confidence

- Confidentiality is ensured in the following ways:
  - Census forms are processed under strict security
  - Personal information held for 100 years before being released for historic and genealogical research
  - Information obtained in a census is only used to provide data in such a way that individuals or households cannot be identified
  - Criminal offence for anybody in the census organisation or users to disclose information about identified individuals
  - Plus: data blurring, threshold counts for small geographies, banded demographic detail,

Census is for the public good, but the public may not agree!

* Tension: Public good versus privacy?
### Census uses, strengths & weaknesses

<table>
<thead>
<tr>
<th>Issues associated with census data:</th>
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<tbody>
<tr>
<td>Censuses suffer from under-enumeration</td>
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<tr>
<td>Data only collected at periodic intervals</td>
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<td>Data out of date by the time they are released</td>
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<tr>
<td>Content is reactive not proactive</td>
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<tr>
<td>Respondents make errors when filling in census questionnaires</td>
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<tr>
<td>Confidentiality measures can reduce utility</td>
</tr>
<tr>
<td>Continuity versus current applicability</td>
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<td>Historical record versus contemporary relevance</td>
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<table>
<thead>
<tr>
<th>The advantages of the decennial censuses are:</th>
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<tbody>
<tr>
<td>They are comprehensive</td>
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<tr>
<td>They represent the gold standard of data collection</td>
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<tr>
<td>They provide data over many geographical scales</td>
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<tr>
<td>They have the confidence of the people who use the data</td>
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### Census uses, strengths & weaknesses

<table>
<thead>
<tr>
<th>Census data essential:</th>
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<tbody>
<tr>
<td>Enabling descriptions of the size and key characteristics of a population</td>
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<td>Providing denominators when calculating rates to compare different areas</td>
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<td>Resource allocation by central government</td>
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<tr>
<td>Service provision:</td>
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<tr>
<td>Social services departments using numbers of elderly people</td>
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<td>Education authorities to forecast schooling need</td>
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<tr>
<td>Housing departments able to identify locations lacking amenities</td>
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<td>Commercial organisations use census data to classify areas based on household information and socio-demographic characteristics of the population using this information for marketing and customer targeting</td>
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<tr>
<td>Census a valuable historical record</td>
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Census data types & geographies

Census data types

**Individual microdata** cf. **Aggregate** data

Individuals fill out Census questionnaires & thus provide information about themselves & their living arrangements

- Age, Sex, Marital status, Ethnicity,
- Health, Occupation

Ownership, Type,
Number of Rooms,
Amenities

Individual level data = microdata
Census data: area statistics

Population

Area statistics are the sum of all individuals & houses in a geographically defined location.

Area statistics = “aggregate” statistics

Census data: interaction data

Population

Removals
Census cross-sectional microdata
Sample

Area 1

Area 2

Area 3

Area 4

Area 5

Census longitudinal microdata sample


Census geographies

• Partly from tradition, but largely because major users & funders of the census are national & local government departments, census geographies are predominantly based on administrative geographies

• In England (& rest of the UK) there is a ‘nested hierarchy’ of subnational geographies whereby a set of smaller zones wholly fit into larger zones

Country (1)

Government Office Region (9)

Local Government (376)

Ward (8,850)

Output Area (175,434)
Census geographies

- Prior to 2001, the smallest geographical areas of data release in England & Wales were known as Enumeration Districts (EDs)
- Geography of data collection not necessarily an appropriate geography for data dissemination
- Need for a custom small area geography = Output Areas (OAs)

**Confidentiality:** tension between providing …

<table>
<thead>
<tr>
<th>Detailed demographic data</th>
<th>Detailed geographic scale</th>
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<tbody>
<tr>
<td>Coarse geographic scale</td>
<td>Banded demographic detail</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Nation</th>
<th>Region</th>
<th>District</th>
<th>Ward</th>
<th>Synthetic</th>
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</table>
### 'Crosstabulation' age by sex and marital status
From ‘CASWEB’

![Crosstabulation Table from CASWEB](image)

### 'Crosstabulation' age by sex and marital status
From ‘NOMISWEB’

![Crosstabulation Table from NOMISWEB](image)
Sample topic
Age-sex structure & ethnicity

Census geographies: age-sex structure

- Censuses predominantly aim to count the population
- Ancient censuses aimed to determine population size for conscription or taxation
- In modern settings, there is a need for population counts by age & sex by geographic area:
  - Assessing the demand for housing, schooling, employment, services, pensions
  - Monitoring social trends: with age sex counts used as denominators for indicators of the economy, health & the performance of public services
  - Distributing a ‘fixed cake’ of resources: between local offices, institutions or council departments
  - Business marketing which requires the size & characteristics of catchment populations
Census geographies: age-sex structure

• Many users of population data are particularly interested in the age-sex structure of a population
• Has a major influence on rates of demographic events
• Occurrences of demographic events of births, migration & mortality are not evenly distributed across the population by age & sex
  • An area which has youthful population is likely to have fewer deaths than a very elderly population of the same size but may be more fertile & more migrant
• Age structure of the population needed to compare levels of health in different areas

Census is the main source of detailed data on the size & age-sex structure / composition of areas

Dependency ratios
• Reveal distributions of both the young & the elderly
• Important in the UK where we have a largely ‘ageing’ society
Ethnicity: what?

- Wide & ongoing debate on what is meant by ‘ethnicity’
- Definitions of categories of ethnic group for which data should be collected
- Whether we should

- Population in UK / GB from a range of national & cultural backgrounds
  - Briton: Celtic background
  - Anglo-Saxon; two different tribal groups immigrants from ‘Germany’ (plus Jutes as well?)

- From late 20th Century onwards, ethnic group population definitions have commonly been based on a combination of categories:
  - Ethnicity describes combined & overlapping aspects of ancestry, heritage, religion, culture, nationality, race, language & region
    - Every person has an ethnicity
  - ‘Race’ has more widespread use in the US

Ethnicity: why?

Reasons for collecting data by ethnic groups include:
Availability of counts of population with an ethnic group dimension informs
- Planning of the provision of relevant goods & services
- Appropriate housing & language support
- Identify differences by employment / education / health
- Targets for take-up of equal opportunities
- Policy debates on international migration & diversity

Haskey (2002: viii) population data available:
- “By ethnic group are a necessary element in the armory of available national demographic data, rather than a discretionary ‘optional extra’ ”

A question on ethnicity was included for the first time in the 1991 Census
- Utility of the 1991 ethnic group information led to a question also being asked in the 2001 & 2011 Censuses
- Available categories changed though
Ethnicity: in the 2011 Census

What is your ethnic group?

Choose one section from A to F, then tick one box to best describe your ethnic group or background.

A White
- English / Welsh / Scottish / Northern Irish / British
- Irish
- Gypsy or Irish Traveller
- Any other White background, write in

B Mixed / multiple ethnic groups
- White and Black Caribbean
- White and Black African
- White and Asian
- Any other Mixed / multiple ethnic background, write in

C Asian / Asian British
- Indian
- Pakistani
- Bangladeshi
- Chinese
- Any other Asian background, write in

D Black / African / Caribbean / Black British
- African
- Caribbean
- Any other Black / African / Caribbean background, write in

E Other ethnic group
- Arab
- Any other ethnic group, write in

Ethnicity: research angles

- The dimensions of segregation / integration / assimilation into which research might be focused include:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Aspect</th>
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<tbody>
<tr>
<td>Geographical</td>
<td>Degree to which groups are:</td>
</tr>
<tr>
<td></td>
<td>- Spatially segregated or dispersed &amp; the level of diversity within areas</td>
</tr>
<tr>
<td>Structural</td>
<td>Degree to which there is equality of access to &amp; achievement in:</td>
</tr>
<tr>
<td></td>
<td>- Education, labour market, income, housing &amp; health</td>
</tr>
<tr>
<td>Cultural</td>
<td>Participation in society’s institutions</td>
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<tr>
<td></td>
<td>Development of interpersonal contacts with members outside the group</td>
</tr>
<tr>
<td></td>
<td>Degree to which behavioural patterns of host country adopted</td>
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</tbody>
</table>
Ethnicity: research angles

- % persons of Indian ethnicity within LSOAs in Leeds, 2001
- Ethnic diversity within LSOAs in Leeds, 2001

Census geographies: age-sex structure

- Population pyramids, selected ethnic groups in Bradford, 2001
  - These populations may have different age-relevant service needs & are likely to change over time in different ways
Estimating fertility rates for ethnic group projections

Study sample
- Women of child-bearing age
- Presence of a dependent child in family identified
- Woman’s own child using generation indicators and household member relationships

Age-Specific Fertility Rates

Is ethnicity the whole story for the differentiation of fertility rates? England & Wales, 2001
Projections: ethnic group age structure 2001-2036

Sample topic
Health & Care
Investigating health using the census

• National censuses aim to provide authoritative data on populations & housing with the results used to inform strategic planning & the allocation of resources

• Annual data on mortality have been available from the Vital Statistics for a variety of geographical scales from national down to small area levels in the UK for many years

• Not the case for ‘morbidity’ data, partly because information on illness is harder to collect & has to be assembled from a variety of sources

Investigating health using the census

• During the 19th Century & early part of the 20th Century, the census was periodically used to collect information on health
• The 1911 Census asked a question on ‘infirmity’; whether an inhabitant was:
  • “Totally deaf or deaf & dumb; totally blind, lunatic; imbecile or feeble-minded”
  • A question not repeated since!
• Between 1911 & 1991, the only way to derive health-related information from the census was using ‘economic activity’ questions
• Some interesting research has been produced (Bentham 1988) the information has been unsatisfactory since questions focusing on people’s occupations only relevant to the working age population
Investigating health using the census

1991 Census
• The 1991 Census was the first since 1911 then to include a direct health-related question. The ‘limiting long-term illness’ (LLTI) question
  • “Does the person have any long-term illness, health problems or handicap which limits his/her daily activities or the work he/she can do?”
• The advantage the census has is that data are available for small area geographies & aims for 100% population coverage rather than a sample & covers communal establishments

2001 Census

Investigating health using the census

The 2001 Census
• In 2001 the LLTI question was supplemented with a ‘general health’ question:
  • “Over the last twelve months would you say that your health has been: Good? Fairly Good? Not Good?”
Investigating health using the census

The 2001 Census
• The 2001 Census also asked about whether people provided unpaid, informal care for others
  • “Do you look after, or give any help or support to family members, friends, neighbours or others because of: long-term physical or mental ill-health or disability, or problems related to old age”
• Caring provided as part of paid employment was not to be included
• Responses to this question provide detailed information about these carers & the amount of care being given, to inform policy initiatives & resource allocation by health & social services
Unpaid Caring: IN households

Correlation = 0.77

Unpaid Caring: OUTSIDE household

Correlation = -0.43
Census future: What if no census?

- Census is the means for collecting the same types of information about each part of the country at the same time.
- The primary source of demographic, socio-economic and household information.
- The census is the ‘gold standard’ against which many social surveys are judged.
- Some of us ‘reliant’ on census data!!

Alternatives?

- Some countries maintain a population register (e.g. Netherlands & Scandinavian countries); demographic events recorded continuously.
- Many argue a national register would improve the quality of the UK’s population statistics.
  - Compulsory identity cards and / or a central dossier is regarded by others as an invasion of civil liberties.
### Census future: What if no census?

**Alternative sources to count the population**
- NHS Patient Register
- DSS National Insurance Numbers

**Alternative sources to set small area threshold size**
- Council tax data
- National Land & Property Gazetteer

**Alternative sources to characterise populations**
- Benefits data (unemployment, incapacity benefit)
- Council tax bands
- Income tax records

**Alternative sources for cross-tabulations**
- Large scale surveys (Labour Force Survey; Health Surveys)
- Lifestyles databases & storecard information

### A synthetic census?

**Record matching of administrative records:**

**NHS Patient Register (an imperfect source)**

Person #1
Abigail Aardvark

- Information on register: Date of Birth & age = 8, female, Long Ashes Park, Threshfield, Nr Skipton, North Yorkshire, BD23 5PN

**Verify** against Vital Registration of birth

- Add information on birth certificate (place of birth, parent’s names, occupations, etc)

**Verify** against Pupil Level Annual School Census (PLASC)

- Add information on education achievement, ethnicity, free school meals

**Otherwise** consider classifying as ‘ghost’
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