



# 3MOONS

METHODOLOGY DIRECTORATE  
LEADING THE DEVELOPMENT OF STATISTICAL METHODS

## Secondment opportunities within MD

Methodology Directorate welcomes applicants from UK government departments and other National Statistics Institutes for short and long-term secondments. Both organisations benefit from the knowledge-sharing and training elements of these arrangements, and MD has been previously, and is currently, fortunate in the number and quality of secondees in our midst. Applicants will be required to have UK employment rights. Please contact [cynthia.clark@ons.gov.uk](mailto:cynthia.clark@ons.gov.uk) for more information.

### Winter 2006

This is the sixth issue of Methodology Directorate's (MD's) quarterly overview of methodological issues in the ONS. The fifth issue covered aspects such as news from Statistics Canada, the new Wealth and Assets Survey, a project to develop a European Socio-Economic Classification, the first International Business Data Collection Workshop, and an introduction to Statistical Disclosure Control. Read on for the latest news from MD.



### Advisory committee meetings

On 18 October 2006, at the fourth meeting of the UK Census Design and Methodology Advisory Committee (UKCDMAC), jointly hosted by MD and Census, a paper on the UK Disclosure Control Policy for the 2011 Census was favourably received. In late November the Registrars General for the UK agreed this policy, which stated the following:

'A common approach will, as far as possible, be adopted throughout the UK.

Disclosure Control methods should ensure that no statistics are produced that allow the identification of an individual (or information about an individual) with a high degree of confidence.

Small counts (0s, 1s, and 2s) could be included in publicly disseminated Census tables provided that uncertainty as to whether the small cell is a true value has been systematically created and creating that uncertainty does not significantly damage the data.'

The UKCDMAC will not meet again until November 2007 (due to the 2007 Census test). In the interim, two subgroups will be set up to review statistical disclosure control and coverage assessment methodology as they develop over the next two years.

### MD GSS forum meeting

Topics are welcomed for the next meeting of the National Statistics Quality and Methodology Programme Board (hosted by MD) in London on 26 April 2007.

Please email suggestions to [david.matthewson@ons.gov.uk](mailto:david.matthewson@ons.gov.uk)

Topics are welcome for the 11 May meeting of the National Statistics Methodology Advisory Committee. Please send suggestions to [jonathan.smith@ons.gov.uk](mailto:jonathan.smith@ons.gov.uk)

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### Moving on

Mark Pont left MD in January to take up a new post as head of Methods at the UK Centre for the Measurement of Government Activity (UKCeMGA). Mark was a stalwart of MD for 12 years and will be missed.

Pete Brodie has been selected as Mark's replacement as head of Business Statistical Methods Unit.

### Future conferences

The twelfth Government Statistical Service (GSS) annual Methodology Conference will be held 25 June 2007 at the Victoria Park Plaza Hotel in London. Papers are welcomed from across the GSS and academia. Abstracts should be 150-200 words, and contain three key words as well as contact details.

Please send abstracts to [methodology@ons.gov.uk](mailto:methodology@ons.gov.uk) by 13 March 2007.

# End of Standards and Guidance (STaG) project

The Standards and Guidance (STaG) database, which holds 'how to' desk instructions for all internal ONS processes, is changing hands. We review the history of STaG, and outline the future management of this key ONS resource.

The STaG project was begun in response to the White Paper *Building Trust in Statistics* and a subsequent internal audit by KPMG, which covered statistical methodology and the guidelines and standards that were in existence in ONS up to April 2000. The audit recognised that much good material existed, but it pointed to the lack of a systematic framework and central guidance. While central guidance for staff matters, finance, project management and so on existed on Lotus Notes, guidance was not available in a similar way for the main business processes.

To address these issues, the audit recommended that a framework for standards and guidance be developed and be available to all staff and updates to statistical guidance be produced centrally, formally and on a timely basis.

## Why a Central Database?

ONS has a commitment to ensure statistics are produced to a high professional standard and are transparent and accessible. Information has to be freely shared within the organisation, and ONS-wide policies should be put in place rather than having separate policies in different work areas. At this time the ONS had no such central database for its core statistical policies.

## STaG is born

The STaG project dealt with this shortfall, bringing together all existing statistical guidance and processes into a common framework on one database.

Over the last six years the project has developed the STaG database into the key quality tool for guidance on ONS statistical methodologies and processes. The success of the project is reflected in the fact that it is now used by 85 per cent of business areas within its scope. To reflect its major role in providing statistical guidance rather than corporate standards, the database has been renamed as the Statistical Guidance database; it retains the acronym STaG. At

the end of October 2006, the Standards and Guidance project closed and the resource was deemed 'operational'. This meant that the responsibility for document management had been passed to the divisional STaG Liaison Officers (SLOs). These recent developments have ensured that business area staff now 'own' the database – which was always the intention.

## The future

Quality Centre staff in MD will continue to lend support but with greatly reduced resources. The STaG project team will primarily be available only to: provide advice to SLOs, oversee the maintenance of the database and keep STaG at the forefront of ONS activities (via contact with other Office initiatives, regular Daily articles and SLO meetings).

The STaG project team would like to thank all staff involved in the project for their help and contributions to the successful delivery of the project.

If you have any queries please contact your divisional SLO. Alternatively e-mail: [statistical.guidance@ons.gov.uk](mailto:statistical.guidance@ons.gov.uk).

# Update on Review of Innovation, Development, and Methodology

In early 2006, Karen Dunnell commissioned David Wroe (former deputy of the Central Statistical Office, an ONS precursor), and Fiona Steele (Bristol University) to undertake a review into Innovation, Development and Methodology in ONS. The review was part of a wider examination of Senior Civil Service (SCS) positions in ONS, and focused on devising an organisational structure and resource plan for the three functions.

The review was based on in-depth meetings with key ONS staff and external experts, supplemented by relevant information from other National Statistical Institutes. The findings of the review were:

- business as usual development was not well communicated
- the modernisation programme was not delivering and was unclear
- outputs were compromised by the current environment

- ONS lacked a vision

The wider recommendations for ONS were to:

- develop a current ONS vision
- review more innovative work
- maintain a centralised MD
- limit modernisation to development linked to new systems and innovations
- combine modernisation, MD and IM under a single person

The specific recommendations for MD were to:

- continue to have an ONS executive presence
- reduce from three to two divisions
- improve business planning
- promote technical expertise
- have a more external focus (including collaboration)
- make more use of advisory committees

Recommendations from the review are now being implemented by a dedicated group set up by the ONS executive. The

impact on MD is likely to be a divisional reorganisation, and increased support for future developments, external work and collaboration. These changes will strengthen methodological expertise in MD and increase the status of ONS as a world class organisation.

An advertisement was issued on 26 January 2007 for an MD divisional director, based in Titchfield, with responsibility for methodological aspects of the 2011 Census and for statistical methodology and research for other ONS programmes. The applicant will be required to demonstrate the UK Senior Civil Service competencies and to have UK employment rights. To apply, download an application pack at [www.statistics.gov.uk/recruitment](http://www.statistics.gov.uk/recruitment) or call Bernice Reeks on **01633 81 9180**.

The closing date for applications is 1 March 2007. If you would like to discuss the post in more depth, please contact Fiona Bonnett, Head of Recruitment on **01633 81 2557**.



*"... the evolution of the Census of Production will continue and we look forward to influencing where that development will lead"*

## Methodology past, present and future

Paul Smith and Stephen Penneck review 100 years of the Census of Production

The Census of Production reaches its centenary in 2007. In this article we review the methodological developments that have taken place since the first Census, including the evolution of questionnaire design, the introduction of sampling and allied estimation methods, and decomposition methods for construction of regional estimates. We also look forward to new developments in the business survey system.

### Original methods

The early censuses had a relatively simple structure, enumerating all businesses above a minimum size threshold. One of the biggest challenges was to create a register from a variety of sources, principally factory and mine lists from the Home Office, which maintained them as part of employment regulations. The questionnaire was developed with representatives of industry, but was still long and complicated – the notes describing what to include in 'output' ran to more than a page. But there were good practices too, with notes included with the questions, and a requirement to state 'none' rather than leave boxes blank.

Once the questionnaires were returned, they underwent similar processes to today, involving extensive checking, but all done manually. In the first censuses all follow-up of queries was by post, which led to a very long

processing time (five years to final results for the 1907 census).

### From annual to integrated

A change to an annual periodicity and a new legal basis for the Census of Production after World War II allowed the questionnaire to be redeveloped to use information more readily available to businesses. However, the notes and questions were soon separated in the interests of economy, and this is likely to have had an impact on data quality. In 1951 sampling methods were introduced in a slimline Census. Stratified sampling was used intermittently, but became a permanent feature from 1978. The very first estimation to compensate for non-sampled units was simple expansion, but by the second year of sampling, ratio estimation was introduced, and became the standard for business surveys. In 1948 the first Standard Industrial Classification was introduced, and used as a consistent classification across government departments.

A new system of business surveys was introduced in 1970, founded on a revitalised Annual Census of Production, and Quarterly Sales Inquiries. Around this time the first moves were made to create a business register for use across government, building on Value Added Tax and PAYE administrative sources, although these were not actually

merged until 1992. There were progressive reductions in the sample size as pressure was brought to reduce costs to business of completing questionnaires (compliance costs), and this eventually led to stopping collection of local unit (single site) information. Local unit information was used to produce regional estimates, so it had to be imputed using information about the business's structure from the business register, kept up to date by the Census of Employment.

The Census of Production had started out sending questionnaires to establishments (businesses mainly at single locations), but in 1959 had moved to allow groups of establishments ('business units') to report together in most years, and finally moved onto an enterprise basis in 1987, where the whole business responded, mainly to keep compliance costs low.

In 1997 the Annual Census of Production was merged with several other surveys to form the Annual Business Inquiry, covering services as well as production. A new method of imputing local unit values was introduced based on regression models including parameters for regional activity. Sampling included strata for Welsh and Scottish businesses to enable improved estimates to be produced in those areas. The notes were finally reintegrated with the questionnaires around this time too, as there was increasing appreciation of how the questionnaire influences the quality of the responses.

### The future

There are plans to modernise the business surveys in ONS, beginning with a Business Register and Employment Survey, which will update the register to form the platform on which other surveys can be built and then moving to economy-wide annual and monthly surveys. These will be based on new systems, using consistent tools and methods for the different parts of the survey chain. Making this approach a reality depends on having sufficient resources, and it may take a while to deliver. Nonetheless the evolution of the Census of Production will continue and MD looks forward to influencing where that development will lead.

# Inside MD

## Census Enumeration Intelligence

### Who are we?

Enumeration Intelligence (EI) is a small but growing work-stream within Data Collection Methodology. The EI team consists of Owen Abbott, Denise E Williams, Shayla Goldring and Alex Tosta.

### What do we do?

EI carry out research and analysis that will support and inform on methods of Census data collection in different areas, leading to better resource allocation and improved estimates. The main customer for EI is Census Data Collection, but much of the research is applicable to social surveys and other areas of Census too.

### Key tasks

The team have completed some joint research with colleagues in MD that gives an advanced understanding of the factors associated with non-response in the 2001 Census. This work has informed an enumeration targeting categorisation for stratifying the sample of areas used in the 2007 Census Test. The aim of the categorisation is to identify areas that are 'hard to count' and/or where there is a high expectation of poor response and therefore a specific enumeration approach might be required.

This categorisation will then be used to ensure resources are allocated efficiently, which has not been possible in previous censuses. This categorisation uses data on the following factors, chosen for their strong association with non-

response: age, housing accommodation type, household ethnicity and household tenure.

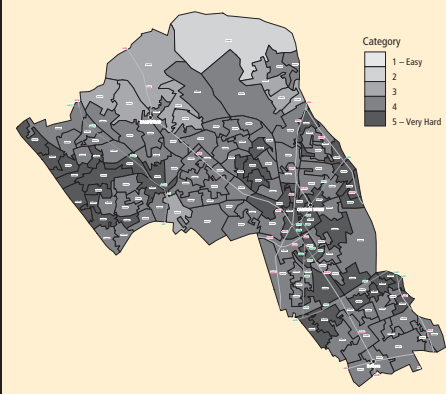
The categorisation has been produced for Lower layer Super Output Areas (LSOAs). The numbers and proportions of LSOAs in England and Wales falling into each of the five enumeration targeting categories are shown in the table below.

| Enumeration Targeting Category | LSOAs in England and Wales |            |
|--------------------------------|----------------------------|------------|
|                                | Number                     | Percentage |
| 1 (easiest)                    | 20,626                     | 60         |
| 2                              | 6,876                      | 20         |
| 3                              | 3,438                      | 10         |
| 4                              | 2,750                      | 8          |
| 5 (hardest)                    | 688                        | 2          |

The map shows the Enumeration Targeting Categorisation for all of the LSOAs in Camden Local Authority District (LAD). Camden is one of the 5 LADs chosen for the 2007 Census Test. It is possible to see there are no LSOAs in Camden in the easiest to count category (1), and very few in categories 2 and 3. The majority of LSOAs are in the hardest to count categories 4 and 5.

Research is being carried out into calling strategies to inform the guidance given to enumerators working on the 2007 Census Test, such as area profiles that include socio-demographic information such as age distribution and languages spoken. These profiles currently only use Census data, but more up-to-date

Enumeration Categorisation to be used in the 2007 Census Test, Lower layer super output areas, Camden LA



local information supplied by Local Authorities is being trialled. Other types of information are being developed to aid the managers of address checkers and enumerators in the field. Future work will include evaluating the enumeration targeting categorisation and the area profiles after the 2007 Census Test and further investigating reasons for non-response in the Census.

### Related articles

#### Non-response

Rahman, N. and Goldring, S. (2006). The Factors Associated with Household Non-Response in the 2001 Census. *Survey Methodology Bulletin* No.59.

#### Enumeration Targeting Categorisation

[www.statistics.gov.uk/about/census/census2011/downloads/EnumerationTargetingCategorisation.pdf](http://www.statistics.gov.uk/about/census/census2011/downloads/EnumerationTargetingCategorisation.pdf)

## Southampton research contract

The contract between ONS and Southampton University formalises a reciprocal agreement whereby MD is able to draw upon academic expertise in carrying out its work programme. Southampton University has the benefit of being the main contractor providing methodological services within ONS and through ONS for the wider Government Statistical Service (GSS).

There has been a long history of joint working between the two organisations, with previous agreements covering both individual project work and collective programmes. The current contract aims to streamline activities by bringing all the methodological work carried out by the university under one umbrella. Southampton University was successful in their bid in 1999, winning an initial five-year contract, which was then renewed in 2005.

Over the past six years the contract has proved beneficial to both parties, with ONS gaining assistance in the development of new methods underpinning a wide range of outputs, as well as those related to quality assessment of its products and the protection of microdata

confidentiality. From the university's perspective the contract has provided a vehicle for the statistics group to cement its strong national and international research profile in official statistics, with ONS-related methodological issues providing an important focus for much of the research carried out.

Currently there are ten projects that Southampton University and Methodology Directorate are working on under the contract. These include;

- redesign of the census coverage assessment (and adjustments) for 2011
- development of integrated and optimised procedures for data cleaning within selected business surveys
- developments in small area estimation techniques which borrow strength over time and space
- a weighting system for the Integrated Household Survey which maintains consistency in core variables with a changing mix of surveys

Project work is carried out on a collaborative basis, with active involvement from ONS project managers and ONS methodologists in order to optimise skills transfer to ONS.



For more information please contact [alison.whitworth@ons.gov.uk](mailto:alison.whitworth@ons.gov.uk)

## Your questions answered

In this issue, we answer a question on the teams in MD. Thanks again for all your queries, from home and abroad. Each MD team deals with a different methodological issue, and aims to concentrate expertise on that issue within the team. As such, teams are known as Centres of Expertise (CoEs).

The current CoEs, and team leaders, are as follows:

- Demographic Methods – Alison Whitworth
- Data Collection Methodology – Elspeth Maclean (Business), Amanda Wilmot (Social), Lyn Potaka (Census)
- Index Numbers – John Wood
- Processing Editing and Imputation – Alaa Al-Hamad (Business), Heather Wagstaff (Social and Census)
- Quality – Bronwen Coyle
- Sample Design and Estimation – Pete Brodie (Business), Gareth James (Business), Charles Lound (Social), Dave Elliot (Social), Owen Abbott (Census)
- Small Area Estimation – Philip Clarke
- Spatial and Other Analysis – Martin Ralphs
- Statistical Disclosure Control – Jane Longhurst
- Statistical Training – Heather Gregory
- Time Series Analysis – Nigel Stuttard (Social), Craig McLaren (Business)

Please send your questions to [3moons@ons.gov.uk](mailto:3moons@ons.gov.uk). We will choose one or more to answer in the next issue.