CAG Paper – Gaps in Demographic Studies in Northern Ireland

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This paper summarizes a number of gaps in demographic statistics/analysis in Northern Ireland. These gaps are identified by reviewing demographic analyses carried out in GB/EU, customer queries and exploring the potential of currently used data sources. It will include, for each gap, a short description, ratings for usefulness and feasibility, and (if any) references to similar work in GB/EU.

Possible gaps are split into two groups: periodic analysis can be produced with a certain frequency by DMB statisticians. Some may become official statistics or form an intrinsic part of the current suite of publications. Occasional studies could be carried out by (academic) researchers, with DMB statisticians providing datasets, guidance and/or project management.

The objective of this paper is to identify areas to develop demographic statistics/analysis. The CAG will be asked for their views on priorities for these gaps, and whether there are additional gaps from (potential) users of demographic statistics. Also, the CAG will be asked to consider applying for funding for occasional studies to be carried out.

A. Periodic
- Quarterly population estimates
- Population Estimates of the very elderly
- Population estimates/projections by marital status
- Population estimates/projections by socio-economic class (SEC)
- Population projections for Parliamentary Constituencies
- Variant sub-regional population projections
- Premature mortality, potential years of life lost and avoidable deaths
- Life Expectancy on cohort basis by sub-regions
- Linking marriage and divorce registrations
- Linking birth, stillbirth and infant death registrations

B. Occasional
- Socio-economic & environmental impact on population
- True replacement fertility level
- Fertility/mortality by subgroup
- Further analysis of seasonality of births and deaths
- Mortality after losing partner
- More analysis on migration estimates
- Profiles of particular household types
- Historical and geographical distribution of surnames
- Micro-simulation – Census and surveys

A. Periodic

Quarterly population estimates

ONS have published quarterly population estimates as part of the experimental statistics. They add counts on 31 March, 30 September and 31 December to the mid-year estimates (30 June). The methodology and data sources will be identical, but broken down by quarter. They can be used to analyse seasonality of population and as nominators for other statistics that are not measured at mid-year (for example, unemployment rate).

<u>Use:</u>	government planning, nominator, seasonality
<u>Feasible:</u>	Yes, existing software and data sources
<u>References:</u>	http://www.statistics.gov.uk/STATBASE/Product.asp?vlnk=13523

Population Estimates of the very elderly

The very elderly are currently aggregated in a 90+ age group at NI level and an 85+ age group at the sub-regional level. The Kanisto-Thatcher database contains data on population counts and death counts by age, sex and year if birth. It uses a cohort method to create very elderly population estimates for mid-Census and post-Census years.

<u>Use:</u>	government planning, health policy
<u>Feasible:</u>	Yes, existing methodology
<u>References:</u>	http://www.mpidr.de/databases/ktdb/introduction.htm

Population estimates/projections by marital status

The Government Actuary's Department produced marital status projections for England & Wales. One of the main uses of these projections is as one of the key inputs to the regular projections of the number and type of households in England. Marital status projections are also used to cost various aspects of the future social security programme. Information on the change in marital status can be taken from civil registrations and courts (divorces); further complications will arise in collecting information on residents changing their marital status outside Northern Ireland, and the marital status of migrants.

<u>Use:</u>	create UK projections by marital status; improve NI household projections, regional policy planning, fertility/mortality rates by marital status, nominator for marriage/divorce rates
<u>Feasible:</u>	Yes, existing software and GAD/ONS expertise
<u>References:</u>	http://www.gad.gov.uk/Demography%5FData/Marital_status_projections/

Population estimates/projections by socio-economic class (SEC)

Similar to marital status, population estimates and projections can be broken down by socio-economic class. The 2001 Census can provide a starting point, with births and death registrations also providing SEC information. More difficult will be the SEC of migrants and SEC changes within the population (for example, due to retirement). It is suggested to use broad SEC categories given available information. Other estimates/projections can be run for community background, tenure, etc.

> Use: government planning, fertility/mortality rates by SEC, denominator for other statistics (health/education)
>
> Feasible: More difficult, subject to data sources (LFS), may be driven by economic projections
>
> References: -

Population projections for Parliamentary Constituencies

The sub-national population projections for Northern Ireland are done for Local Government Districts (LGDs) only. The latest projections are 2006-based, which run up to 2021, including projections by sex and single years of age. It is proposed to replicate these figures for Parliamentary Constituencies (PCs), constrained by published projections for NI and LGDs. Some PCs have already overlapping borders with LGDs.

> Use: government planning, boundary commission
>
> Feasible: Yes, existing software and MYE expertise
>
> References: http://www.gro-scotland.gov.uk/statistics/publications-and-data/population-estimates/westminster-parliamentary-constituency-population-estimates.html

Variant sub-regional population projections

The Government Actuary's Department produced variant population estimates for Northern Ireland by alternating low, principal and high assumptions for fertility, life expectancy and migration. In addition, special cases such as replacement fertility and zero migration are presented. These variant projections can be used to produce sub-regional variant projections. Also, additional variants can be created with different variation of sub-regional differences, for example, a higher rate of de-urbanisation. In turn, these variant projections can be fed into variant household projections.

> Use: government planning
>
> Feasible: Yes
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> References: http://www.gad.gov.uk/Demography_Data/Population/2006/methodology/varlist.asp

Premature mortality, potential years of life lost and avoidable deaths

These headings are variant indicators of mortality and can be presented alongside the Standardized Mortality Rates. Premature mortality is an indicator of the number of deaths at an age below a certain benchmark (say, 65 years). The Potential Years of Life Lost (PYLL) is derived from aggregating positive differences between a certain benchmark (say, 75 years) and the age of death. This aggregate can be related to the population and compared across time and/or geography; it has been used as an indicator in the Health Domain of the NI Deprivation Study (MDM'05). A study on avoidable deaths makes a further distinction between amenable mortality and preventable mortality, taking into account the age at death in combination with the cause of death.

Use:	mortality statistics, health policy
Feasible:	Yes
References:	http://www.poverty.org.uk/35/index.shtml
	http://www.statistics.gov.uk/articles/hsq/HS34Q-Mortality.pdf
	http://www.scotpho.org.uk/nmsruntime/saveasdialog.asp?IID=3751&sID=3206

Life Expectancy on cohort basis by sub-regions

Life Expectancy figures for Northern Ireland have been compiled by GAD on a period or cohort basis by age and sex. The cohort basis is regarded as a more appropriate measure of how long a person of a given age would be expected to live, as it is calculated using age-sex-specific mortality rates, which allow for known or projected changes in mortality in later years. Period life expectancy tables are currently available for NI sub-regions. Cohort life expectancy tables for sub-regions will be more difficult to compile given more variable historic age-specific mortality rates and regional differences in the assumption of future mortality rates.

Use:	mortality statistics, population projections
Feasible:	Yes, existing methodology
References:	http://www.gad.gov.uk/Demography%5FData/Life_Tables/period_and_cohort_eol.asp

Linking marriage and divorce registrations

The linkage of marriage and divorce registrations could be used to derive marriage survival rates. The probability of divorce can be related to the age at marriage, duration of marriage and type of ceremony. A similar analysis can be carried out on the grounds for divorce. Further linkage can be made to the registrations of deaths.

Use:	social trend
Feasible:	subject to identifiable information from court service
References:	http://www.statistics.gov.uk/downloads/theme_population/Population_Trends_131_web.pdf

Linking birth, stillbirth and infant death registrations

Identifiable information from the registration process can be used to create links between vital events of the same person. A first linkage could be that between birth registrations and those of infant deaths. This would provide additional information to infant deaths, such as the place of birth, multiple birth, number of previous children, parents' country of birth and marital status. Further linkage can be made to the registrations of births to the same parent(s), stillbirths, and marriages through the details of the parent(s). Birth registrations contain information on the mother (and father). Linking registrations of the same mother could provide more information on family planning, for example, the average birth interval. It could also provide information on changes in the parent's circumstances, such as marital status, social-economic class and location.

<u>Use:</u>   government planning, birth interval, household formation

<u>Feasible:</u>   Yes, but resource consuming, expertise from NILS

<u>References:</u> -

B. Occasional

Socio-economic & environmental impact on population

Changes in population (through fertility, mortality and migration) can be related to local socio-economic and environmental factors. Common hypotheses are that people move towards areas with high employment and good standard of living. A quick analysis showed that population growth between 2001 and 2003 was smaller in more deprived SOAs, more advanced analysis could include other factors of interest. Consideration should be given to the causality of population change.

<u>Use:</u>   regional planning, understanding internal migration

<u>Feasible:</u>   Yes, subject to small area population estimates

<u>References:</u> http://www.defra.gov.uk/rural/pdfs/research/env_qual/finalrep.pdf

True replacement fertility level

To replace themselves women, on average, need to have one female child, who survives long enough for a female grandchild to be born, and so on for succeeding generations. The replacement fertility of 2.10 is a commonly used *benchmark*. This figure is subject to the male/female ratio of births and the mortality rates (of females), and can therefore be derived for every year (and region).

<u>Use:</u>   historic replacement rates, commentary on birth statistics

<u>Feasible:</u>   Yes, readily available data and methodology

<u>References:</u> http://www.statistics.gov.uk/articles/population_trends/PT119ReplacementFertilityWhat.pdf

Fertility/mortality by subgroup

The NILS mortality database can be used to look at mortality of different subgroups of the population: community background, ethnicity, education level, etc. Comparisons can be made between mortality rates or the underlying causes of death. Birth and death registrations contain information on the socio-economic class (of the parents). Fertility and mortality rates can only be calculated with reliable estimates of the population by socio-economic class, which are currently only available from the 2001 Census. In turn, these rates can be used for population projections by SEC.

Use:	fertility/mortality rates, population projections
Feasible:	population estimates by SEC
References:	http://www.demographic-research.org/volumes/vol18/5/18-5.pdf

Further analysis of seasonality of births and deaths

The seasonality of births could be driven by parental choice or environmental factors. Also, there is some evidence of a seasonal effect in complications at birth and birth disorders. Other avenues of analysis are to look at differences in seasonality, either historically, geographically, by mother's age, etc. The seasonality of deaths focuses often on excess winter deaths, which compares the number of deaths in identified winter months with non-winter months.

Use:	demographic statistics, health policy
Feasible:	Yes
References:	http://www.wako.ac.jp/~nonaka/Summary.html
	http://www.statistics.gov.uk/downloads/theme_health/HSQ19.pdf

Mortality after losing partner

A Belgian study found that the mortality rates of people who have lost a partner increased by roughly 10 per cent. This study can be replicated using the NILS. It is suggested to look at demographic factors only; follow-up NILS projects into the impact of health and socio-economic variables can be commissioned at a later stage. A similar study looked at the probability of divorce after one of the partners was diagnosed with cancer. Most cancer forms resulted in small, immediate declines in divorce rates the first years following diagnosis.

Use:	health policy, promote use NILS
Feasible:	Yes
References:	http://www.statbel.fgov.be/pub/d0/p008n109_nl.pdf
	http://www.ingentaconnect.com/content/els/02779536/2003/00000056/00000002/art00046
	http://www.demographic-research.org/Volumes/Vol16/15/default.htm

More analysis on migration estimates

Since the recent expansions of the EU in 2004 and 2007, inward migration has increased to historically unseen levels. However, it has proven difficult to quantify and/or predict this flow of migrants. Other migration patterns of interest are the internal migration, in particular the net outward migration from Belfast, and the re-entrants. Also, further analysis can be carried out into the (socio-economic) drivers of migration to improve population projections, and conversely, the impact of migration on fertility and mortality.

Use: improve population estimates/projections, high priority

Feasible: Yes, but resource consuming, subject to data sources

References: -

Profiles of particular household types

The currently used household types in the household projections are defined by the number and age of residents, not their relationships. A relationship matrix, comprised of the relations of each household member to other household members, is available from the 2001 Census. It can be used to characterise household types that are similar in their relationships. For example, a 3-adult household could consist of two parents plus adult child, or three unrelated persons (say, student household). Both household types will have different probabilities of transition to, for example, a 2-adult or 4-adult household type. Further analysis could include a demographic profile of particular types (single, lone parent, pensioner couple, etc.) in terms of age, sex and relationships of household members. This would be particularly useful for household types that are not standard Census output.

Use: government planning, Census 2011 output

Feasible: Yes, links to NILS

References: http://www.stats.govt.nz/NR/rdonlyres/17EDC29C-CCFC-44BB-9698-4781902D0DD4/0/NZFamilyAndHHProj2004.pdf
http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/about/CI/events/esrcseminar/household.aspx

Historical and geographical distribution of surnames

An initial study can be carried out to develop a list of "most popular surnames" in Northern Ireland. Other dimensions to that list could be the change over time, geographical distribution, classification of surnames, etc. The Scottish survey uses birth and death registration data.

Use: Similar to baby names, raise profile of GRO services in genealogy

Feasible: Subject to digitalisation project/access to historic censuses, collaboration with PRONI/GRO.

References: http://www.gro-scotland.gov.uk/statistics/publications-and-data/occpapers/surnames-in-scotland-over-the-last-140-years.html

Micro-simulation – Census and surveys

A paper was presented to the Demographic Policy Board, which described the use of micro-simulation in the Small Area Income Estimate project. In particular, it focussed on the potential of applying a relationship estimated from survey data (Family Resource Survey) between income and other variables, to the 2001 Census to create household-level income indicators. Currently, an MSc student from Queen's University is applying this methodology to create estimates of small area smoking incidence using the Continuous Household Survey. Other surveys that can be used are the Labour Force Survey and the Expenditure and Food Survey, but also non-periodical or 'one-off' surveys.

Use: sub-regional or small area statistics from relatively small survey sample size

Feasible: subject to overlap variables survey and Census and relationship between these variables and variable of interest

References: http://www.communities.gov.uk/documents/communities/pdf/325286
http://www.nisra.gov.uk/archive/demography/publications/IncEst_Model.pdf