

Northern Ireland Multiple Deprivation Measure 2005

Blueprint



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Consultation process FINAL DRAFT

The contract to review and update the NI Multiple Deprivation Measure 2001 was awarded in March 2004 to the Social Disadvantage Research Centre (University of Oxford). The team is led by Michael Noble.

As part of the review, the research team produced a consultation document proposing the design of the new NI Multiple Deprivation Measure 2004. This document was released for public consultation on 9 July 2004. The consultation period closed on 29 October 2004.

In total, in excess of 3,000 copies of the consultation document were sent to a wide range of interested parties including central Government departments, Local Government Districts, non-departmental public bodies, MLAs and political parties, statutory organisations, community and voluntary sector organisations and the general public.

The document was also available for download from the NISRA website. In total, 2,529 downloads of the document were activated during the consultation period.

Public Meetings

As part of the consultation process a series of public meetings took place across Northern Ireland. In total, 272 participants attended.

The list below shows the date, venue, number of attendees and speakers at each meeting.

Public Bodies / Statutory Organisations meeting, 5 August, Lagan Valley Island Hall, Lisburn (98 attendees)

Speakers

Northern Ireland Statistics and Research Agency (NISRA)

Dr Norman Caven - Registrar General and Acting Chief Executive

Mr Robert Beatty - Head of Demography and Census

Mr Uel McMath - NISRA Geography

Social Disadvantage Research Centre (SDRC), University of Oxford

Professor Michael Noble

Mr George Smith

Miss Helen Barnes



Open public meetings (organised in conjunction with Northern Ireland Council for Voluntary Action)

Coleraine, 1 September, Coleraine District Council Offices (18 attendees)

Speakers

Mr Paul McGill, NICVA
Dr David Marshall, NISRA
Mr George Smith, SDRC

Newry, 1 September, Ballybot House (27 attendees)

Speakers

Mr Paul McGill, NICVA
Mr Robert Beatty, NISRA
Mr Uel McMath, NISRA
Miss Helen Barnes, SDRC

Fermanagh, 2 September, Manor House Hotel (65 attendees)

Speakers

Mr Lauri McCusker, Fermanagh Trust
Mr Paul McGill, NICVA
Mr Robert Beatty, NISRA
Mr Uel McMath, NISRA
Mr George Smith, SDRC
Miss Helen Barnes, SDRC

Belfast, 3 September, Northern Ireland Council for Voluntary Action (54 attendees)

Speakers

Ms Frances McCandless, NICVA
Mr Robert Beatty, NISRA
Mr Uel McMath, NISRA
Mr George Smith, SDRC
Miss Helen Barnes, SDRC

Responses

As well as the 272 verbal responses to the public consultation meetings, an additional 74 written responses were received.



Research team response to the consultation process

The remainder of this report is a discussion of the main issues arising from the consultation and the final proposals or blueprint for the new NI Multiple Deprivation Measure. These were discussed and signed off at the Steering Group meeting arranged for Monday 20 December 2004.

Many useful and important comments were made both at the consultation meetings and in the written submissions. It was clear that a great deal of time and effort had been spent in preparing many of the written responses. The whole consultation process was an extremely worthwhile exercise and has ensured that the domains, indicators and methodology have been subjected to a second round of extensive exploration.

First, some general comments made in consultation are discussed, followed by an examination of the issues relating to the specific domains and indicators within each domain. New indicators are highlighted in italics. Next the report looks at concerns arising over the proposed methodology and geography of the Measures, and the final two sections discuss proposals for the Local Government District (LGD) and other summaries and an Output Area (OA) level measure. In many of the sections, after discussion of the salient points from consultation, specific attention is paid to addressing rural/urban issues and recommendations for future work. A frequent argument in consultation responses was that certain indicators or domains demonstrate either an urban or rural 'bias', which needs to be investigated. Several respondents also requested that where data are not currently available, work is undertaken now to ensure such datasets are in place for the next review of the Measures of Deprivation.

General comments

Output Area (OA) level indicators

A comment made by several respondents was that each domain should be available at Output Area (OA) level - or at least some indicators from each domain should be produced at OA level.

For most domains, OAs would be too small to produce statistically robust information. For this reason Super Output Areas (SOAs) were suggested. It is possible to produce an Economic Deprivation measure at OA level (as was the case for the 2001 Measures at Enumeration District level). It has further been suggested that the Geographical Access to Services domain is also produced at this level. As the domain will be created at OA level and aggregated to SOA level, this is certainly feasible. However, whether the three domains can be merged to form one OA level Measure - and indeed whether this is necessary - requires some discussion. The final section of this report sets out a proposal for an OA level measure.



Guidance on using the Measures

It was strongly felt in the majority of responses that guidance on how to use the Measures is essential. In many cases it was argued that it was not the results themselves that caused the most concern, but rather the way the Measures were used.

The intention is to produce a separate report offering guidance on how the Measures should be used. This will be written shortly after the main report is published.

Comparisons between 2001 and 2005

There was some concern over the difficulties in making comparisons between the Measure published in 2001 and the new Measure which will be published in 2005. This was due to the new indicators and a lack of consistency between administrative boundaries used in 2001 and those proposed for the 2005 Measures. In addition it was stated that the ongoing review of public administration would impact on SOAs further down the line.

Our argument has always been that the Measures should be constructed using the best and most up-to-date data available and at the smallest practically possible spatial scale. New data sources have become available since 2001 and changes to the measurement of some existing indicators are inevitable over time. Such 'backwards compatibility' is therefore not possible.

Rural bias

There were many calls for extensive checks for rural bias in the Measures. This has been addressed in the domain sections of this report under the heading urban and rural issues.

However, there is the general issue that sheer density of population will inevitably mean that people in general and deprived people in particular will be more concentrated in urban areas. We do not consider this to be an issue of bias.



Domains

Original domains

- Income Deprivation
- Employment Deprivation
- Health Deprivation and Disability
- Education, Skills and Training Deprivation
- Geographical Access to Services
- Living Environment
- Crime

Issues arising from the consultation

Crime domain

In general the domain themes appeared acceptable, although there were comments about the breakdown of these themes into domains. The main issue raised by a number of respondents was the inclusion of a separate Crime domain. It was felt that the Crime domain relies solely on Police Service of Northern Ireland (PSNI) data and reported crime, which was perceived as suffering from under-reporting in certain areas. It was argued that Crime should not be a domain on its own and that the Crime and Living Environment domains should be combined. It was further felt that any radical changes to the domains in general should be avoided.

The issues surrounding differential reporting of crime and the robustness of the PSNI data will be discussed under the Crime domain in the Indicators section. It is our opinion, however that the PSNI data are sufficiently robust to be used as part of a revised Crime and Disorder domain.

Weak community infrastructure/Social capital

Although it was felt by some respondents that a domain looking at community issues, social capital or weak community infrastructure would be a useful inclusion, many respondents recognised the difficulties in defining weak community infrastructure and collecting suitable data and argued that such a domain should not be included.

After careful consideration of the responses and the available data it was decided not to include any measures of weak community infrastructure or social capital in this review, but steps should be taken to develop indicators and assess their suitability for inclusion in future Measures (see below).



Impact of the Troubles

A domain measuring the impact of the Troubles was requested by some respondents as the effect on people in Northern Ireland has been extensive and needs to be recognised as a form of deprivation.

As with the last Measures, issues of measuring the troubles have emerged from the consultation. We argued on the last occasion that psychological morbidity would be a good measure of the extra impact of the troubles (above and beyond death and injury that would anyway be measured in the MDM). To show that this was the case we examined the relationship between deaths in the troubles and the mental health measure.

Proposed final domains

The proposed final domains are essentially the same as in the original proposals. However, as a result of the consultation, there are changes in focus in two of the domains which have resulted in new indicators and a change in domain names. In the case of Geographical Access to Services, it is proposed that rather than incorporating an imperfect transport measure, the domain should revert to a series of indicators - similar to those used in the 2001 Measures - that measure road distance to various services. It is felt that the change in name to 'Proximity to Services' will make it clearer that the domain does not take into account wider geographical barriers or other barriers to accessing services. Police *incident* data on 'disturbances' have been made available in addition to the data on recorded crime and it is proposed to incorporate this into the domain as an indicator of social disorder. Also, it is proposed that the Crime domain should incorporate malicious fire incident data sourced from the Northern Ireland Fire Brigade (NIFB). This will complement the PSNI data and will address concerns raised by different groups about the domain relying solely on one data source. The definition of the domain changes with the inclusion of NIFB data and PSNI incident data to become a measure of the rate of crime and disorder at small area level. 'Crime and Disorder' therefore seems a more appropriate domain name.

In addition, more detailed explanations can be found in the Indicators section.

- Income Deprivation
- Employment Deprivation
- Health Deprivation and Disability
- Education, Skills and Training Deprivation
- **Proximity to Services**
- Living Environment
- **Crime and Disorder**



Recommended further steps

There would be value in developing measures of weak community infrastructure and social capital. Research projects currently being carried out by the Department for Social Development and also by the Community Foundation for Northern Ireland are important steps in this direction. However neither is at a point where it can be included in the Measures.

Indicators

Income Deprivation domain

Original indicators

- Adults and children in Income Support (IS) households (2003, Source: DSD)
- Adults and children in Income Based Job Seeker's Allowance (JSA(IB)) households (2003, Source: DSD)
- Adults and children in Working Families Tax Credit (WFTC) households whose equivalised income (excluding housing benefits) is below 60% of median before housing costs (2003, Source: Inland Revenue and DSD)
- Adults and children in Disabled Person's Tax Credit (DPTC) households whose equivalised income (excluding housing benefits) is below 60% of median before housing costs (2003, Source: Inland Revenue and DSD)
- Adults and children living in households in rented accommodation in receipt of housing benefit who are not captured through IS, JSA(IB), WFTC or DPTC (2003, Source: NIHE)
- Adults and children living in households in owner occupied accommodation in receipt of rate rebate who are not captured through IS, JSA(IB), WFTC or DPTC (2003, Source: Northern Ireland Rate Collection Agency)

Issues arising from the consultation

There were three main issues that arose from the consultation:

Low income groups excluded from the domain

Some concern was raised about the omission of some low income groups from the domain. The groups most often mentioned were older people and lone parents. These groups are, in fact, currently within the domain. For the



sake of clarity, the Income Support indicator includes Minimum Income Guarantee (MIG) and therefore includes low income older people as well as people of working age. There will be some low income older people who are not claiming MIG, and it has been suggested that these could be captured by including all recipients of State Retirement Pension. Although this could be achieved technically, it would significantly overstate income deprivation, as virtually all people over the age of 65 would be included, whatever their income status. We are not therefore proposing to extend the domain in this way.

The Income Support indicator as it presently stands includes lone parent households on low income, as well as low income people who are sick and disabled (whether long or short-term).

There will nevertheless be people on or at the margins of low income who are excluded from the domain through lack of satisfactory data. Of particular significance to Northern Ireland are the many individuals working in low paid employment or otherwise working for the minimum wage. Whilst many people thought this had been adequately addressed by the incorporation of Working Families Tax Credit Data, it was recognised that there was an issue relating to people other than families in low paid work, and data such as Inland Revenue Tax records were suggested. This has been investigated, but at this point, it is not possible to utilise tax data. It had been hoped to use post-April 2003 Working Tax Credit (which extends WFTC beyond families) but 100% extracts are not available. We have also discussed with the Rate Collection Agency the issue of Housing Benefit and Rate Rebate data being included, but this is not technically feasible and, in any event, investigations by the Rate Collection Agency found that almost all Housing Benefit/Rate Rebate claimants were already claiming IS/JSA-IB (which is included in the domain).

Take-up of benefits

Many respondents raised the issue of the problem of spatial variation in take-up rates of benefits across Northern Ireland. This echoes concerns which were raised originally when the MDM 2001 was constructed. When creating the MDM 2001 we could not adjust benefit rates for take-up because there was no robust evidence to apply to the data at the ward level. This is still the case. To our knowledge, no further research has been published on take-up which would generate information on which to adjust the measures to take account of area variation in take-up. Some work was commissioned from York University during the construction of the English Indices of Deprivation 2004 to investigate whether sub national take-up rates could be generated from the Family Resources Survey. A fruitful line of research looking at take-up rate by area classification was pursued. However, even using several years of data for the whole of England, stable information could not be generated. It remains an essential area for commissioned research if the measures in this domain are to be improved.



Debt

Some respondents requested that a measure of debt should be included in the Income Deprivation domain. There are a number of reasons why this is difficult and inappropriate.

First, consistent sources of information at SOA level across Northern Ireland do not exist. Information on, for example, referrals to Citizen Advice Bureaux (which does exist) would give a skewed picture as it relates only to help seeking behaviours. Similarly County Court judgments give a distorted picture as most cases do not come to court. Second there are many different reasons for debt, some of which do not relate to low income. To take an example, a debt on a credit card might reflect poverty, but might also reflect a judicious spreading of cost of asset acquisition by relatively well off people. The third issue is conceptual. Even if robust information is available we remain unconvinced that it should be included as the domain specifically is an attempt to measure low income, and debt in itself is not a measure of low income.

Other issues

Some respondents have called for the inclusion of Free School Meal data within the Income domain. Access to free school meals is only possible if parents are in receipt of IS/JSA-IB. As all people (including parents and their children) who are in IS or JSA-IB claiming households are included, all children in receipt of free school meals are already included in the domain.

There were also issues raised relating to the Income Deprivation Affecting Children (IDAC) and Income Deprivation Affecting Older People (IDAOP) measures. There was some confusion as to whether these formed part of the Income domain and therefore part of the overall MDM. It is therefore worth restating that these are separate, stand-alone measures, and are not proposed to be included within the MDM. They are supplementary tools for the identification of income deprivation affecting children and older people. The information contained therein is already present within the Income domain. Some respondents have suggested broadening the IDAC into a multiple deprivation measure for children. Whilst this is a very laudable recommendation, it is outside the scope of the current review, but it would merit further work in the future in its own right.

Proposed final indicators and method of combination

- Adults and children in Income Support (IS) households (***includes lone parents and MIG recipients***) (2003, Source: DSD)
- Adults and children in Income Based Job Seeker's Allowance (JSA(IB)) households (2003, Source: DSD)
- Adults and children in Working Families Tax Credit (WFTC) households whose equivalised income (excluding housing benefits) is



below 60% of median before housing costs (2003, Source: Inland Revenue and DSD)

- Adults and children in Disabled Person's Tax Credit (DPTC) households whose equivalised income (excluding housing benefits) is below 60% of median before housing costs (2003, Source: Inland Revenue and DSD)

These are non-overlapping counts and can be summed and presented as a rate.

Urban/rural issues

There are no indicators which apply more specifically to urban areas than rural areas. However, it may be the case that take-up of benefits is greater in urban areas than in rural areas. There is anecdotal evidence that this is the case. Furthermore localised studies elsewhere in the UK have demonstrated this (Bramley et al., 2000). Some respondents to the consultation have suggested we weight the domain at NUTS3 level by average income from the Continuous Household Survey. Such an adjustment would not correct the problem as there is no evidence of a relationship between average income in an area and take-up rates. However, the matter would be addressed if data were available to weight the domain by take-up rates. At present such data are not available but recommendations in this area are given below.

Recommended further steps

Consideration should be given to a research programme should be undertaken to ascertain small area take-up rates of all means tested benefits and in work support across Northern Ireland.

Consideration should be given to developing a child specific Measure of Multiple Deprivation to extend the Income Deprivation Affecting Children measure.

Consideration should be given to the feasibility of producing small area income estimates expressed in the form of 'the proportion of the population of an SOA below a fraction of mean or median income'. This would provide an alternative to reliance on benefit data for the domain¹.

¹ Some work is being conducted by the ONS in England along these lines.



Employment Deprivation domain

Original indicators

- Unemployment claimant count (JUVOS) of women aged 18-59 and men aged 18-64 averaged over 4 quarters (2003, Source: DETI)
- Incapacity Benefit claimants women aged 18-59 and men aged 18-64 (2003, Source: DSD)
- Severe Disablement Allowance claimants women aged 18-59 and men aged 18-64 (2003, Source: DSD)
- Participants in New Deal for the 18-24s who are not included in the claimant count (2003, Source: DEL)
- Participants in New Deal for 25+ who are not included in the claimant count (2003, Source: DEL)

Issues arising from the consultation

New Deal for Disabled People and for 50+

A number of respondents to the consultation have asked whether New Deal for Disabled People (NDDP) could be added to the domain. Most New Deal for Disabled People gain their eligibility through receipt of Incapacity Benefit/Severe Disablement Allowance. Recipients of these benefits are currently within the domain, and it is therefore essential, if we are to avoid double-counting in the domain, to include New Deal for Disabled People *only* if they are not already included. Other respondents have called for the inclusion of New Deal for 50 Pluses (ND50+). In fact again most of such people are already included in the domain, as they are represented in the claimant count. The Disablement Advisory Service - who have part responsibility for the running and data management of both NDDP and ND50+ - and the Department of Employment and Learning (DEL) have been consulted. Unfortunately they have no readily available method of distinguishing between what benefit a participant is in receipt of while on these programmes. They (and DEL) do, however, confirm that it is highly likely that most of the participants on ND50+ and NDDP would be picked up in the JSA, IB and SDA counts or would be in employment.

New Deal for Lone Parents

In the consultation document there was a proposal to include New Deal for Lone Parents (NDLP) participants who had moved beyond the gateway into full New Deal participation. A very small number of respondents requested the inclusion of lone parents other than those participating in NDLP, but this was by no means a universal view. It would be incorrect to assume that all lone parents were involuntarily out of work and so we see no reason to modify the earlier proposal to now include all lone parents in this domain (although they are represented in the Income domain). We had, therefore intended to include NDLP participants in the domain. Unfortunately we have been advised by the



Department for Social Development that there are severe data reliability issues. Accordingly it will not be possible to include them.

16 and 17 year olds

There has been a suggestion that 16 and 17 year olds in the various indicators could be added into the domain. This was certainly the situation in the MDM 2001 and in all Indices we have created for other parts of the UK. However, this was questioned by the Peer Reviewer of the Indices of Deprivation 2004 for England and by a variety of academic commentators who were concerned that the overwhelming majority of this age group were either in school or in training (neither of which could be considered a deprivation). Including the small numbers to the numerator and the relatively large numbers to the denominator (including all those at school) would distort the domain in unpredictable ways unrelated to deprivation. We are persuaded by this argument and would continue to recommend that this domain covers men 18-64 and women 18-59 in the Northern Ireland Measures.

Long term unemployment

Some respondents requested a measure of long term unemployment. There are, however, difficulties with this. As discussed elsewhere (Noble, Smith *et al*, 2000a) the meaning of 'long term' unemployment is now less clear. Frequent 'cycling' of some unemployed people on and off the claimant count; seasonal work in some parts of Northern Ireland; and schemes such as the New Deal all complicate the picture. There would also be issues relating to the Incapacity Benefit indicator – should long term recipients of this benefit also be effectively given additional weight? On balance, we continue to recommend that long term unemployment is not included as an indicator.

Barriers to employment

A number of respondents requested that barriers to employment, such as lack of childcare, should be included in the domain. However, there is a conceptual problem. If we are seeking to measure those involuntarily out of work then 'barriers' are a reason for the outcome measures in this domain – they are not part of the measure itself. Such barriers might be incorporated in a re-formulated Access domain which included wider barriers as well as geographical barriers.

Carers

A small number of respondents questioned whether carers were (as we argued in the consultation document) voluntarily out of the labour market and suggested that some measure of carers be added to this domain. We are persuaded by their arguments – being out of the labour market as a 'carer' is often 'Hobson's choice' - and propose to add the indicator to the domain. Some have suggested using Invalid Care Allowance while others have suggested widening the net by including data from the Census or from local



Health and Social Services Boards. To be included as an indicator the data would have to meet our usual quality assurance rules and in addition, (a) be applicable to carers of working age only, and (b) not overlap with any other indicators in this domain. From our investigations, only Invalid Care Allowance recipients meet this criterion and we propose that these data be added to the domain.

Proposed final indicators and method of combination

- Unemployment claimant count (JUVOS) of women aged 18-59 and men aged 18-64 averaged over 4 quarters (2003, Source: DETI)
- Incapacity Benefit claimants women aged 18-59 and men aged 18-64 (2003, Source: DSD)
- Severe Disablement Allowance claimants women aged 18-59 and men aged 18-64 (2003, Source: DSD)
- Participants in New Deal for the 18-24s who are not included in the claimant count (2003, Source: DEL)
- Participants in New Deal for 25+ who are not included in the claimant count (2003, Source: DEL)
- Participants in New Deal for Lone Parents aged 18 and over (2003, Source: DSD)
- ***Invalid Care Allowance claimants women aged 18-59 and men aged 18-64 (2003, Source: DSD)***

These are non-overlapping counts and can be summed and presented as a rate of the relevant population (the whole population aged 18-59 plus men aged 60-64).

Urban/rural issues

There are no indicators which apply more specifically to urban areas than rural areas.

Recommended further steps

Consideration should be given to future work in investigating the Labour Force Survey and the Family Resources Survey as possible sources of information on 'hidden unemployment' beyond that which is already incorporated within the domain.



Health Deprivation and Disability domain

Original indicators

- Years of Potential Life Lost (1999 to 2003, Source: Mortality data, NISRA)
- Comparative Illness and Disability Ratio (2003, Source: IS, AA, DLA, SDA, IB from DSD)
- Measures of emergency admissions to hospital, derived from Hospital Inpatient System records (2001/2002 to 2003/2004, Source: DHSSPS)
- Measure of individuals suffering from mood or anxiety disorders, based on prescribing (2003, Source: CSA), Hospital Inpatient System records (2000/2001 to 2003/2004, Source: DHSSPS) and suicides (1999 to 2003, Source: NISRA).

Issues arising from the consultation

Three main points were raised in the consultations:

1. Concern about a potential bias in the emergency admissions to hospital measure.
2. A call for the retention of the measure of cancer incidence.
3. A call for the retention of the child dental health measure.

The aim of the Health Deprivation and Disability domain is to produce a single summary measure of the relative concentration of cases of premature mortality, morbidity and disability in a small area. There is therefore a balance to be struck between including a large number of indicators, when they may make little difference to the final score, and the relative stability and error reduction multi-indicators bring.

The five indicators now proposed for the domain (see below) are broad and comprehensively cover the area of health and disability. To be judged useful, any extra indicators have to add more information to a combined scale and not bias it.

Potential bias in the emergency admissions to hospital measure

The first thing to emphasise about the emergency admissions to hospital measure is that it is not based on attendance at Accident and Emergency. It is based on the admission of a person into hospital (i.e. on to an inpatient stay) for a 'spell' lasting more than one day that is classified as an emergency. The indicator captures serious medical emergencies that are a result of sudden events. It also captures those that might otherwise have been admitted by another method but because of a problem in accessing health care have now become an emergency. This does mean that this measure reflects, to some degree, medical health care decision making. Where this decision-making has led to the patient's situation becoming 'worse', we would argue that they



are suffering greater health deprivation. However it is also true that this decision-making may reflect organisational factors that are not indicative of health deprivation.

The point made by a number of respondents to the consultation was that decision-making might differ between rural and urban areas of Northern Ireland. They argue that in rural areas, because of poor access to a hospital, they might be less likely to attend and instead receive care through another provider. The project team, in conjunction with the Department for Health, Social Services and Public Safety (DHSSPS), had identified this as a potential problem and will investigate whether there appears to be any issues surrounding the use of this indicator.

Retention of the cancer incidence measure

A call for the incidence of cancer measure to be retained was frequently made. The incidence of cancer is of course a very important indicator of health and its concentration in certain areas is a key element of health deprivation. For this reason we are persuaded that it should be included. However, obtaining the cancer registration data is a fairly lengthy process and so no guarantee can be made that the data will be available in time. If the data are not made available, people suffering from cancer will still be captured in the measures of morbidity and premature death.

Retention of the child dental health measure

Within the consultation there was a frequent call for the retention of the dental health measure and to a lesser extent the inclusion of a Low Birth Weight measure as an indicator of child health. On balance, we believe it would be useful to have a measure of childhood health. However after much investigation in consultation with the DHSSPS we do not feel there is a sufficiently robust measure available. Although the dental health measure used in the MDM 2001 might have been an adequate indicator, changes in the organisation of dental health care and in particular the way extractions under anaesthetic are now administered mean that an unbiased measure at a small geographical level is no longer available. Other measures and methods of identifying dental health were explored but none seem to offer robust enough indicators.

Two further points should be made about child and young peoples' health. First, the use of the 'Years of Potential Life Lost' measure of premature death means that the weight given to a death increases as the age at death of a person decreases, giving greater weight to a young person's death.

Secondly, what is probably most important when examining health and young people is the potential for health or ill health in later life. This is strongly related to the conditions within which they are growing up, factors which are being measured in the other domains within the Measures. The importance of



child and young peoples' health is therefore not being missed by the exclusion of dental health for technical reasons.

Measure of individuals suffering from mood and anxiety disorders

Unfortunately it will not be possible to obtain data on admissions to hospital for mood and anxiety disorders from the six Mental Health Trusts in Northern Ireland within the timescale of this review. Therefore the measure of individuals suffering from mood and anxiety disorders will be constructed from prescribing and suicide data only.

Proposed final indicators and method of combination

- Years of Potential Life Lost (1999 to 2003, Source: Mortality data, NISRA)
- Comparative Illness and Disability Ratio (2003, Source: IS, AA, DLA, SDA, IB from DSD)
- Measures of emergency admissions to hospital, derived from Hospital Inpatient System records (2001/2002 to 2003/2004, Source: DHSSPS)
- Measure of individuals suffering from mood or anxiety disorders, based on prescribing (2003, Source: CSA) and suicides (1999 to 2003, Source: NISRA)
- ***People registered as having cancer (excluding non-melanoma skin cancers) (Source: Northern Ireland Cancer Registry)***

The indicators will be combined in two steps, although each step will follow the same process. First, the mood or anxiety disorders indicators will be combined to form one measure. Then this measure along with the other indicators will be combined into the overall domain measure. Within both these processes the indicators will be ranked and then their ranks transformed to a standard normal distribution. Factor analysis will be used to produce the weights for combining them into a domain score.

Urban/rural issues

As was noted above, the emergency admissions to hospital will, in particular, be investigated for urban/rural bias. This will be done by regressing it against the other health and disability measures and seeing if any of the unexplained variance, between it and the other health indicators, is associated with measures of rurality. The length of a person's hospital 'spell' will be manipulated in order to reduce any urban/rural bias before it is included as an emergency admission. If we are unable to remove any urban/rural bias in the emergency admissions then this indicator will be dropped.



Recommended further steps

Because dental extractions under anaesthetic are now carried out in hospital, the dataset on extractions no longer has 100% of cases. It would be useful therefore if the dental extractions data for all cases were compiled into a single dataset in future. Similarly, there are inpatient stays in specialist mental health hospitals which are not captured in the Hospital Inpatient System records. The possibility of developing a dataset that contains all admissions for mental health conditions needs to be explored. At present prescribing data cannot be linked to an individual's home address; the data only have the GP or pharmacist postcode. This makes the prescription data less powerful as they are attributed as a practice rate to smaller areas. An improvement to this measure could be brought about by the inclusion of patients' home postcodes in the prescription dataset.

Education, Skills and Training Deprivation domain

Original indicators

Sub Domain: Children/young people

- GCSE/GNVQ points score (1999/2000 to 2001/2002, Source: School Leavers Survey, DE)
- Key Stage 3 data (2003, Source: DE) Note: Key Stage 3 assessment is based on formal tests taken by pupils at the end of KS3 (c. age 14) in English (and Irish – in Irish medium schools/units), Mathematics and Science.
- Proportions of those leaving school aged 16 and not entering Further Education (1999/2000 to 2001/2002, Source: School Leavers Survey, DE)
- Absenteeism at secondary level (all absences) (2002/2003 Source: Summary of Annual Examination Results (SEAR), DE)
- Proportions of 17-20 year olds who have not successfully applied for Higher Education (1999/2000 to 2002/2003, Source: UCAS and DEL)
- Proportions of Years 11 and 12 pupils not in a grammar school (2003, Source: School Census, DE)

Sub Domain: Working age adults

- Proportions of working age adults (aged 25-59) in the area with no or low levels of qualification (2001, Source: Census, NISRA)

Issues arising from the consultation

The written responses to the consultations and the summaries of discussions held at the meetings across Northern Ireland were reviewed to identify the



principal issues raised. These were then discussed with the Department of Education (DE).

The idea of two sub-domains was strongly supported in virtually all consultations. The proposed equal weighting between these two sub domains was also widely supported. The main substantive issue was that both components would be separately reported. This was always the intention.

Primary school data

There were some requests for primary school level data, in particular for Key Stage 2 results. As with the previous Measures, there are two issues here. First, this assessment is essentially school based and teacher assessed, rather than by external tests. Second, at the present time DE does not have individual pupil data at primary level that would allow allocation of primary school results to a local area. This could only be done at school level and the school results then distributed to the area. For KS3 and KS4 the results are held in individual format with a home postcode field. This restriction on primary level data applies to other suggestions (e.g. for primary school class size etc).

Other measures of educational performance

Other issues raised on measuring educational performance are effectively captured by existing measures (GCSE/GNVQ and KS3). A levels are difficult to capture because of the existence of A level takers in both schools and Further Education (FE) colleges. However the UCAS data will reflect A level performance very closely as they are the main criterion for entry to Higher Education (HE).

Grammar schools

Another major area of comment was the grammar school indicator. While there was some support for this indicator, concern was raised about Irish medium schools and about integrated provision. Post-primary pupils in Irish medium schools make up less than 1% of pupils. However integrated schools make up approximately 6% of the post-primary pupils and these are likely to be concentrated in some areas rather than others. The suggested way forward is to see how far numbers and concentrations of pupils in integrated provision affect the results at SOA level and then decide whether this means that the indicator should be dropped or retained. This indicator contributed only a relatively small weight to the Education, Skills and Training domain in the previous measures.

Special Educational Needs

Some comments focused on including a measure of Special Education Needs (SEN) pupils. Information on these pupils is now recorded in more detail than in previous years where it was restricted to pupils with statements (c. 1.9% of



all pupils). The additional information means that approximately 9% of pupils are covered with an SEN code. Provided that this is applied in a reasonably consistent way across Northern Ireland schools, this would be a good candidate for inclusion as a new indicator. It would be restricted to pupils in post-primary mainstream schools only as pupil postcoded data are not available centrally for pupils in special schools. These constitute about 1.4% of all pupils.

Age range for adults

The main issue raised here was the age range for adults, with both lower thresholds reduced (i.e. down to 20 years) and higher thresholds increased (i.e. up to any age). Only one comment from the Belfast consultation meeting was to raise the lower threshold to 30 years.

Due to the problem posed by concentrations of students in parts of Belfast, Coleraine, Derry and Newtownabbey, lowering the age below 25 would pick up many of these young people. However many of them will only be there temporarily and then move on. If they stay on in the area then they will be captured once 25. While it would be good to pick up young people aged under 25 who were not in education, employment or training (NEET), these groups will be picked up in part in other domains. Therefore it is proposed to keep the lower threshold at 25 years.

The upper threshold could be moved upwards from 59 to any age. However the purpose of the measure would change, as it would take in the retired population who might move to a rural area or coastal location. Including these groups may give an inflated picture of the economic potential of these areas, for example if it was the retired population which was better qualified. Therefore the recommendation is still to use the working age population and cut this at less than 60 years in view of the declining numbers working at this point.

Other issues

Suspensions and exclusions are not held at an individual pupil level centrally, so the information would be aggregated at the school level only. Although attendance has since 2003/2004 been classified separately as authorised or unauthorised and also by year group, this information is not available for earlier years. Also the distinction between authorised and unauthorised could vary by school. The recommendation is to use the overall figure of numbers of sessions missed (for any reason) over the number of possible sessions on the grounds that any absence constitutes missing out some schooling.

Some respondents argued that people taking HE courses at FE should be included. The UCAS data on entry to HE will therefore be supplemented by information about those taking HE courses at FE.



There were various suggestions for indicators that could be included such as Educational Maintenance Allowances, which are now being phased in, and for Free School Meals. These issues are covered under the Income domain.

The various special groups picked out by some respondents represent highly disadvantaged groups (e.g. children in care, in hospital schools etc), but we do not have the information to identify these groups in the overall data, and they are also quite small in numbers in any one area.

While it would be good to have other measures of adult skills as was suggested in consultation, the qualifications recorded in the Census would seem to be a good, universal and consistent measure.

Proposed final indicators and method of combination

Sub Domain: Children/young people

- GCSE/GNVQ points score (1999/2000 to 2001/2002, Source: School Leavers Survey, DE)
- Key Stage 3 data (2003, Source: DE) Note: Key Stage 3 assessment is based on formal tests taken by pupils at the end of KS3 (c. age 14) in English (and Irish – in Irish medium schools/units), Mathematics and Science
- Proportions of those leaving school aged 16 and not entering Further Education (1999/2000 to 2001/2002, Source: School Leavers Survey, DE)
- Absenteeism at secondary level (all absences) (2001/2002 and 2002/2003 Source: SAER, DE)
- Proportions of 17-20 year olds who have not successfully applied for Higher Education (1999/2000 to 2002/2003, Source: UCAS and DEL)
- Proportions of Years 11 and 12 pupils not in a grammar school (2003, Source: School Census, DE)
- ***Proportions of post primary pupils with an SEN code in mainstream schools (2002/2003 School Census, Source DE)***

Sub Domain: Working age adults

- Proportions of working age adults (aged 25-59) in the area with no or low levels of qualification (2001, Source: Census, NISRA)

Urban/rural issues

All of the indicators in the Education, Skills and Training domain apply equally to urban or rural areas. There is no evidence (that we are aware of) suggesting that they could be biased against one or other area. Differences between urban and rural areas on these measures would, if they existed, be evidence of *real* differences (rather than bias).



Splitting the previous MDM Education domain into two parts would be likely to help distinguish areas where educational provision at school level is good but qualified adults move away to other areas.

Recommended further steps

If the educational performance data are to be extended to primary level, then a major step forward would be to include the home postcode of primary school pupils, and this information assembled centrally by the Department of Education. This could then be linked to KS2 or other data at an individual or school level.

At present data from the School Leavers Survey provide significant information on pupil progress (e.g. performance at KS4, destination after school etc). This information is compiled at the time a pupil leaves school, but this means that 'year group snapshots' of data have to be built up over time, as all pupils who took KS4 in a particular year will not all be 'school leavers' at the same point. The ways in which similar data are being built up in other parts of the UK (e.g. the Pupil Level Annual School Census (PLASC) and the National Pupil Database in England, and the equivalent developments in Scotland under ScotXed) might provide some possible guides as they draw on very similar packages of pupil level data.

In any further revisions to the MDM, consideration will have to be given to using something other than the Census for adult qualifications. At present the only likely alternative is the Labour Force Survey, but this will have to be modelled to give output at anything less than district level. It is not clear how this could be done at SOA level. There will clearly be issues of data robustness.

Geographical Access to Services domain

Original indicators

- Road distance to a Post Office (2003, Source: Post Office Ltd)
- Road distance to a GP premises (2003, Source: CSA)
- Road distance to an Accident and Emergency hospital (2003, Source: DHSSPS)
- Road distance to a general food store (2003, Source: Census of Employment, DETI)
- Access to transport (2003, Source: DVLNI Vehicle Registrations; 2004, Translink bus stop audit)



Issues arising from the consultation

Many comments were made in the consultation process about the Geographical Access to Services domain.

Post Offices

Many respondents argued that access to a Post Office is no longer as relevant as many have now closed down and banks are used instead. We believe it is still important to include access to a Post Office as they still provide some essential services, including their role as a focal point in many communities. We explored the possibility of proximity to an ATM with Mastercard as they have an ATM locator on their website. Unfortunately they were unable to provide the underlying data.

General food store

A more precise definition of a general food store was requested as there are important differences in the range, quality and price of products in say a corner shop compared to a supermarket. A minimum size of 2500 sq.ft was suggested. One response argued that supermarkets AND small shops are important.

We agree that the consultation comment was not clear on this point. There is some merit in looking at any type of shop that sells food as in one sense the deprivation is living a long way from this key service. However, it would perhaps be more useful as an indicator if only shops of a certain size are considered. The Census of Employment does not have information on size of store, but does have information on the number of employees which can be used as a way of excluding food stores below a certain size. Exploration of the data revealed that using a threshold of 50 employees produces a dataset of 94 food shops, in which all the major stores are included.

Dropped indicators

The majority of the consultation responses asked that all the indicators used in the 2001 Measures are retained. This was often because it was felt that they may not be captured by the measure of access to a service centre of a certain size that was incorporated into the transport indicator.

As the overwhelming view is that the 2001 indicators should be used, we propose to put back in road distance to a dentist, optician, pharmacist and Job Centre/Jobs and Benefit office in addition to the indicators of road distance to an A&E hospital, GP premises and Post Office that were used in 2001. The relevant data have been collected or requested. It is proposed that a classification of settlements based on size is included to account for road distance to both libraries and museums (used in the 2001 Measures) and many other indicators suggested for inclusion (see below).



Suggested indicators

Various indicators were suggested for inclusion.

Road distance to:

- a school
- sports/leisure facilities
- social/recreational facilities
- community facilities
- main town/larger settlement
- facilities for young people
- ATM/bank
- parks/open spaces
- major employer
- open police station
- cultural/arts facilities
- SSA offices

Access to:

- nursing homes
- out of hours services
- (affordable) childcare
- affordable telephone
- pre-school education
- FE/HE
- broadband/internet (it was suggested that libraries are one internet source and so should definitely be retained)

It will not be possible to include all of these indicators as data are not available for the whole of Northern Ireland at a small area level and in a consistent form. There is also some need for parsimony in the indicators, and it is unlikely that the inclusion of additional indicators will have much effect on the overall domain score. The omission of access to a school was noted repeatedly in the consultation responses. The issue is quite complicated in Northern Ireland as it is not just proximity that is taken into account but also decisions based on religious beliefs enter into the equation. Although the religious make-up of an area could technically be used in constructing an indicator of proximity to a school, this would reinforce the sectarian divides, and certainly within education there are moves away from this with the introduction of integrated schools.

Road distance/travel time

It was considered by some respondents that access is not simply a question of distance; the time taken to travel to the service is also crucial. It was felt that factors such as congestion and the quality of roads need to be taken into account.



We have been provided with a time and distance matrix by NISRA so it would be possible to look at time taken to travel to services. However, this will simply take into account road speeds on different categories of road and will not give any weighting for congestion. A further key challenge when considering travel time is that this will vary greatly at different times of the day and night. In order to maintain consistency across Northern Ireland, we therefore propose to use road distance.

Transport

Many issues were raised in relation to the transport indicators. The most important of these are:

- the address where a vehicle is registered may not be related to actually having access to it
- car registration data are at a postcode rather than household level and so this is likely to mask the ‘no car’ situation experienced by a number of households
- the public transport indicator calculates the proportion of people within a given area who live within walking distance of the nearest bus or train station, which ignores the fact that walking distance for the elderly or disabled is very different
- information is required on the frequency, timing and destination of public transport and not just the number of services per day
- cars are a necessity in rural areas
- combination of the transport indicators with the road distance indicators
- weighting of the transport indicators is too high
- need to focus on transport poor and determine the number and the degree to which public transport facilitates them in their necessary journeys.

It seemed that a real breakthrough could be made with this domain by including transport data that have not been incorporated into any Index of Multiple Deprivation thus far. However, we have since come to the conclusion that the available data are not suitable for constructing an indicator of access to transport in the way that was first envisaged.

The data from Translink on the number of different services serving a bus stop cannot be applied meaningfully to this domain. What is required is information on the frequency and timing and the impact this has on access to services, but this information is not available at present.

It is a rather crude assumption that household level car ownership equates with access to services for all members of the household as there are obvious situations where the household car(s) are in use by one member of the household (e.g. the car is driven to work and unavailable until the person returns home in the evening), meaning the rest of the household is reliant on public transport, taxis or lifts from friends and family in order to access services. This is especially true for young people. A partial solution to these



problems is to use the 2001 Census which has data on the number of cars/vans owned, or available for use, by one or more members of a household. An indicator of the proportion of households without a car could then be constructed. However, this brings with it the well documented problems of using increasingly out-of-date Census data.

There are difficulties in equating a lack of cars with transport deprivation. Owning a car has become a necessity because of inadequate public transport – it is widely acknowledged that Northern Ireland has suffered from underinvestment in its roads and public transport. Low income households often have no choice but to spend a greater proportion of their resources (compared to higher income households) on running a car. Increasing car ownership is also bound up in lifestyle changes, and it is not necessarily the case that a highly car dependent lifestyle could necessarily be sustained by alternative modes of transport (Gray, 2001). However, there is also a convincing argument that if you do have a car to use you are less deprived than another individual who does not have access to a car, but who has the same poor access to public transport and the same time required to travel to services.

It was felt by several respondents that access for people with disabilities and the elderly should be considered. It would obviously be desirable to look at the barriers to access for these groups, but such fine grained information is not yet available at a small area level across Northern Ireland. The proposed public transport indicator calculates the proportion of people within a given area who live within walking distance of the nearest bus or train station. This figure is then weighted by a measure of bus/train frequency. As it stands this does not take into account access issues for certain groups such as the elderly or disabled, by ignoring the fact that walking distance is neither a given nor a constant for all people.

It is therefore proposed to drop the transport indicators from the domain and simply revert to a similar set of indicators to those used in the 2001 Measures.

Further discussion of some of these issues can be found in the paper 'Factors Affecting Geographical Access to Services' in Appendix B.

Cross border services

It was noted that people living in areas of Northern Ireland that border the Republic of Ireland will regularly make use of services across the border, and in fact these are often the nearest service. In the instance of Fermanagh, some people in Rosslea and the south-east area of the county look to Monaghan Town in County Monaghan in the Republic of Ireland rather than to Enniskillen. As one response to consultation states, 'The topography of the area dictates that the Rosslea/Monaghan access is more relevant than the Rosslea/Enniskillen access (Fermanagh's primary market town).'

There is no way of determining who actually uses services across the border and indeed whether this applies equally to all services. For food shops and



A&E hospitals for example, it is quite likely that this would be the case, but for other services it is less straightforward. Furthermore, DHSSPS - who would be the data supplier for cross-border A&E hospital data - caution against taking account of cross-border provision, arguing there is a need to be consistent across all indicators and data may not be available on cross-border services for the other indicators. We would support this position. The Measures should be restricted to Northern Ireland data that we know have been collected in a consistent way.

Interface areas

It was strongly felt in consultation responses and at the consultation meetings that interfaces/peace lines need to be taken into consideration when measuring road distances to services.

Although it is important to take into account all barriers which effectively increase distance to services – and this would include peace lines and the like - there are practical problems which make this impossible to achieve in a consistent, coherent way. First, it is difficult to be precise about the exact number of interface barriers, partly due to the invisibility of some, and partly because there is uncertainty about the continuity of some barriers.² Second, there is no way of knowing how many members of an interface community actually decide not to use the nearest service if it is in the wrong territory and regularly make a longer journey to a 'safe' service.

Various studies have found that interface communities suffer from social and economic disadvantage including long term unemployment, low educational achievement and poor health, lower levels of car ownership and mobility. Interface areas are also characterised by the presence of bricked up or derelict buildings, empty or wasteland, graffiti and vandalism (Murtagh et al., 1994; Shirlow, 1999; Jarman, 2002). Many of these forms of deprivation will be picked up in other domains.

² The OFMDFM *Managing Disorder – Responding to Interface Violence in North Belfast* report refers to North Belfast but presumably the situation is similar across Northern Ireland. See <http://www.research.ofmdfmi.gov.uk/managingdisorder/interfaces.htm>



Proposed final indicators and method of combination

- Road distance to a GP premises (2004, Source: CSA)
- Road distance to an Accident and Emergency hospital (2004, Source: DHSSPS)
- **Road distance to a dentist (2004, Source: CSA)**
- **Road distance to an optician (2004, Source: CSA)**
- **Road distance to a pharmacist (2004, Source: CSA)**
- **Road distance to a Job Centre or Jobs and Benefit office (2004, Source: DEL)**
- Road distance to a Post Office (2004, Source: Post Office Ltd)
- Road distance to a large food store (2003, Source: Census of Employment)
- **Road distance to the centre of a settlement of 10,000 or more people (2004, Source: NISRA)**

It is suggested that the domain should be renamed 'Proximity to Services'.

It is proposed that the indicator scores are transformed to a normal distribution, and then combined using equal weights except for the road distance to an A&E hospital which will be awarded a double weight.

Urban/rural issues

This domain is frequently perceived as favouring rural areas. While it is true that services are more likely to be located in urban areas, this does constitute a deprivation for people living in rural areas, especially those with limited access to transport. The ideal would have been to include measures of access to transport in order to further examine the extent of access deprivation. Even without this data it is still important to look at the deprivation caused by living some distance from various services.

Recommended further steps

It is crucial that the data on frequency, timing and destination of bus and train services are made available. We are aware that work has been carried out by Translink in this area, but unfortunately it will not be completed in time to be incorporated into these Measures. Some thought needs to be given on how to weight indicators measuring road distance/travel time to services and measures of public and private transport. It would be useful for data on car ownership/registration to be collected at household level on an annual basis. Finally, the possibility of collecting data on the point locations of many of the services suggested but not used should be considered.



Living Environment

Original indicators

Sub Domain: Housing quality

- Housing stress (2001, Source: SDRC and NIHE, modelled NIHCS)
- Houses without central heating (2001, Source: Census, NISRA)

Sub Domain: Housing access

- Household overcrowding (2001, Source: Census, NISRA)
- District level rate of acceptances under the homelessness provisions of the Housing (Northern Ireland) Order 1988 and the Housing (Northern Ireland) Order 2003, assigned to the constituent SOAs (2003, Source: NIHE)

Sub Domain: Outdoor physical environment

- Pedestrian and cyclist casualties resulting from road traffic accidents (2001 to 2003, Source: PSNI)
- Local area problem score (2001, Source: SDRC and NIHE, modelled NIHCS)

Issues arising from the consultation

A number of questions, concerns, and suggestions that touched on the Living Environment were raised in the consultation. The most commonly mentioned responses questioned the lack of an indicator of air quality, the absence of a measure of green space and the inclusion of an indicator of pedestrian and cyclist casualties.

Air quality and other pollution-related indicators

It was argued by a number of consultation respondents that an indicator of air quality or other environmental quality indicators should be included in the Measures. Unfortunately, measurement of air quality across Northern Ireland is not consistent enough to allow for the inclusion of an air quality indicator.³ For example, levels of carbon monoxide were measured in 2002 (the most recent year for which data are available) at just two sites, in Derry and Belfast. Nitrogen dioxide was measured at 267 sites, but the majority of these are placed at road sides and in other urban areas. The four monitoring sites in Ards, for example, are all located in Newtownards, while the six sites in Fermanagh are located in Enniskillen. The placement of monitoring stations and the discrepancies in the numbers of stations used for various pollutants

³ For details of the most recent air quality data in Northern Ireland, please see *Air Quality Monitoring in Northern Ireland, 2002*, Department of the Environment in Northern Ireland, January 2004.



mean that not all areas of Northern Ireland would be represented equally by an indicator of air quality in the Measures.

Additionally, some respondents suggested that water quality, or access to safe drinking water should be included as an indicator of environmental quality. The most recent data on water quality for Northern Ireland reveal that, fortunately, problems with water pollution and supplies are isolated.⁴ In 2002, for example, less than 1.5% of consumers had tap water that failed to meet the standards for drinking water established by the Drinking Water Inspectorate.

Pedestrian and cyclist casualties

Many respondents raised concerns about the inclusion of a measure of pedestrian and cyclist casualties. These were related to both the ways in which this measure relates to deprivation and the presumed concentration of such casualties in urban areas resulting in an 'urban bias' to the Measures. In the light of these concerns it is proposed that the indicator be dropped.

Green and leisure space

Concerns were raised by several respondents about green or leisure space in the Measures. A handful of respondents were concerned that the inclusion of a measure of green space would skew the Living Environment domain in favour of urban estates, many of which have been planned around open park-like space, thereby giving a false impression that these estates are not deprived. On the other hand, several respondents argued that an indicator of access to or presence of green and/or leisure space should be included in the Living Environment domain. Unfortunately, there is no comprehensive source of data to indicate the presence of green space in Northern Ireland. In future it may be possible to include an indicator of access to sports or leisure facilities as such a database is currently being compiled by the Sports Council NI, but will not however be finished in time to be included in these Measures.

Affordable housing

Several respondents argued that an indicator of affordable housing should be included in this domain. While such an indicator would be desirable, there are a number of complicating factors. Chief among these is income information, which is typically estimated or modelled from surveys. A measure of housing affordability in England, presented as difficulty of access to owner occupation in the Index of Multiple Deprivation 2004, made use of data from the Family Resources Survey (FRS) pooled over three years. Currently, the FRS is only available for one year in Northern Ireland, with an effective sample size of fewer than 2,000 households, making it inadequate for modelling income at

⁴ For details of the most recent water quality data in Northern Ireland, please see *Northern Ireland Drinking Water Quality 2002*, Northern Ireland Drinking Water Inspectorate, December 2003.



small area level.⁵ It is possible that a measure of housing affordability could be created for Northern Ireland using alternative data, but such a measure is not proposed for inclusion in the updated Measures.

Homelessness (presenting vs accepted, urban vs rural)

Some respondents raised concerns about the inclusion of the proposed district level homelessness indicator. A number were concerned about the difference between those presenting as homeless and those accepted as homeless, while other respondents were concerned about an urban bias in the measure.

While no final decision can be made until the data have been thoroughly examined, it is unlikely that the final indicator will include those people who have presented as homeless but were not accepted as such. This is for the simple reason that they have not met the legal definition on homeless.

The Housing Executive has found that people living in remote areas were less likely in 2001 to seek out HE services for homelessness-related issues.⁶ However, until the data have been analysed by the research team, it is unclear whether this is a trend that continues or whether the inclusion of the homelessness indicator in the Measures would introduce an urban bias.

Fuel poverty

The suggestion was made by a handful of consultation respondents that an indicator of fuel poverty should be included in the housing quality sub-domain of the Living Environment. While an inability to properly heat one's home will result in, at least, an uncomfortable home environment, this is not reflective of deprivation in the Living Environment per se. Fuel poverty would more appropriately be considered reflective of income deprivation which is itself captured in other ways.

Proposed final indicators and method of combination

It is proposed that the indicator measuring pedestrian and cyclist casualties be dropped. The indicators within each sub-domain will be standardised by ranking the rates, and then transformed to a normal distribution. The indicators in the Housing quality sub-domain will then be combined with equal weights. The Housing access sub-domain will be combined using an 80% weighting for the overcrowding measure and a 20% weighting for the

⁵ For more information on the Family Resources Survey in Northern Ireland, please visit <http://www.dsdni.gov.uk/publications/DisplayItem.asp?intCategory=67>.

⁶ Please see the Homelessness Strategy and Services Review 2001, available at http://www.nihe.gov.uk/publications/reports/homeless_final_version.pdf.



homelessness measure.⁷ The three sub-domains will then be ranked and transformed to an exponential distribution and combined with equal weights.

Sub Domain: Housing quality

- Ward level housing stress (2001, Source: SDRC and NIHE, modelled NI House Conditions Survey)
- Houses without central heating (2001, Source: Census, NISRA)

Sub Domain: Housing access

- Household overcrowding (2001, Source: Census, NISRA)
- District level rate of acceptances under the homelessness provisions of the Housing (Northern Ireland) Order 1988 and the Housing (Northern Ireland) Order 2003, assigned to the constituent SOAs (2003, Source: NIHE)

Sub Domain: Outdoor physical environment

- Local area problem score (2001, Source: SDRC and NIHE, modelled NIHCS)

Urban/rural bias

Homelessness data will be assessed with the assistance of Housing Executive staff to ensure that any indicator included adequately measures homelessness in both rural and urban areas.

Recommended further steps

In addition to testing for bias in the homelessness indicator, it is also recommended that further work is undertaken to improve data sources on homelessness for obtaining spatial data at the small area level. It is recommended that the feasibility of producing a measure of housing affordability distinct from the overall MDM be examined. The primary task of such a feasibility study would need to identify possible sources of income data that are robust and either available for small areas or are drawn from samples large enough that modelling to small areas can be achieved. Additionally, such a study would need to propose a workable geographical definition of housing markets and identify the population to be covered by such a measure.⁸

⁷ Due to issues surrounding robustness of data at the small area level.

⁸ See, for example, Bramley, G., (October 2003), 'Updating the English Indices of Deprivation 2000: Proposals for the construction of the indicator 'Difficulty of Access to Owner Occupation', www.neighbourhood.gov.uk



Crime domain

Original indicators

- Violence
- Burglary
- Theft
- Criminal Damage

This domain was originally intended to be based solely on recorded crime data provided by the Police Service of Northern Ireland (PSNI). The four indicators were to be constructed by combining a selection of recorded crime categories for the period 1 April 2002 to 31 March 2004.

Issues arising from consultation

The majority of respondents to the consultation process were in favour of including some form of Crime domain in the Northern Ireland Measures of Deprivation. However, a number of valid concerns were raised about the proposed domain structure and its constituent indicators. These concerns are as follows:

Under-reporting and under-recording of crimes

The issues of under-reporting and under-recording of crime were the most commonly raised concerns in the consultation process, with 30 respondents highlighting one or other of these as a potential weakness of the domain in its originally proposed form. Many of these respondents felt that reliance on just PSNI data for the Crime domain would significantly weaken the domain due to perceived problems of under-reporting and under-recording, perhaps even to the extent that the domain should be dropped from the Measures.

Under-reporting of crimes to the police and under-recording of reported crimes by the police do complicate any analysis of crime patterns and trends. The 2003-2004 British Crime Survey estimates that 31% of total occurring crime is reported to the police and recorded by the police; 11% is reported to the police but not recorded by the police; and 58% of crime is not reported to the police and therefore not recorded by the police. While the latest such data are not presently available for Northern Ireland – the 2004 Northern Ireland Crime Survey is scheduled for publication in early 2005 - the previous 2001 Survey revealed that around half of crime against Northern Ireland households and their adult occupants was reported to the police (French, 2002). It is important to note, however, that these rates do vary considerably by crime type, with crimes such as burglary and vehicle theft having some of the highest reporting rates and crime such as common assault and vandalism having some of the lowest reporting rates. A particular form of crime which is



both serious in nature and yet very poorly reported is domestic violence. Domestic violence is also widely believed to have one of (if not *the*) highest rate of repeat victimisation.

If under-reporting and under-recording of crimes were consistent across population groups and across areas, these issues would not present such a great problem to analyses of crime patterns and trends as all areas and all groups would be equally affected. However, one of the main concerns of consultation respondents was that the legacy of the Troubles would result in differential reporting rates by religious affiliation. There was also the concern that the police might adopt different recording practices based on religious affiliation of the victim or person reporting the crime. If either of these concerns were true then, given the religious segregation of certain communities, spatial analyses of small area crime rates may yield misleading results.

Although a considerable number of responses to the consultation highlighted this potential problem, the evidence available at the present time does suggest that reporting and recording rates are very similar across religious groups. The following subsection draws on some of the key work undertaken to date in Northern Ireland to quantify the effect on reporting rates of religious affiliation.

Reporting and recording crime in Northern Ireland: religious issues

It is important to note that the views people express about the police are often essentially political views about the institution, rather than views about the policing service which they themselves receive (ICP, 1999). Indeed, while many people regardless of their religious background may have similar expectations and experiences of policing, they may take a different view of the institution – a view owing more to political considerations than to policing concerns or experiences (ICP, 1999). Brewer notes that political affiliation rather than religion is the best predictor of public attitudes towards the police. Moreover, other factors are also important in structuring these attitudes, such as social status, gender and age. Essentially, attitudes towards the police are not structured by religion alone (Brewer, 1992).

The Community Attitudes Survey (CAS) by NISRA found that while lower proportions of Catholics than Protestants thought that the police were doing a good job, that they dealt fairly with paramilitary or sectarian crime, and that they dealt fairly with everyone, overall, generally people seem to find the police polite and helpful. Research has also found that around 80% of both Protestants and Catholics find the police polite, while around 80% of Protestants and 74% of Catholics find them helpful (ICP, 1999).

Geary et al. (2000) also notes that there are wide variations in the perceptions and experiences of crime within Catholic and Protestant groups themselves. For example, the attitudes and life experiences of middle-class Protestants and Catholics appear to be different from those of lower working class Protestants and Catholics. Indeed a focus group study conducted by the



Independent Commission on Policing for Northern Ireland (1998) found that in the lower income groups, Protestants could be as strongly alienated from the police as were their Catholic counterparts. Essentially, the religious communities in Northern Ireland can be divided within themselves on some issues and united with one another on others (Brewer, 1992).

For example, unpublished findings from the Northern Ireland Crime Survey 2001 revealed no statistically significant difference in reporting rates between Catholics and Protestants who had been the victims of crime. Indeed, the overall crime reporting rate was higher in Northern Ireland than in England and Wales, a finding supported by the 2000 International Crime Victim Survey. Furthermore, there is little difference in reporting trends amongst those who have initiated contact with the police. For example, according to the Community Attitudes Survey 2003, nearly four in ten respondents (37%) had initiated contact with the police during the previous two years. Of those who had been in contact with the police in the last two years, 71% had contacted the police to report a crime or other incident (75% of Catholic and 69% of Protestant respondents) (CAS, 2003). More specifically, when asked, *“If you witnessed a burglary in a stranger’s house and by an unknown perpetrator, would you report the crime?”* – 97% of Protestant and 93% of Catholic respondents said ‘yes’. Moreover, 85% of Protestant and 84% of Catholic respondents said that they would be prepared to provide a statement to the police (CAS, 2003). When asked, *“If your own home was burgled and things stolen would you report the crime?”* – 100% of both Protestants and Catholics said ‘yes’. Moreover, 99% of both groups would report the crime to the police, 99% would be prepared to provide a statement to the police, and 93% of Protestants and 91% of Catholics would be prepared to give evidence in any subsequent court trial (CAS, 2003).

In summary, therefore, although there appears to be a broad public perception that reporting rates are different across religious groups, the evidence to date suggests that this perception is largely unfounded. While different religious groups do undoubtedly hold different perceptions of the PSNI as an organisation, there is considerable equity in the propensity to report crimes.

In terms of under-recording of crime by the police (i.e. not recording crimes that are reported to them), it should be borne in mind that not all crimes reported to the police are notifiable offences meaning that many of the less serious offences are not recorded and are subsequently omitted from published crime statistics. This is the standard approach required of police forces in England and Wales by the Home Office and is the same approach adopted by the Police Service of Northern Ireland. In fact, standards in the recording of crime by the police have been substantially improved over recent years with the introduction of the National Crime Recording Standard which the Police Service of Northern Ireland has fully adopted. This, combined with the introduction of more automated systems for logging reports of incidents/crimes from the public, should mean that there is less potential for under-recording of crime. In conclusion, there is no evidence that under-



recording of crime is a significant problem across Northern Ireland nor that it varies across the two communities.

Proposed amendments to original domain structure

Within the Community Safety arena, data on malicious and deliberate fires from fire brigades are often used as an indicator of wider social disorder. Given that recorded crime data do not cover all offence types, especially many less serious offences which are not recordable, it is felt that there is merit in including NI Fire Brigade data on malicious fires as an additional measure of disorder to supplement the PSNI's recorded crime data.

Many of these smaller malicious fires are probably not reported to the police as the public will tend to report them to the fire brigade in the first instance. In addition, some fires that are drawn to the attention of the police may not meet the Home Office Counting Rules definition of an offence of arson and, thus, would not be included in the recorded crime count. The research team explored the use of fire brigade data in the English Indices of Deprivation 2004, but the required information was not available from every Fire Authority at that time. This information is, however, available from the Northern Ireland Fire Brigade and could be included in the revised Measures.

A further source of valuable information that was pursued for the English Indices of Deprivation 2004 but could not be included due to variations in recording practices across the country is police *incident* information on 'disturbances'. Police incident data relate to reports from the public etc. about on-going incidents including those where a less serious (non-recordable crime) has been committed or even where there has been no crime at all. As such, this is another good indicator of social disorder. One category of such incidents recorded by the Police is 'disturbances' which would generally include several types of disorderly behaviour such as 'youths causing annoyance' and disturbances in the street. Police incident data have been provided to the research team for the revised Measures with those incidents that subsequently became crimes having been removed to avoid double-counting.

The inclusion of fire brigade data and police incident data has resulted in a revision of the definition of the domain. The original suggestion was that the domain should measure the risk of criminal victimisation at small area level and therefore be named the 'Crime domain'. By supplementing the crime data with information on social disorder, the research team propose that the new domain should measure the rate of crime and disorder at small area level and be renamed the 'Crime and Disorder domain'.

It is further proposed that the indicators be grouped into two sub-domains: a 'Crime sub-domain', and a 'Disorder sub-domain'. Within the Crime sub-domain, each of the four indicators of 'violence, robbery and public order', 'burglary', 'theft', and 'criminal damage' should be combined using equal weights. In the Disorder sub-domain, the indicators of 'disturbances' and 'malicious primary fires' should be combined using weights of 0.6 and 0.4



respectively. The final Crime and Disorder domain score should then be constructed by combining the two sub-domains using weights of 0.6 for the Crime sub-domain and 0.4 for the Disorder sub-domain. These weightings are subjectively defined based on two criteria: (1) impact on individuals and communities, and (2) robustness of data source.

Fear of crime

A number of respondents suggested that a crime domain should ideally include one or more measures of fear of crime in addition to measures of actual incidence of criminal events. The research team agree with the respondents that a measure of fear of crime would add valuable additional context to the domain. Unfortunately, however, at the present time no data source exists that allows robust estimates of fear of crime to be constructed at small area level. Two potential sources of information have been explored: the Northern Ireland Crime Survey, and the District Policing Partnership surveys.

The Northern Ireland Crime Survey is similar in nature to the British Crime Survey in that it explores a wide variety of issues around actual victimisation, fear of victimisation, perception of the police, methods of reporting etc. The research team have discussed the content and methodology of the survey with members of the Northern Ireland Office research team who commission and analyse the survey. The conclusion reached with regard to this potential data source is that, with a sample size of just 3100, the survey cannot be modelled down to small area level. This conclusion is supported by the Northern Ireland Office.

District Policing Partnership (DPP) surveys are undertaken in each of the 26 districts in Northern Ireland and are coordinated by the Central Survey Unit at NISRA. These surveys also collect a wealth of useful information along the same lines as the Northern Ireland Crime Survey and, being conducted at district level rather than national level, they might offer the possibility of being able to model down to small area level. However, it is unfortunate that the survey is conducted by postal questionnaire as this generates a response rate of just 25%. Such a low response rate will have considerable implications for response bias as the sample is likely to be unrepresentative of the total population in the area. The research team has discussed these issues with the NISRA Central Survey Unit and have concluded that it will not be possible to use the DPP surveys at the present time.

Crime types

A number of additional crime types were suggested for inclusion in the Crime domain. Three commonly suggested crime types were: (i) paramilitary crime; (ii) drug related crime; and (iii) domestic violence.

Crimes of a paramilitary nature will be captured in the PSNI recorded crime data. If a murder is carried out under the auspices of paramilitary activity, then this crime will be included within the total number of murders recorded by the



police. PSNI do produce 'security statistics' in which all crimes deemed to be of paramilitary nature are flagged and presented in a stand alone report, but for the purposes of this domain it was felt that the emphasis should be placed on the actual crime rather than the reason for its occurrence. Therefore, while recorded paramilitary crime will be picked up in the PSNI data categories proposed for inclusion in the domain, specific consideration will not be afforded to this type of crime. One major justification for this is that the relatively low numbers of paramilitary crimes prevents such events being considered as a stand alone category.

Drugs offences are relatively uncommon and the majority of offences are for possession. Although some high visibility drug users can have a negative impact on a neighbourhood by engendering fear within the community, the main problem people associate with drug use is crime generated to sustain such usage. These crimes will be included within the police recorded crime data if they are reported to and recorded by the police. Therefore, the research team proposes that drugs offences are not included as a crime category within this domain.

Domestic violence is a hugely important crime which afflicts many people. A number of respondents to the consultation process stated a desire to include domestic violence as an indicator in its own right. Although the research team would support this suggestion given the impact this crime causes and the extent of repeat victimisation, the fact that domestic violence is so under-reported means that a specific domestic violence indicator constructed from police data alone would not be robust enough for inclusion. Unfortunately there are no alternative datasets collected consistently across Northern Ireland that could be incorporated to strengthen the police data and therefore it is proposed that domestic violence offences are retained within the violence category of police recorded crime data.



Proposed final indicators

Sub Domain: Crime

- ***Violence, Robbery and Public Order (PSNI)***
- Burglary (PSNI)
- Vehicle Theft (PSNI)
- Criminal Damage (PSNI)

Sub Domain: Disorder

- ***Malicious and Deliberate Primary Fires (NIFB)***
- ***Disturbances (PSNI)***

Urban/rural issues

There is very little literature available to evidence whether people living in urban or rural areas are more or less likely to report crimes, disturbances or malicious/deliberate fires. However, the research team will continue to explore this possibility upon receipt of the data from data providers.

Recommended further steps

The research team recommends that further work be invested in:

- exploring the reporting rates of different population groups
- considering the feasibility of expanding the NICS and DPP surveys to enable results to be modelled down to small area level
- developing a robust measure of domestic violence at small area level based on data other than police recorded crimes (e.g. voluntary organisations). While reporting rates may be low, PSNI domestic incidents involving violence against the person or property might still be used to indicate those areas where it is more prevalent.



Methodology

Weighting

One aspect of the methodology that received many and varied responses was the issue of weighting. Every domain received at least one request for a higher weighting with the exception of the Income and Employment domains, which were either recognised as being the most important and thus requiring the highest weights or were considered to be weighted too highly. Both Weights A and Weights B were supported, with Weights A receiving marginally more votes. Various other weighting structures were proposed. There were objections to the weighting as arbitrary and it was argued that the weighting needs to be objective and empirically driven. Other requests included consideration of the weighting of indicators within domains and more information on the impact of the weightings. It was recommended that sensitivity analyses are carried out using different weighting methods.

In the absence of a robust methodology for determining weights empirically, it remains our view that weighting is a matter of researcher judgement taking into account the appropriate literature. We therefore propose to proceed with the A weights but will undertake sensitivity testing and publish the results thereof.

Urban and rural rankings

A frequent suggestion in the responses to the consultation exercise was the need for distinct spatial deprivation rankings for urban and rural areas. The spatial deprivation measures under development will be equally applicable in both urban and rural areas. Therefore what remains is, we believe, a policy specific issue of classifying areas as 'urban' or 'rural'. Once this is done at the individual policy level, then this research could readily be used to generate rankings for policy specific 'urban' or 'rural' areas.

Comparison with GB and Republic of Ireland

Some respondents expressed a need for spatial deprivation measures which would be applicable across the UK or Ireland. The focus of this research is to produce the best spatial deprivation measures for Northern Ireland. To this end, the extensive consultation process has flagged up issues which, when measuring spatial deprivation, are specific to Northern Ireland. However we recommend that further research is carried out to assess the need for small area spatial deprivation measures for wider geographic areas.



Geography

Ward or Super Output Area (SOA)?

A common concern over the use of SOAs was that users would not understand the new geography and would find SOAs confusing. A number of respondents asked for the Measures to be produced at SOA and ward level. Some respondents requested that only wards are used, often citing instances within their work where ward level information is used and targeting is on a ward basis, which would become problematic if SOAs are the new geography and the Measures are only produced at SOA level. It was also felt that the Measures should be made available at HSSB and ELB level and also for Parliamentary Constituencies.

We appreciate the concerns from users over introducing a new geography. Therefore the possibility of creating ward (and Parliamentary Constituency) level summaries has been explored and is discussed in more detail in the section 'LGD and other summaries' below.

Pockets of deprivation

The consultation responses repeatedly stressed the need to identify local pockets of deprivation and it was felt in some areas that SOAs may not do this (for example, pockets of deprivation in Moyle will be hidden as wards are combined to make SOAs). It was argued that SOAs may actually mask deprivation in rural areas, and further clarification of the impact on rural areas of using SOAs was requested. Related to the actual definition of SOA boundaries is the argument that by splitting wards by tenure, some SOAs will not be homogenous due to new trends in housing occupation where more affluent people have moved into low tenure housing.

There is a proposal (see below) to produce an OA level economic deprivation measure which will further aid the identification of very small pockets of deprivation.

Naming of SOAs

It was felt that if SOAs are used, the naming of them will be crucial. The importance of retaining a link to wards was also recognised. To support this NISRA have created a set of Super Output Areas which have been named and labelled with reference to their ward (e.g. Andersonstown ward has 3 SOAs labelled Andersonstown 1, Andersonstown 2, Andersonstown 3).



Local Government District (LGD) and other summaries

The MDM 2001 was not calculated directly at Local Government District (LGD) level: ward level results were summarised in six ways to produce LGD level summaries. These six measures reflected the different ways that deprivation might be distributed within a LGD and picked up both extremely polarised areas with highly advantaged and disadvantaged wards, as well as areas which were more uniformly 'badly off'. They included two measures with a scale component to identify areas with large deprived populations.

Six summary measures of the overall SOA level MDM are again proposed and can be produced at both LGD and Parliamentary Constituency (PC) level. No single summary measure is favoured over another, as there is no one best way of describing or comparing LGDs. LGDs are complex to describe as a whole or to compare for several reasons. First, LGDs can vary enormously in population size. Further, some LGDs may have a 'mixed' population, containing more variation in deprivation, and in some places deprivation may be concentrated in severe pockets rather than being more evenly spread. This makes an overall picture more difficult to establish. Six measures have been devised which take account of these issues, and which describe the LGD in different ways. They look at the most deprived populations, the most deprived SOAs, as well as the average of the SOAs, to give six meaningful descriptions of deprivation at LGD level. More subtle descriptions of deprivation across a LGD can be established by a close analysis of the SOAs within that LGD, as the SOA level MDM contains the most detailed account of local deprivation. At the SOA level much more information is retained than with the LGD level summaries.

These measures are discussed individually below.

Local concentration

Local Concentration is the population weighted average of the ranks of a LGD's most deprived SOAs that contain exactly 10% of the LGD's population. This is an important way of identifying 'hot spots' of deprivation within a LGD.

Extent

The aim of this measure is to portray how widespread *high levels* of deprivation are in a LGD. In the MDM 2001 it was the proportion of a LGD's population living in the wards which rank within the most deprived 10% of wards in Northern Ireland. It only included LGDs that contain wards which fall within the top 10% of the most deprived wards in Northern Ireland. Therefore some LGDs (11 out of 26) did not have an overall score for this measure. Following a refinement which was employed in the ID2004 to prevent this sudden cut off, we propose that the measure is redefined so that 100% of the population of SOAs in the most deprived 10% on the MDM will be included, and a proportion of the population of those SOAs in the next two deciles on a



sliding scale – that is 95% of the population of the SOA at the 11th percentile, 5% of the population of the SOA at the 29th percentile.

Scale (two measures)

These two measures are designed to give an indication of the sheer numbers of people experiencing income deprivation and employment deprivation at LGD level. The Income Scale score is a count of individuals experiencing income deprivation. The Employment Scale score is a count of individuals experiencing employment deprivation. It is useful to present both measures as they are real counts of the individuals experiencing these deprivations.

Average of SOA ranks

This measure is useful because it summarises the LGD as a whole, including both deprived and less deprived SOAs. All the SOAs in a LGD need to be included to obtain such an average, as each SOA contributes to the character of that LGD. This measure is calculated by averaging all the SOA ranks in each LGD. The SOA ranks are first of all population weighted within a LGD to take account of the fact that SOA size can vary significantly in that LGD.

Average of SOA scores

This measure also describes the LGD as a whole, taking into account the full range of SOA scores across a LGD. The advantage of the measure is that it describes the SOAs by retaining the fact that the more deprived SOAs may have more 'extreme' scores, which is not revealed to the same extent if the ranks are used. This measure is calculated by averaging the SOA scores in each LGD after they have been population weighted.

A ward level summary?

As agreement is that an SOA level MDM is produced for Northern Ireland, there would be considerable interest in a presentation at ward level. There could be a complete re-calculation at ward level. However, this would be problematic as the factor analysis solutions for various domains would be different even for wards which were identical to SOAs. To build a ward level MDM using weights generated from the SOA analysis would be to lose the statistical integrity of the technique.

Our proposal would be to present (in the final report) the SOA level MDM at ward level in the same way as at LGD/PC level⁹. As many of the LGD level presentations would not make sense (Local Concentration, Extent and Scale), we suggest producing one Ward level summary only. We recommend that the most appropriate and meaningful is a population weighted average score (see above).

⁹ Ward level summaries for individual domains will be presented at a later stage.



Output Area level measure

There are three domains which lend themselves to presentation at very small area level. These are Income, Employment and Proximity to Services. Other domains would not be robust enough at this level of spatial aggregation even after using Shrinkage Estimation. We therefore propose to produce these domains at Output Area level.

We further propose a measure of Economic Deprivation created by combining the three domains in the same way as proposed for the overall MDM - that is by ranking each domain, exponentially transforming the ranks and combining using explicit weights. Selected weights will be proportionate to the agreed weights for the overall MDM. The resultant Economic Deprivation measure will aid policy analysts in identifying very small pockets of deprivation. This Economic Deprivation measure will not form part of the overall MDM but will be a stand alone measure.

Recommended further steps

All other things being equal lack of income is exacerbated by poor proximity to services. We recommend further research to investigate the possibility of weighting the Income Deprivation domain by the Proximity to Services domain. In addition we recommend that further research is undertaken to assess the ability to measure the other domains and output area level. Such innovations would need thorough validation.



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Appendix A: Population estimates

The research team would like to thank Demography and Methodology Branch at NISRA and Robert Barry at the Northern Ireland Assembly for their constructive comments and continued support in developing the methodology detailed below.

Introduction

Population estimates are a crucial element of the Northern Ireland Measures of Deprivation 2005 (MDM 2005). Such estimates form denominators for the vast majority of indicators, thereby underpinning the entire study.

This paper first sets out the specific requirements of the current population estimation process, including the time point, geography and demographic breakdown. It then offers a summary of past and present population estimation exercises and a brief critique of key methodological approaches available to the research team. The paper then proceeds to detail the proposed methodology for the construction of population denominators for the MDM 2005, including a discussion of available datasets and their relative strengths and weaknesses.

Specification of requirements

All indicators in the MDM 2005 that are expressed as rates must use an indicator-specific denominator. A denominator should measure the population 'at-risk' of experiencing a particular form of deprivation. So, for example, an indicator based on receipt of a particular benefit would require a denominator which only included people who could potentially claim that benefit (i.e. an 'unemployment' indicator using Job Seeker's Allowance data as the numerator should have a denominator which excludes children and people of pensionable age as these groups are not at risk of claiming the benefit due to being outside the age range for eligibility).

Due to the vast array of indicators proposed for inclusion in the MDM 2005, a number of different denominators will be required. Some indicators will require an estimate of total population in an area, while others will require particular age and sex breakdowns. The population estimation procedure must therefore be capable of producing a collection of population estimates rather than simply an estimated count of total people living in an area.

The MDM 2005 will be based largely on numerator data for 2003, therefore the population denominators should also relate to the situation as at 2003. As the last decennial population Census in Northern Ireland took place in 2001, the methodology employed in the construction of MDM 2005 denominators



must incorporate an element of estimating population change over time. Clearly, the greater the elapsed time since the Census the more difficult it becomes to accurately estimate population distribution.

The issue of geography is particularly important in the construction of population estimates. The smaller the geographical unit of analysis, the greater the likelihood of volatility in population distribution over time and therefore the more difficult it becomes to construct reliable estimates. This difficulty in producing estimates at smaller geographical levels results in NISRA's official annual Mid Year Estimates (MYEs) being produced at Local Government District (LGD) level. As the MDM 2005 will be produced at sub-district level, the research team are required to construct new population estimates for this project. Estimates at sub-district level are typically referred to as 'small area population estimates'.

The MDM 2005 will be constructed at Super Output Area (SOA) level. SOAs in Northern Ireland are relatively homogenous in terms of population size, with approximately 1800 people per area. While this choice of geography enables spatial patterns of deprivation to be identified more accurately than if electoral wards are used, it does increase the difficulties facing the research team in terms of creating reliable population estimates.

Furthermore, although the full MDM 2005 output will be presented at SOA level, a number of constituent parts may be produced at an even lower geographical level – that of 2001 Census Output Area (OA). While OAs are also relatively homogenous in terms of population size, the problems of volatility over time become more pronounced due to having a mean population of approximately just 350 people. If the MDM 2005 is to contain any results at OA level then the research team must construct population denominators at OA level.

In summary, therefore, the research team must construct a range of small area population estimates as part of the MDM 2005 study. These estimates must be for mid 2003, contain a variety of indicator-specific age/sex breakdowns, and be at both SOA and OA levels.

Possible methodological approaches

Small area population estimates have been, and continue to be produced for a variety of different purposes and by a number of different organisations, both in the UK and in the wider international community. A sizeable body of literature therefore exists on methodological approaches to estimation and critiques of relevant data sources. Although the international literature offers some interesting perspectives, the idiosyncrasies of national demographics suggest that the identification of a suitable method for Northern Ireland should lean more towards experience gained in the UK.

The 'Estimating with Confidence' project (EwC) was initially established by an informal network of local government statisticians and demographers across



Great Britain and subsequently funded by the ESRC. The work was subsequently extended to Northern Ireland. The primary aim of the project was to compare local and health authority generated small area population estimates for 1991 with the 1991 Census figures in order to identify factors that influence the accuracy of population estimation. The project collated small area population estimates from 41 producers across Great Britain. Five main types of population estimation methodology were found to exist: Local Census; Cohort Component/Survival; Apportionment; Ratio; and Additive Change. The EwC team also found that in a number of cases these methods were used in combination to form a hybrid/composite procedure. Some of the most favoured methods are summarised below (but see Simpson et al, 1996 for further details of the project).

In 2000, the Office for National Statistics (ONS) established the 'Small Area Population Estimation' project (SAPE). This study was intended to build upon the earlier work undertaken in the EwC project, and investigate the feasibility of producing small area population estimates for England and Wales. An initial review of population estimation procedures in use in England and Wales revealed the following methodologies: Ratio; Additive; Apportionment; Local Census; and Cohort Component/Survival (see SAPE(01)4, 2001 for further details). Furthermore, a review of the availability of small area estimates by other national statistics agencies found the following methods to be in use: Population Registers; Apportionment; Cohort Component/Survival; Growth Rates/Extrapolation; Dwellings-led; and Regression (see SAPE (01)3 Revised for further details). In both reviews, hybrid/composite approaches were identified in a number of cases. Some of the most favoured methods identified in the two SAPE papers referenced above are summarised below (see SAPE(04)9, 2004 for a good discussion of the entire SAPE project between 2001 and 2004).

Apportionment

Indicators of population stock at small area level are used to apportion an independent estimate of local authority district population to the small areas. Each small area receives a fraction of the local authority district/LGD population equal to the proportion of the district's indicator stock that is within the small area. Apportionment is a common technique for estimating small area populations but relies on the assumption that the indicator in question accurately reflects the actual distribution of population across small areas.

Cohort Component/Survival

This procedure yields small area population estimates by projecting population dynamics since the last Census. Each person in each small area is aged by the appropriate number of years between the last Census and the year for which estimates are required. Births over the period are added and deaths subtracted (from the appropriate age/sex group). This results in an estimate of natural change. To this, it is necessary to add an estimate of net migration. While constructing estimates of natural change in a small area is



relatively straightforward, estimating migration flows at such small geographical levels is particularly difficult.

Ratio

In the Ratio method, indicators of population change are used to update earlier population estimates for each small area of interest. Such indicators are derived from the ratio of indicators of population stock in successive years. In order to function effectively, this method requires indicators which cover the entire population of interest and in which a change in indicator stock is indicative of an equivalent change in actual population (i.e. an observed increase of 2% in the indicator is indicative of an actual 2% increase in the population as a whole).

This method lends itself well to small area population estimation projects such as that required for the MDM 2005. However, it is important to remember that the ratio method is only as good as the indicators used to estimate population change.

Proposed methodology and data: MDM 2005

The research team proposes that the Ratio method should be adopted for constructing small area population estimates for the MDM 2005. As noted above, the Ratio method uses indicators of population change to update earlier population estimates for each small area of interest. These indicators are derived from the ratio of indicators of population stock in successive years.

The main reasons for proposing this method of estimation are as follows:

- The Ratio technique is a straightforward method and therefore transparent (a key necessity of all aspects of the MDM 2005)
- It is easily replicable over time and between people
- It lends itself well to the data available to the research team
- It can cope with small geographical areas
- It is a 'tried and tested' method which has yielded good results in recent estimation exercises
- The ONS SAPE group concluded that ratio change was the preferred method for 2002 ward level estimates in England at the present time.



The basic concept is as follows:

$$(1) \quad P_{ij(t+n)} = P_{ij(t)} * C_{ij(t,t+n)}$$

and $(2) \quad C_{ij(t,t+n)} = I_{ij(t+n)} / I_{ij(t)}$

where $I_{ij(t)}$ is the indicator of population stock in age group i in small area j at time t (i.e. base year); $I_{ij(t+n)}$ is the equivalent population stock indicator at time $t+n$ (i.e. year for which estimates are required); $C_{ij(t,t+n)}$ is thus the ratio of population change for age group i in area j between time t and $t+n$ in the indicator of population stock; $P_{ij(t)}$ is the population in age group i in area j at time t , and $P_{ij(t+n)}$ is the estimated population in age group i in area j at time $t+n$.

In order to ensure the small area estimates sum to the local authority district level Mid Year Estimates produced by NISRA, the following step is undertaken:

$$(3) \quad L_{i(t+n)} = \sum_{j=1}^n (P_{i(t+n)})$$

where $L_{i(t+n)}$ is the local authority district MYE for age group i at time $t+n$. This step 'constrains' the small area estimates to the LGD MYE by age group thereby ensuring synergy between the small area estimates and the official MYEs.

The basic premise of the Ratio method is that certain datasets can be used to predict changes in population distribution over time. The first task is to identify a time point for which reliable small area counts of population exist. In the case of the current estimation process, our starting point is the 2001 Census. The Census tells us how many people were living in each small area on 29 April 2001 (i.e. Census day). In addition to the Census counts at small area level, the MYEs represent the most reliable counts at LGD level for both mid 2001 and the mid points of following intercensal years. Our end objective is to derive an estimate of how many people were living in each small area on 30 June 2003 (i.e. mid 2003).

To arrive at this conclusion, independent datasets must be identified in which changes in stock reflect equivalent changes in actual population. The population estimation process therefore requires both population-specific datasets (i.e. those created for the purpose of estimating population distribution) and 'administrative' datasets (i.e. those which, although collected for a different purpose, do actually reflect population distribution). The key datasets available to the research team for this purpose are as follows:

2001 Census

The 2001 Census is the best possible measure of population distribution at small area level and is therefore an integral part of the estimation process. Certain issues do exist with the Census, however. These include a degree of undercount in particular age/sex groups and particular geographical areas



and the fact that the Census relates to the population distribution as at 29 April 2001 whereas all other datasets relate to mid year points. The major weakness is, of course, that the Census is only carried out every ten years.

Mid Year Estimates

The MYEs are the best available estimate of population distribution by age and sex in the intercensal years. The MYEs are released annually at local authority district level which enables population change over time to be monitored at this level.

Central Health Index

The Central Health Index (CHI), owned and managed by the Central Services Agency (CSA), is a database of all people registered with a GP in Northern Ireland. Each individual record contains the person's age, sex and home postcode, enabling counts of GP registered people by age and sex to be constructed for any specified geography. The strengths of the CHI database lie in the facility to construct a population profile by single year of age and sex for the entire age range. The weaknesses, however, centre on problems of list inflation (where people move area but neglect to tell their GP surgery) and list cleaning (where these people are identified and removed from the GP's list). If list inflation was evenly spread across all areas and all age/sex groups then the issue would not present a problem. However, it is known that particular population age/sex groups and particular types of area are more prone to suffering from this issue – for example, students and young people and areas with large concentrations of these groups. Similarly with list cleaning, if the effects were spread evenly across age/sex groups and geographical areas then this would be less of a problem. However, it is known that certain age/sex groups and certain areas are targeted for list cleaning at different times, therefore the consistency over time can be compromised.

Child Benefit

Child Benefit (CB) is managed and administered by the Inland Revenue (IR) in Northern Ireland. CB is a non-means tested benefit paid to parents/carers of children aged 0 to 15 inclusive (and children aged 16 to 18 if they remain in full time education). The CB database contains information on each child for whom CB is claimed, including age, sex and home postcode. As CB is known to have almost universal take up, these data enable reliable counts of children aged 0-15 inclusive to be constructed by single year of age and sex for any specified geography. The data are not suitable for estimating numbers of children aged 16-18 as those who are not in full time education cannot be claimed for. In addition, there are a number of groups of children aged 0-15 for whom CB cannot be claimed which can lead to an underestimation of the correct number of children aged 0-15 in an area . These groups are:

- Children for whom child benefit is not claimed but who are eligible
- Foreign Armed Forces dependants are not eligible for child benefit
- Children in local authority care



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- Children detained in secure or non-secure accommodation
 - Children whose entry to the United Kingdom is subject to immigration control.

There are also certain groups of children aged 0-15 who may appear to live in one place according to the CB database but in reality live elsewhere. These groups are:

- School boarders – if claimant's address different to boarder's residential address
- Children who reside at a different address to the address of the claimant.

In summary, therefore, CB offers the potential to accurately estimate numbers of children aged 0-15 inclusive by single year of age and sex for each small area in Northern Ireland and at different time points. However, one must remember that in certain instances the data may not be wholly reliable.

Super Older Persons Database

The Super Older Persons Database (SOPD), managed by the Department for Social Development, is a non-overlapping count of people aged 65 and over who are in receipt of any of the following benefits: Attendance Allowance, Disability Living Allowance, Widows Benefit, State Pension, Incapacity Benefit, Winter Fuel and Minimum Income Guarantee. The SOPD includes information on age, sex and home postcode of each claimant. Like CB, the number of people aged 65 and over who do not claim one of these benefits is thought to be very low, thereby making the SOPD a valuable tool for estimating population distribution for those aged 65 and over by age and sex at small area level across the whole of Northern Ireland.

Dwelling Stock

Work is underway to identify the possibility of obtaining counts of dwelling stock at small area level for use in identifying areas of housing growth/contraction.

Annual School Census

The Annual School Census, managed by the Department of Education, contains details of all children in maintained schools aged 11-15 inclusive. These details include age, sex and home postcode. Such data may be a useful tool for estimating population in these particular age/sex groups.

Armed Forces

Data on the age/sex profile and geographical distribution of armed forces personnel is useful as this population group tend not to register with GPs and are therefore rarely included in the CHI database.



Prisoners

Most indicators in the MDM 2005 require prison populations to be excluded from the denominator. An accurate count of prisoners by age, sex and postcode of prison establishment is therefore necessary.

Due to the potential problems with the data sets listed above, the first stage of the estimation process is to undertake a thorough programme of data testing and validation in order to identify particular age/sex groups and/or particular geographical areas where one or more of the datasets may have a degree of unreliability/instability. Each of the datasets must be aggregated to the chosen small area level and then compared against each alternative dataset and against itself over time. This should reveal inconsistencies in population stock between datasets and inconsistencies in population change over time. If problematic groups and/or areas are indeed identified, mechanisms will be implemented to adjust the suspicious data using both internal and external tests of consistency. The findings of this validation programme will be relayed to NISRA for comments.

Once a set of cleaned data has been constructed, the chosen estimation methodology can be applied. The research team proposes to first construct mid 2001 population estimates by age and sex for each small area in Northern Ireland. This will be achieved by constraining the 2001 Census counts to the 2001 MYE then subtracting the 2001 prisoner population from the relevant areas. This set of mid 2001 small area estimates will be the base population from which to estimate change between 2001 and 2003.

The second task involves constructing a change statistic for each age/sex group in each small area in Northern Ireland between mid 2001 and mid 2003, separately for each administrative dataset. These change statistics can then be applied to the mid 2001 small area estimates by age and sex to produce estimates of population distribution at mid 2003. A weighting system will be applied to the various indicative datasets to determine relative influence on the estimate. Finally, the mid 2003 small area population estimates will be constrained to the 2003 MYE at local authority district level by age and sex to produce mid 2003 small area estimates which are synergistic with the higher level estimates.



Appendix B: Factors affecting geographical access to services

There are various different factors that impact on geographical access to services: cross-border service provision, access to frequent and appropriately timed public transport, interface issues and other aspects of physical infrastructure. While it would be interesting and desirable to take all these issues into account in a domain measuring access to services, as the following discussion will highlight, unfortunately there are various reasons why this is not always possible.

Cross-border services

It has been noted that people living in areas of Northern Ireland that border the Republic of Ireland will regularly make use of services across the border, and in fact these are often the nearest service. In the instance of Fermanagh, some people in Rosslea and the south-east area of the county look to Monaghan Town in County Monaghan in the Republic of Ireland rather than to Enniskillen. As one response to consultation states, 'The topography of the area dictates that the Rosslea/Monaghan access is more relevant than the Rosslea/Enniskillen access (Fermanagh's primary market town).'

However, there is no way of determining who actually uses services across the border and indeed whether this applies equally to all services. For food shops and A&E hospitals for example, it is quite likely that this would be the case, but for other services it is less straightforward.

Furthermore, DHSSPS - who would be the data supplier for cross-border A&E hospital data - caution against taking account of cross-border provision, arguing there is a need to be consistent across all indicators and data may not be available on cross-border services for the other indicators. We would support this position. The Measures should be restricted to Northern Ireland data that we know have been collected in a consistent way.

Access to transport

Transport is a key issue for enabling and improving access to services. The Social Exclusion Unit in England looked in detail at the links between transport and social exclusion noting that transport problems can be a significant barrier to social inclusion. They highlight five key barriers to accessing services:

- The availability and physical accessibility of transport;
- Cost of transport;
- Services and activities located in inaccessible places;
- Safety and security of transport;
- Travel horizons.



People living in rural areas without a car face particularly acute problems as distance to services are often greater and public transport can be infrequent or inadequate. In urban areas, buses tend to be focused on radial routes entering town centres rather than the periphery, while early morning, evening and weekend journeys are poorly served.¹⁰

Transport poor

According to the report 'Transportation and Land Use' by the NI Department for Regional Development, 'upwards of 40% of the total population within Northern Ireland live in small towns, villages, hamlets and the open countryside... Most rural areas share a common transport deficit of low public transport provision and high car dependency.'¹¹ One feature of transport policy in Northern Ireland that contrasts with the rest of the UK is the serious under-investment in public transport¹². When the estimated 25-30% of households in Northern Ireland that do not have a car are added to the poor public transport provision, it is clear that accessing services becomes problematic. Where households without a car do not have access to good quality and affordable public transport, they are said to suffer from 'transport poverty'.

A report by the Inter-Departmental Working Group on Rural Transport in the Republic of Ireland found that 'a number of clearly identifiable rural sub-groups emerge as having consistently greater rural transport problems than the average'.¹³ These groups are older people (especially older women), people who are ill or who have disabilities, people on low incomes and young people. These particular groups of people are often referred to as the 'transport poor'.¹⁴ While the report focused on rural areas, the transport poor can be found in urban areas also.

It would obviously be desirable to look at the barriers to access for the transport poor, but such fine grained information is not yet available at a small area level across Northern Ireland. The proposed public transport indicator calculates the proportion of people within a given area who live within walking distance of the nearest bus or train station. This figure is then weighted by a measure of bus/train frequency. As it stands this does not take into account certain of the transport poor, by ignoring the fact that walking distance is neither a given nor a constant for all people. The proposed car indicator equates household level car ownership with access to services for all members of the household. This is of course a rather crude assumption as

¹⁰ Social Exclusion Unit (2003) Making the Connections: Final Report on Transport and Social Exclusion.

¹¹ Draft Policy and Planning Statement 13 'Transportation and Land Use', Regional Planning and Transportation Division, DRD, December 2002.

¹² Fawcett, L. (2002) 'On the Move: Attitudes to Transport in Northern Ireland' Northern Ireland Life and Times Survey: Research Update, No.11.

¹³ See <http://www.transport.ie/upload/general/2646.pdf>

¹⁴ Fawcett, L. (2002) 'On the Move: Attitudes to Transport in Northern Ireland' Northern Ireland Life and Times Survey: Research Update, No.11.



there are obvious situations where the household car(s) are in use by one member of the household (e.g. the car is driven to work and unavailable until the person returns home in the evening), meaning the rest of the household is reliant on public transport, taxis or lifts from friends and family in order to access services. This is especially true for young people.

Quality of transport

A further issue with public transport is the frequency and timing and the impact this has on access to services. Without a car, services become inaccessible if the available public transport is limited. It is not only the number of buses or trains that run each day, but also the times that they run. If the times do not coincide with the opening hours of the services that are to be used then access is greatly reduced. Again, such data are not currently available at present.

Interface barriers

An interface is the term used to describe the common boundary between a predominantly Protestant or unionist area and a predominantly Catholic or nationalist area. Interfaces are widely recognised as a feature of urban areas across Northern Ireland, but segregation does also exist in rural communities. Interfaces vary in their form (physical barriers, 'peace-lines', a turn in the road, a local landmark, a shop etc) and visibility (they may be invisible to those unfamiliar with the area). People living in interface areas order much of their daily routine, travel patterns and social arrangements by reference to both the visible and invisible boundaries which form their conceptual and internalised social geography.¹⁵ Studies have found that interface areas tend to have few industries, business or commercial premises and few social, welfare or leisure services. This all impacts on access to services as there are either no nearby services, or even if the nearest service is very close, it may be that it is located in a 'no-go' area.

Although in an ideal world it would be good to take the sectarian nature of Northern Ireland into consideration in this domain, in practice it is not possible to do this for various reasons. The first and most practical of these is that 'it is difficult to be precise about the exact number of interface barriers',¹⁶ partly due to the invisibility of some, but largely because there is uncertainty about whether some barriers are one continuous or two separate boundaries. Another reason is that there is no way of knowing how many members of an interface community actually decide not to use the nearest service if it is in the wrong territory and regularly make a longer journey to a 'safe' service. This also raises questions relating to personal preferences; do people always use the services that are the most proximate or do they prefer a more distant

¹⁵ 'Managing Disorder - Responding to Interface Violence in North Belfast' OFMDFM website: <http://www.research.ofmdfmi.gov.uk/managingdisorder/interfaces.htm>

¹⁶ The OFMDFM report refers to North Belfast but the situation is similar across Northern Ireland.



service for whatever reason. Schools would be a good example here, as very often parents do not send their child to the nearest school, perhaps preferring a school with a better reputation further away. The issue is further complicated in Northern Ireland as decisions based on religious beliefs also enter into the equation (it is for this reason that road distance to schools has not been included as an indicator in the domain, although its omission was noted repeatedly in the consultation responses).

Various studies have found that interface communities suffer from social and economic disadvantage including long term unemployment, low educational achievement and poor health, lower levels of car ownership and mobility. Interface areas are also characterised by the presence of bricked up or derelict buildings, empty or wasteland, graffiti and vandalism. All of these forms of deprivation will be picked up in other domains.

Road distance vs travel time

Another issue relating to road distances and geographical access to services are factors such as congestion and the quality of roads. As a time matrix has been provided by NISRA Geography it would be possible to look at time taken to travel to services. However, this will simply take into account road speeds on different categories of road and will not give any weighting for congestion. A further key challenge when considering travel time is that this will vary greatly at different times of the day and night.