

CROSS-BORDER HEALTH DATA: GEOGRAPHICAL CONSIDERATIONS?



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While spatial studies are only one part of a wider critical study of cross-border service planning, medical / health geographies have much to offer in terms of spatial data analysis. Based on the existing literature and developing a proposed index of well-being, a new micro-geography of potential patient demand is identified for the island of Ireland. In addition, new proposals on improved data sharing and a stronger focus on the collection of utilisation data are identified as valuable future empirical directions for applied research.

Introduction

Given the unique position of Ireland as a small island containing two jurisdictions, a question that regularly emerges in public discussion asks, *Should ambulances stop at the border?*¹ For medical / health geographers this question touches on a wide range of issues which relate directly to the geographical, if not the political or structural, unity of the island of Ireland. On one level this is quite a simple question - might health-care be provided more efficiently if we had well-developed, all-island services? In trying to model and understand this question, geography has a part to play in any meaningful research-policy interaction grounded in political and operational realities. At the heart of any good policy work is good evidence. To truly develop this idea, geographical evidence with a spatial dimension or tag is central, especially in trying to identify relationships between health-care planning, policy proposals and potential

outcomes. Examples include earlier research which tried to model how proposals associated with the 2003 *Hanly Report* on the re-configuration of hospitals in the Republic of Ireland (heretofore referred to as Ireland) might play out spatially (Kalogirou and Foley, 2006; Teljeur et al., 2004; DOHC, 2003). More recently, the *Compton Review* of 2011, a broadly similar Northern Ireland proposal on the centralisation of services into bigger regional hospitals has much in common with Hanly (Department of Health, Social Services and Public Security, 2011). Indeed, since the initial launch of the *Hanly Report*, deemed at the time to be unworkable, there has been a creeping policy of closure of smaller hospital services, especially in border settings such as Monaghan and Dundalk. Local campaigns often frame such perceived down-grading of services in explicitly geographical terms linked to distance and access (see Figure 1). Such developments in the South are at times referred to as “Hanly-by-Stealth” (Burke, 2009) and, given the identification of Daisy Hill Hospital in Newry as a potential target for service down-grading, shows that a lack of consultation and policy alignment across both jurisdictions has the potential to deepen the problem and create forms of service-ghettos (D’Arcy, 2012; Dear and Wolch, 1992).

At the same time and at another level, a number of policy proposals on both sides of the Border flag up the increasing attention being given to primary care and ‘primary-led’ systems (Health Service Executive (HSE), 2012; Department of Health, Social Services and Public Security, 2011; Nolan and Nolan, 2004). The development of new primary-secondary interactions in terms of service provision and delivery opens up some intriguing geographical possibilities.

Figure 1: Campaign Placards outside Roscommon County Hospital, September 2012.



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Coming from a geographical background I have a particular interest in accessibility and the differing relationships between service supply / provision and patient need / demand, all ultimately focused on a sense of spatial equity (Burke and Pentony, 2011; Layte and Nolan, 2004). But this paper is not a completely blind advocacy for all things geographical and, in practical and political terms it is important to discuss how and where geography has a role – but also tease out the critical limitations of a *purely* spatial approach, especially on an island where decisions about service location are perceived to remain deeply political. The paper will discuss some examples of how and where spatial data can be used, and conclude with some suggestions as to how a more nuanced and relevant spatial modelling might be achieved across the island.

Medical / Health Geographies

Geographers interested in medical geography traditionally worked in two areas, epidemiology and health-care planning. The latter took a relatively quantitative approach to service mapping and location planning at a time when computing was in its infancy (Brown et al., 2010). Much of this work was concerned with the mapping of service volumes to compare inequalities between different areas, i.e.

rural versus urban as well as the identification of 'optimal' service locations (Gattrell and Elliott, 2009). Another key theme was modelling accessibility and utilisation, where distance, service location and the distribution of patient need and indeed, choice, were significant components (Morrissey et al., 2008; Schuurman et al., 2006; Damiani et al., 2005). More recently, there have been two developments of note in the area of health-care planning. The first of these has been the development of the increasingly valuable technology of GIS (Geographical Information Systems) and linked to that, a recognition of the increased power and value of *digital* spatial data. Work by Gleeson et al. (2008) looked at how comparative census data could be used across a range of subject areas, including health, for both parts of the island. In the South, the HSE has developed an *All-Ireland Health Atlas* driven by increasing expectations of information on service location to be made available in a spatial form. This is embedded into their website - <http://www.hse.ie/eng/services/maps/> - and lists service locations and contact details for public searches. In the North the Department of Health, Social Services and Public Security (DOHSSPS) does not provide such an immediately spatial interface, though spatial data are used to inform policy.

As a second development, geographers now utilise a more hybrid medical / health geography where qualitative aspects of political structures and human agency are recognised as equally valid dimensions (alongside clinical practice) affecting the delivery of health-care. One example would be research focused on the factors which shape cross-border patient mobility (Migge and Gilmartin, 2011; Glinos et al, 2010). This is especially apposite along the Irish Border where flows in both directions occur in terms of informal utilisations of health-care that Glinos notes may be caused by factors including access to health cover availability, affordability, familiarity and perceived quality (Glinos et al., 2010). In trying to understand all forms of contemporary health-care, one needs to consider both spatial and aspatial data; the former inspired by increasingly accurate locational data on patients, services

and routes, the latter informed by more structural dimensions of income, choice, inclusion and patient perspectives (Sofianopoulou et al., 2012). However, as will be discussed later, awareness of and access to improved spatial information to inform policy and planning are two quite different things.

Recent Geographical Research on Cross-Border Health-Care

As examples of research which support cross-border health-care planning, the All-Island Research Observatory (AIRO), the Centre for Health Informatics (CHG) and the National Centre for Geocomputation (NCG) – all based at NUI Maynooth – and the Centre for Cross-Border Studies have been engaged in a

number of projects over the years which are briefly illustrated here to show different ways in which modelling provides outcomes which might not otherwise be evident. Table 1 shows one example of work which looks at using the power of GIS to overlay and extract information on the relative spread / provision of services and model distances to services across the whole island of Ireland. The location quotient² approach suggested that Belfast stood up very well compared to the rest of the island, while it was also possible to map travel-time to services and to begin to posit the geographical impact of the Border in Inishowen and parts of Mid-Ulster in reshaping natural catchments and flows.

Table 1: Location Quotients for Hospital Bed Provision

Region	Population 2006	No. of Hospital Beds, 2005	Beds per 100k, 2005-06 (LQ)
Belfast NI	267374	1986	742.78
Border	468375	1373	293.14
Dublin	1187176	3534	297.68
East of NI	420874	1392	330.74
Mid East	475360	335	70.47
Mid West	361028	679	188.07
Midlands	251664	536	212.98
North of NI	283866	1026	361.44
Outer Belfast NI	378162	1024	270.78
South East	460838	1188	257.79
South West	621130	1561	251.32
West	414277	1318	318.14
West and South of NI	391343	864	220.78
ALL NI	1741619	6292	361.27
ALL ROI	4239848	10524	248.22
ALL ISLAND	5981467	16816	281.14

Source: Foley et al., 2008

More recently, an intriguing map was published on the Guardian Website³ which collected and mapped an enormous amount of individual data at postcode district scale to model travel-times to emergency services in Northern Ireland (Torney and Evans, 2012). The data was based on individual data on over 215,359 emergency phone calls made to the Northern Ireland Ambulance Service (NIAS) in 2010-11 and mapped in relation to the working targets that 72.5% of Category A (life-threatening) calls should be responded to in eight minutes. Only 1% were over this number but there were some serious disparities in response times between urban and rural districts, where slower average response times were recorded. Though the results are limited in one sense, the raw data underneath has enormous potential in terms of the processing of large volumes of spatial information. As another example, mapping accessibility in traditional distance terms can be nuanced by overlaying proxy maps of choice based on waiting list time and public / private bed availability to produce unexpected outcomes (Damiani et al., 2005). In a case study of England and Wales, the assumed wealthy and accessible 'Home Counties' region emerged as quite 'low-access' when choice was factored into the equation. In addition, specific cross-border work by McQuillan and Sargent (2012) identified a range of spatial factors such as critical mass, support service distributions, waiting-list times and willingness to travel in their study of the potential for cross-border service development while also identifying the lack of political will and the absence of a strategic imperative as key additional barriers.

Issues and Problems

There are a number of reasons, therefore, why there is a real challenge for effective cooperation in cross-border healthcare provision. Those challenges come in two forms when one thinks about how spatial information can be used to inform policy and planning, as well as for operational and monitoring purposes. There is sometimes a tension between these two needs. Gathering information on population needs in terms of drafting policy may often be weighed-up against the availability

and allocation of resources. Where high-levels of potential demand may be identified, the ability to respond to this demand may remain unmet in service delivery terms, due to the shrinking resource-base available to the service provider. At times, detailed evidence may be quite intimidating and throw a sharp focus on the gap between need and provision.

At the heart of all of this geographical work, issues of compatibility of spatial information expresses itself in ways which present both problems and possibilities. The spatial units used, both North and South, do not match in terms of patient sub-population work, though 2011 Census changes in the South help. From mid-2012, new data emerged at Small Area (SA) level which has aggregations of populations of around 250-300 people. This is broadly in line with the Output Area (OA) scale used in Northern Ireland and should overcome many of the comparison problems noted in the past (Gleeson et al., 2008). The routine tagging of health information with some sort of locational identifier is another. This is less a problem in the 'postcoded North' but remains an issue in the more complex addressing used in the South. For modelling and accessibility work, the location of services, the transport routes providing access to those services, and the geographical distribution of potential demand populations all form the basis of such work. But accessibility and utilisation have a co-dependent relationship and it is much easier to access the former than the latter in both jurisdictions. Yet to properly model actual or potential demand in any meaningfully predictive way, we need much better information on patterns of utilisation, and on where patients are actually coming from. That's one set of geographical issues, but there is of course a whole other level of non- or aspatial aspects which shape accessibility to, and utilisation of, health-care services. As anyone knows, information, and increasingly spatial information, is power and there are issues of access which relate to the willingness of data holders to provide it. Some of this is clinically sound, framed by considerations of privacy and ethics.

Health services are also deeply embedded in politics and in public debates; evidence to support different political positionalities is highly desirable. For service providers, this leads to a certain unwillingness to either provide evidence which may be used and interpreted (or misinterpreted) to make political points. One example was research on a Health Research Board (HRB) funded project in the South, based on the development of a full Resource Allocation Model⁴ for the country. By the end of the project, the scale of the work had been much-reduced, focused solely on the primary and community care level, aggregated to local health office (LHO) scale. The work was never published as the provision of financial information, central to a full working out of the geography of health funding, was not made available on the grounds of 'sensitivity'. The data for the study of emergency-call response times (Torney and Evans, 2012) is interesting in that the raw data was provided to the journalist authors using an FOI (Freedom of Information) request. FOI requests are often seen as a "last port-of-call" in a search for information, and for honest cooperation the use of FOI does not seem to be a productive way forward, being seen perhaps as a confrontational tool from both sides of the spatial divide (data-holder and data-user), tinged always with a seed of suspicion.

Other aspatial aspects also frame discussions on North-South services with a concern, especially in the North, as to who a 'core constituency' is. Despite a willingness to help out and co-operate across the Irish Border there is a political sensitivity around prioritisation that has emerged to limit the reality of that commitment. Finding the answer to that is a much deeper issue but it shows that no matter how detailed the spatial information, there are whole networks of non-spatial elements that also matter. These include structural aspects of health-care systems such as financial supports, equity, access and political will, all working with and against professional and institutional powers. This structural debate is evident in policy and the spatial location of services. Everyone knows that no matter how much political agreement there is on the location of a new

service, the minute someone writes down "where" on a piece of paper, all hell breaks loose. Recent discussions on the locations of the new hospital in Enniskillen and the ongoing debates about the siting of a new National Children's Hospital in Dublin bear testimony to this concern (Murphy and Killen, 2007). Finally, much research takes place using publicly available data. Yet both health-care systems, North and South, have substantial and increasing private health-care sectors, from whom little or no data is forthcoming. Without this, one is never ever capable of modelling a health-care system fully or properly. Given political shifts towards neo-liberal agendas on both sides of the Border, this is an important discussion for a full-system perspective in future.

Case Study of Cross-Border Measures of Well-being for Potential Use in Policy and Planning

As an example of how spatial data can be used in health-care planning and to assist in future cross-border mapping of health-care demand, a new Index of Well-Being is under development in NUI Maynooth, based on questions on self-reported health asked in the most recent 2011 censuses held in both jurisdictions. While awaiting the release of the Scottish data, all of the different census collection agencies have now standardised to a 5 point scale as opposed to the 3-point scale (Good-Fair-Not Fair) used across the UK in 2001. The question was not asked in Ireland prior to 2011, yet the response to the question in the South is interesting when compared to results from the other parts of the British Isles. We see that the percentage of people in very good and good health in Ireland, at over 88%, is above that observed in Northern Ireland and England and Wales, where it averages around 80% (see Table 2). At the other end of the scale, the percentage of people recording bad or very bad health is quite consistent between England and Wales and Northern Ireland, at 5.6% which is considerably higher than in Ireland where only 1.52% of respondents self-identify in this category.

Table 2: Comparative Data from National Census General Health Surveys

General Health Question in Census	2001/2	2011
	%	%
Rep. of Ireland*		
Very Good/Good	No question	88.28
Fair	No question	8.02
Bad/Very Bad	No question	1.52
Northern Ireland		
Very Good/Good	70	79.51
Fair	19.34	14.85
Bad/Very Bad	10.66	5.64
Scotland		
Good	67.91	n/a
Fair	21.94	n/a
Not Good	10.15	n/a
England & Wales		
Very Good/Good	68.55	81.2
Fair	22.23	13.2
Bad/Very Bad	9.22	5.6
	3 point (Good-Fair-Not Good)	5 point scale (VG-G-F-B-VB)

Sources: CSO, 2002/2012; NISRA, 2002; ONS, 2002; GRO Scotland, 2002

To look more closely at the geography of this new variable, we consider that mapping the self-reported health question from the 2011 Census has serious value as a predictor of health-care demand, and for input into service planning. The detailed geographical data for the U.K. will not be available until Summer 2013 but we have produced an adjusted score for Northern Ireland for 2001 to look at geographical variations. However, once the detailed data is available, we will be able to calculate a standard score across all jurisdictions. We would be at pains to acknowledge the arbitrary nature of such a self-

reported question, and the fact that it's a 'felt' rather than clinically measured response. In this sense, it can be more usefully referred to as a measure of well-being as much as health. Nonetheless, the indicator has worked reasonably well in the other countries, and has been shown to have a good relationship with equivalent measures (Drever et al., 2004). Drawing on models used in the calculation of poverty / deprivation, we have been developing a new score based on the self-reported health questions in the 2011 Census (NISRA, 2011; Haase and Foley, 2008; Haase and Pratschke, 2005). We have designed a very basic but promising metric called the *Kavanagh-Foley Index of Well-Being* (KFIW). It has been calculated at a range of levels from State down through local authority to smaller units such as the new small areas. It calculates an overall weighted score based on the levels of self-reported health in each area and some example summaries are listed below. In addition, we adopted the method to calculate roughly equivalent scores for Northern Ireland districts for 2001 and also mapped these.

Ireland's score is calculated on the basis of calculating the % of each area by their self-identified health and adding all values together. The final KFIW score is achieved by weighting the percentage for 'very good' by 1, the percentage for 'good' by 2 etc., through to weighting the percentage for 'very bad' by 5. This ends up by balancing out the scores across all responses but giving a higher level of impact, in poor health terms, to the 'very bad' and 'bad' responses. It also identifies variation from the national average across scales, though we have found relatively consistent means for scale across both jurisdictions. The calculation for Northern Ireland in 2001, where only three categories were used, follows the same broad principle but weights Good by 1, Fair by 2 and Not Good by 4 (as a compromise between the higher scores in the South). Table 3 lists the KFIW scores at local authority / district scale.

Table 3: Kavanagh-Foley Index of Well-Being (KFIW): Scores for Local Authorities and District Councils

Local Authorities in the Republic of Ireland: Health Status in 2011 (% of respondents)

	Very Good	Good	Fair	Bad	Very Bad	KFIW Score
Dún Laoghaire-Rathdown	66.7	25.5	6.5	1.0	0.2	142.55
Fingal	65.6	27.2	6.0	1.0	0.2	142.89
Meath	65.1	27.2	6.5	0.9	0.2	143.93
Cork County	65.0	27.0	6.9	0.9	0.2	144.38
Kildare	64.9	27.1	6.7	1.1	0.2	144.62
Wicklow	64.2	27.1	7.5	1.1	0.2	146.16
South Dublin	63.3	27.9	7.3	1.2	0.3	147.2
Waterford Co.	63.1	27.8	7.9	1.1	0.2	147.51
Kilkenny	62.9	27.8	7.9	1.2	0.3	148.09
Cavan	62.9	27.4	8.4	1.1	0.2	148.39
Limerick Co.	62.0	28.9	7.8	1.1	0.2	148.72
Laois	61.6	28.8	8.1	1.2	0.3	149.86
State	61.7	28.6	8.2	1.3	0.3	149.92
Galway City	60.6	30.1	7.7	1.3	0.3	150.38
Galway Co.	61.1	29.0	8.5	1.2	0.3	150.66
Wexford	61.2	28.5	8.6	1.4	0.3	150.98
Monaghan	61.0	28.5	9.2	1.1	0.2	151.04
Louth	61.2	28.3	8.7	1.4	0.3	151.23
Clare	60.1	30.1	8.3	1.3	0.3	151.53
Westmeath	60.5	29.4	8.5	1.3	0.3	151.63
Kerry	59.5	30.3	8.8	1.2	0.3	152.46
N. Tipperary	59.9	29.5	9.1	1.3	0.3	152.63
Offaly	59.9	29.6	8.8	1.4	0.3	152.66
Carlow	59.6	29.7	9.0	1.4	0.3	152.88
Sligo	59.0	29.7	9.6	1.4	0.3	154.28
Leitrim	58.3	30.4	9.8	1.2	0.2	154.59
S. Tipperary	58.7	30.1	9.5	1.5	0.3	154.7
Dublin City	59.1	29.5	9.3	1.7	0.4	154.77
Waterford City	58.5	30.3	9.2	1.7	0.3	154.97
Donegal	58.8	29.4	10.1	1.5	0.3	155.15
Roscommon	58.5	29.7	10.0	1.5	0.3	155.44
Longford	58.0	30.3	10.0	1.5	0.3	155.95

Local Authorities in the Republic of Ireland: Health Status in 2011 (% of respondents) *continued*

Mayo	56.6	31.2	10.3	1.5	0.4	157.82
Cork City	56.7	30.5	10.6	1.8	0.4	158.73
Limerick City	53.4	32.4	11.6	2.2	0.5	164.03

District Councils in Northern Ireland: Health Status in 2011 (% of respondents)

	Good	Fairly Good	Not Good	KFIW Score
Ballymena	72.6	19.2	8.2	143.72
Antrim	72.8	18.6	8.7	144.51
Fermanagh	72.2	19.3	8.5	144.77
Coleraine	71.5	19.9	8.6	145.62
Banbridge	71.9	19.2	8.9	145.86
Limavady	72.3	18.5	9.2	146.11
Down	72.1	18.7	9.2	146.23
Armagh	71.6	19.2	9.2	146.83
North Down	71.2	19.7	9.1	146.90
Magherafelt	71.3	19.5	9.1	146.94
Lisburn	72.0	18.4	9.7	147.41
Ballymoney	70.9	19.9	9.2	147.45
Omagh	71.4	18.7	10.0	148.55
Newry & Mourne	71.8	17.9	10.3	148.69
Larne	70.5	19.9	9.6	148.79
Carrickfergus	70.4	19.6	10.1	149.75
Moyle	69.4	20.8	9.8	150.14
Dungannon	70.1	19.8	10.1	150.23
Ards	69.7	20.2	10.0	150.27
Newtownabbey	70.1	19.5	10.4	150.67
Castlereagh	69.9	19.8	10.3	150.72
State	70.0	19.3	10.7	151.32
Derry	69.8	18.2	12.0	154.16
Cookstown	68.6	20.1	11.4	154.17
Craigavon	68.3	20.0	11.7	155.23
Strabane	67.0	20.2	12.7	158.46
Belfast	65.8	19.9	14.4	162.99

Sources: CSO, 2012; NISRA, 2002.

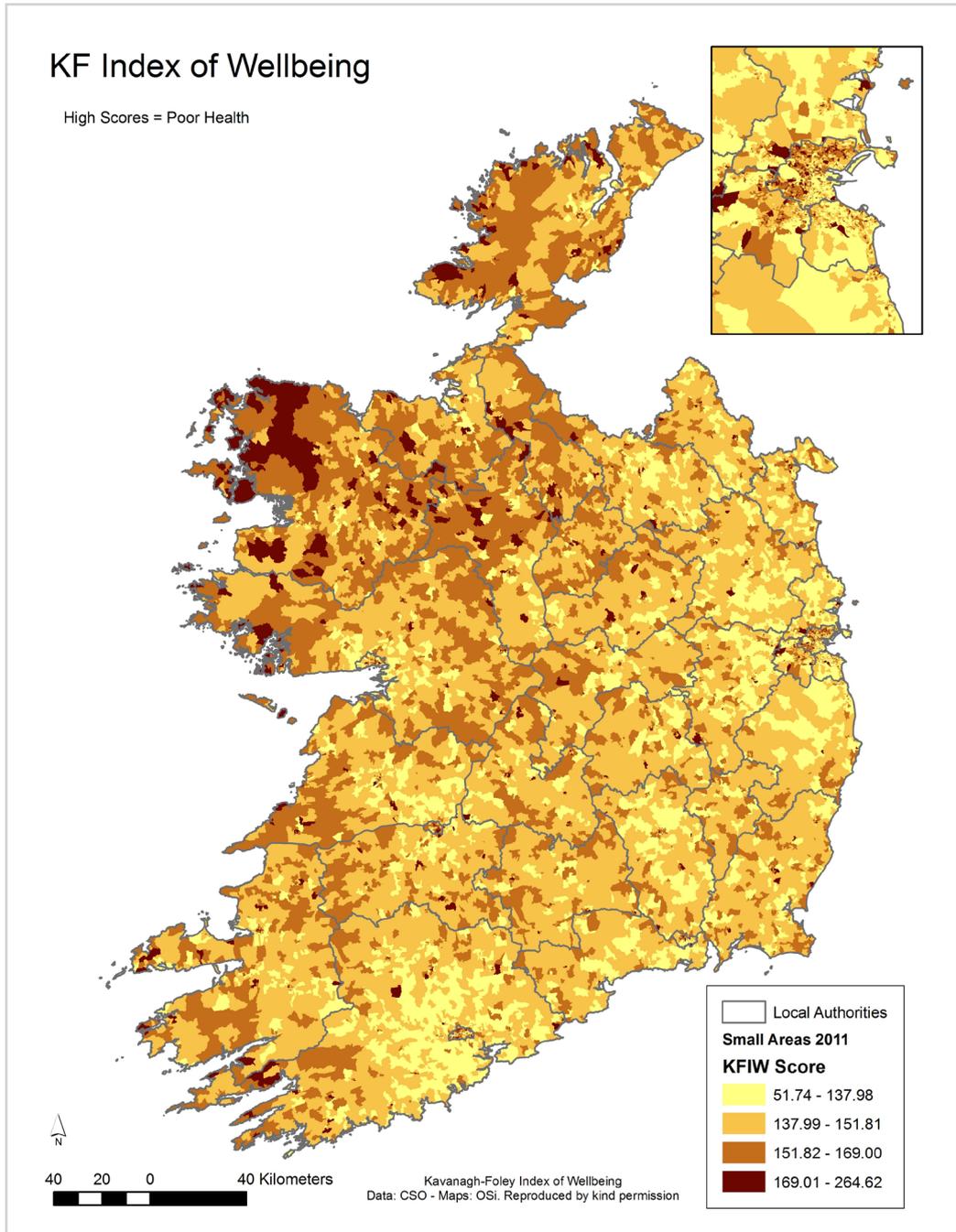
The national average at this local authority scale is 149.92 for Ireland and 151.32 for Northern Ireland. The score is ordered from low to high, where the lowest score indicates the areas with the highest levels of well-being. The areas with the highest score and, therefore, with the lowest levels of well-being, are Limerick City (164.03) and Belfast (162.99). At the other end of the scale, the districts with the lowest score and by extension, the most healthy, are Dún Laoghaire-Rathdown (142.55) and Ballymena (143.72). Looking at other local authorities with high KFIW scores, we can see a good mix of urban and rural areas which makes sense in terms of extremes of urban and rural poverty, though the bias seems to be more urban in the North. By comparison, Galway City fares better than the other urban areas, while the bulk of the authorities in the lower KFIW categories seem to be the suburban and urban region counties around Dublin, Cork and Belfast which typically have younger and relatively affluent age-income profiles. KFIW scores have been calculated at Electoral Division (ED)/Ward and OA/SA scales as well and the comparative maps for the latter scale are shown in Figure 2a and Figure 2b.

In the longer term it will be a very interesting process to see how robust this measure is in relation to other associated measures of poverty and deprivation. At these scales the expected increase in the ranges of results tends to pick up the pockets of 'poor health / well-being' one might expect to find in urban areas but also identifiable in rural areas. At ED/Ward level, the areas with the lowest scores include affluent suburbs like Malone and Stranmillis in Belfast and places like Clonskeagh-Milltown in Dublin, all also associated with nearby third-level institutions. But there are also a number of random rural EDs in Meath, Cork and Kilkenny which also record high-levels of well-being so the pattern needs further scrutiny. At the other end of the scale, urban areas like Fair Hill and Gurranabraher (Cork) and St. Johns B (Limerick) along with Shankill, Crumlin and New Lodge in Belfast emerge as having the lowest levels of well-being; yet some of the very rural parts of North West Mayo also record some of the lowest levels of well-being showing it does pick up

elements of rural ill-health as well. When mapped at SA level, we can identify pockets of poor health in affluent counties like Dún-Laoghaire Rathdown and Fingal which only emerge from this more fine-scaled geographical analysis. Figure 2(a and b) shows the mapped KFIW scores at SA level in the South and OA level in the North which highlights the wide inequalities apparent at this 'neighbourhood' scale.

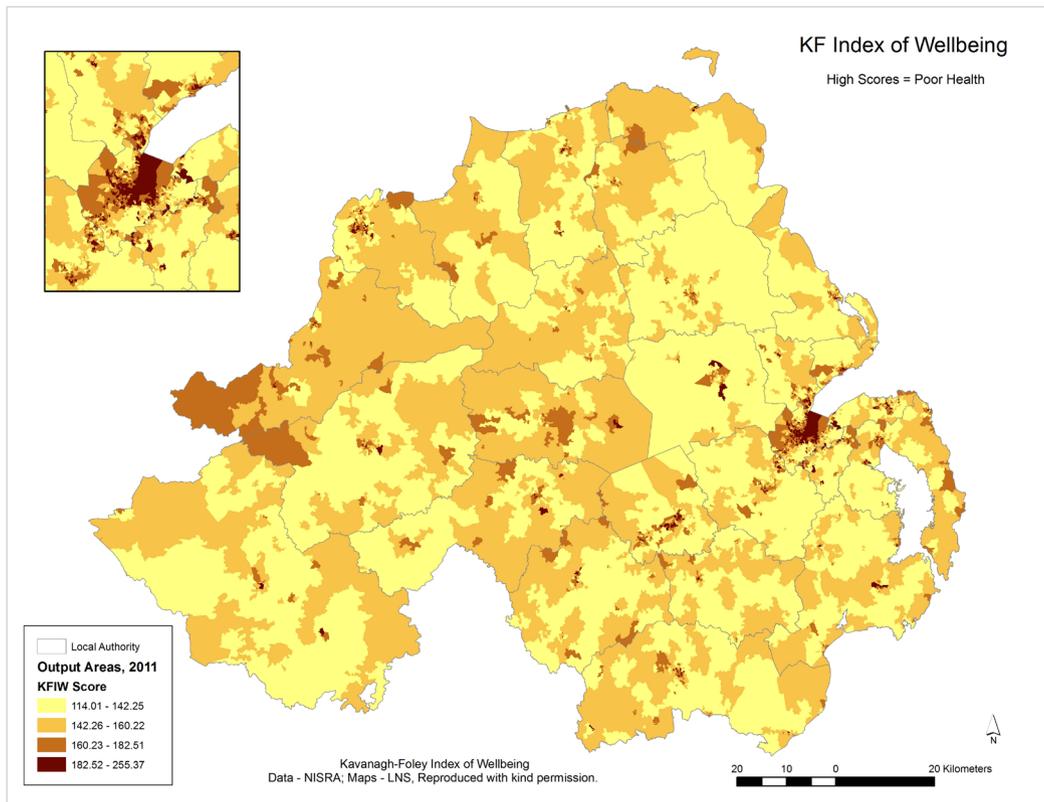
As the Central Statistics Office identify in their preliminary reporting (CSO, 2012), it is possible to map the rates of good and poor health by local authority and county across Ireland but with some important caveats at this early stage. Clearly counties with significantly older populations come out with poorer health status so to get a more accurate measure, it will be necessary to perform age-standardisation adjustments to take this into account. In addition, it is also clear that, in general, urban areas have lower levels of very good health than some of the 'younger' counties in their hinterlands. Having this information makes it possible, for example, to compare with other regularly used indicators of mortality and morbidity, though few of these are available at any meaningful spatial scale. Figure 3 shows a basic charting of the relationship between the KFIW score and unemployment rates at ED level in the South, and suggests there is a linear relationship.

Figure 2a: The KF Index of Well-being for Ireland, 2011



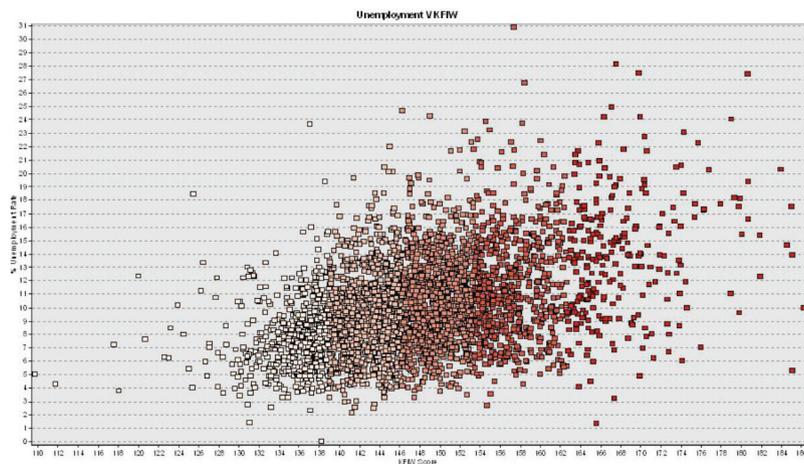
Source: Kavanagh & Foley, 2012; Data - CSO with maps by OSI

Figure 2b: The KF Index of Well-being for Northern Ireland, 2001



Source: Kavanagh & Foley, 2012; Data from NISRA and maps by LNS

Figure 3: Scatter Chart of KFIW Score against Unemployment Rate at ED level, ROI, 2011.



Source: CSO, 2012

Discussion and Ways Forward

In drawing from some empirical research, it is plausible to suggest that geography matters in terms of mapping potential patterns of service use, service supply and the modelling of different scenarios to inform the development of more equitable systems in the future. Given the ongoing financial and structural difficulties faced by the National Health Service (NHS) in the North and the HSE in the South, an island with around six million people running two quite different systems seems like something that might benefit from closer strategic thinking. The potential to combine data from both jurisdictions within a modelling tool like GIS, as demonstrated in the case study above, is also considerable. But it is important to admit that geography is only ever part of a fuller story which also contains many aspatial dimensions that are often more important (though some of these too have geographies). In seeing the bottom line as providing as good a health-care system as possible for citizens on the island of Ireland, then developing common evidence bases is a starting point. In addition, perhaps we need to show the 'added value' of cross-border work rather than assume it's a good thing. Individual citizens on both sides of the Border tend to be quite locally focused so that internal inequalities are a sensitive issue. Adding a cross-border dimension is seen by many as a step too far and these public perceptions on equity often emerge in quite different ways from the views of service or financial planners. In finding the balance between good quality spatial evidence and the realistic and astute use of that evidence, the argument as to why ambulances shouldn't stop at the Border can be more effectively made.

In moving the discussion forward I suggest four recommendations to develop a research agenda around improved spatial data awareness as follows:

- A better harmonisation of health information at spatial and temporal scales would be extremely helpful. There are increasing possibilities with spatially-tagged information especially as both jurisdictions use a common referencing system.

In addition, the introduction of the new small area unit in the 2011 Ireland Census makes a statistically sounder comparison with Northern Ireland data much more feasible.

- A more detailed collection of health-related spatial information, especially in mapping more grounded patterns of utilisation is a key gap and one which should be addressed at official levels, in terms of consistent tagging of patient records etc. In much of the U.K. for example, the measurement of deprivation is slowly shifting its 'spatial data base' from the infrequently collected census to more regular and routine datasets such as claimant data and social benefits payments. The collection and use of such data in the South is being tentatively explored though the AIRO website (www.airo.ie) and it will be instructive to see how much the potential of routinely-collected spatial data may filter into administrative work in health and social care settings in the South.

- A funded project on the mapping of cross-border patient mobility. This would gather real information about cross-border markets in social and health-care, in which location-as-postcode becomes a central tool. This would also enable researchers to turn anecdotal information on informal economies into some serious evidence. This could be both spatial and aspatial but would reflect on these permeable geographies of provision. It raises the question, quite relevant in cross-border work, as to whether permeability is necessarily a bad thing, or is it something we should accept and manage?

- Given the increasing blurring of relationships between primary, acute and what one might term short-term secondary care, it would be very useful to map out these relationships and provide a more geographical understanding of networks of referral and treatment including day-cases. An ongoing project the CHG are involved in is working with a wide range of

scientists in NUI Maynooth, Dublin City University and the Royal College of Surgeons Ireland on a range of diabetes-related problems in which the geographical work on modelling potential demand is informed by data collected by hospital clinicians along with the choice and availability of a range of services. There is a real value here in incorporating a more joined-up form of thinking across a full pathway, from pure science to clinical biomedical work and on to public health interventions. The reality of diabetes as a human disease leading to considerable demands on health and social care services on both sides of the Border acts as a valuable and realistic example from which future public health planning can potentially learn.

Dr Ronan Foley lectures at NUI Maynooth and teaches courses on GIS and Medical / Health Geographies. He has a particular interest in GIS and its applicability within health and social care settings. He has a PhD from the University of Brighton and received earlier degrees / diplomas from University College Cork (UCC), and the University of Wales, Aberystwyth. At NUI Maynooth, he is a Research Associate of the National Institute for Regional and Spatial Analysis (NIRSA), the National Centre for Geocomputation (NCG), the Centre for Health Geoinformatics (CHG) and the All-Island Research Observatory (AIRO). He has been involved in a diverse range of research and consultancy projects allied to health, social and economic analysis across the island of Ireland and in the U.K.

Endnotes

¹ This was the title of a joint Institute for British-Irish Studies (IBIS), International Centre for Local and Regional Development (ICLRD), and Centre for Cross Border Studies (CCBS) seminar held in Dublin in June 2012.

² A location quotient identifies an index or score for a specific location or region relative to a national average (score of 100). Scores below 100 show a lower relative position, those above 100 a higher one. For example, a location quotient of 200 would identify an area with twice the national average score.

³ <http://www.guardian.co.uk/news/datablog/2012/mar/13/emergency-services-northern-ireland>.

⁴ Resource Allocation Models are developed to allocate resources - usually financial - as equitably as possible among competing groups of people or regions, generally based on a measure of need/demand.

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