

# Spatial Trends of unpaid caregiving in Ireland

Stamatis Kalogirou<sup>1,\*</sup>, Ronan Foley<sup>2</sup>

1. NCG Affiliate, Thoukididi 20, Drama, 66100, Greece; Tel: +30 6977 476776; Email: [skalogirou@gmail.com](mailto:skalogirou@gmail.com); Web: <http://www.gisc.gr>.

2. Department of Geography, National University of Ireland Maynooth, Maynooth, Co. Kildare, Ireland, E-mail: [Ronan.Foley@nuim.ie](mailto:Ronan.Foley@nuim.ie)

## 1. Introduction

Demographic changes in Europe, otherwise known as increases in the size of the very elderly population, mean that the number and proportion of people in need of assistance with everyday activities is expected to increase considerably in coming decades. Nowadays, most of this assistance is provided by voluntary caregivers, predominantly close relatives. There is an increasing need for statutory authorities to work with and support these caregivers.

In fact, caregivers support not only elderly people but also those with a long-term illness, health problem or disability, regardless of age. The number of elderly people is predicted to increase dramatically in the future due to population ageing. Ireland has a relatively younger population compared to other western European countries due to high birth rates (CSO, 2004). However, it is important to raise these issues (of population ageing) and plan for those days when an aged society will be a fact.

We believe that there is a strong geographical element in the study of voluntary care giving. In this paper we examine the spatial distribution of unpaid care providers, the disabled and the elderly people. We aim to identify areas of high and low probability of provision of voluntary (domestic) care to the people in need. We build on past experience (Young et al., 2005; Foley, 2007) and we attempt to conduct a more advanced geographical analysis on a finer geographical scale.

## 2. Literature Review

Care provision is an important issue in Ireland and for this purpose government funds are provided by means of two schemes, Carer's Allowance (since 1990) and Carer's Benefit (since 2000). As the census question indicates, the financial aim of these schemes does not constitute paid care. Another scheme is the Respite Care Grant. Care provision in Ireland is a crucial issue. There are several social groups of carers as well as umbrella organisations such as the Care Alliance Ireland (CAI). CAI is an NGO that supports Irish carers and conducts research in care giving and issues related to carers.

There is extensive literature on social care, informal care giving and the socio-economic profile of the carers as both Young et al. (2005) and Foley (2007) indicate. There are also several geographical studies looking at those in need of care as well as the availability of care (Foley, 2002; Milligan, 2000; 2001; Power, 2005; Shaw and Dorling, 2004; Wheeler et al., 2005). Shaw and Dorling (2004) look at the relationship between the need for care (through LLTI) and the domestic as well as state-derived provision of care to discuss the high geographical association between informal care and LLTI. A report of a longitudinal study looking at the characteristics of people who provide unpaid care has been recently published by the Joseph Rowntree Foundation (Young et al., 2006).

### 3. Methodology and Data

The main source of information is the 2002 Census for Population in Ireland. We use data on population distribution, disability and unpaid care giving. The latter data were collected for the first time in 2002, making it possible to study in detail the geography on unpaid care giving. The census question is presented in Figure 1 (CSO, 2007). The demographic data used are at the Electoral Division (ED) geographical level.

<p><b>Question 21</b></p> <p><b>Do you provide regular unpaid personal help for a friend or family member with a long-term illness, health problem or disability?</b></p> <p>The results of question 21 will facilitate an assessment to be made of the extent to which unpaid personal help is provided by carers in our society, along with the demographic and socio-economic characteristics of the carers themselves. This question was asked for the first time in Census 2002.</p>	<p><b>21 Do you provide regular unpaid personal help for a friend or family member with a long-term illness, health problem or disability?</b></p> <p><i>Include problems which are due to old age.</i></p> <p><i>Personal help includes help with basic tasks such as feeding or dressing.</i></p>
<p><i>Some guidelines on answering question 21:</i></p> <ul style="list-style-type: none"> <li><i>The receipt of Carers Allowance or Carers Benefit is not considered payment for the purposes of this question.</i></li> <li><i>'Meals-on-wheels' staff are not considered as carers for the purposes of this question.</i></li> </ul>	<p>1 <input type="checkbox"/> Yes, 1-14 hours a week</p> <p>2 <input type="checkbox"/> Yes, 15-28 hours a week</p> <p>3 <input type="checkbox"/> Yes, 29-42 hours a week</p> <p>4 <input type="checkbox"/> Yes, 43 or more hours a week</p> <p>5 <input type="checkbox"/> No</p>

Figure 1. Census Question 21 (Source: Central Statistics Office, Ireland)

We employ Exploratory Spatial Data Analysis (ESDA) methodologies to examine the existence of spatial dependence in our data. In order to assess the degree of spatial autocorrelation, we choose to use Local Indicators of Spatial Association (LISA). One such indicator is Moran's I (Moran, 1948), for which we use the formula by Cliff and Ord (1973, 1981) as shown in Equation 1:

$$I = \frac{n \sum_i \sum_j w_{ij} z_i z_j}{M \sum_{i=1}^n z_i^2} \quad (1)$$

where  $n$  is the number of data points,  $z_i = x_i - \bar{x}$ ,  $\bar{x}$  is the mean value of  $x$ ,

$M = \sum_{i=1}^n \sum_{j=1}^n w_{ij}$ , and  $w_{ij}$  are the element of the matrix of spatial proximity  $M$ , which show

the degree of spatial association between the points  $i$  and  $j$ . Here we use  $w_{ij}=1$ , when  $j$  is one of the  $k$  nearest neighbours of  $i$ , and  $w_{ij}=0$  elsewhere. We use a single order Queen Contiguity weighting, which means that  $k$  varies for each data point  $i$ . Queen Contiguity includes all common points, namely boundaries and vertices, to define neighbours (Anselin, 2003b). The Moran Scatter Plot and the global value of Moran's I for the mean income analysed here are shown in Figures 2 – 5 for the four variables shown in Table 1.

The local indexes of spatial autocorrelation measure the spatial association for only a small part of the study area. Using the same matrix of spatial proximity, we calculate the values

of the local Moran's I and find them to be statistically significant at the 0.05 level. For the calculation of the above indexes (Moran's I, local Moran's I) as well as the scatterplot and the map we used the software GeoDa (Anselin, 2003a, 2004).

Variable	Nominator	Denominator
Proportion of carers providing 15 hours or more unpaid	Carers per ED	Total Population per ED
Proportion of people with long-lasting illness or disability	People with long-lasting illness or disability per ED	Total Population per ED
Ratio of people with long-lasting illness or disability divided by the number of unpaid carers	Total number of carers per ED	People with long-lasting illness or disability per ED
Ratio of people aged 75 and over years old divided by the number of unpaid carers	Total number of carers per ED	Population aged 75 and over per ED

Table 1. Study Variables

#### 4. Results and Discussion

The spatial analysis of the geographical data of the variables the proportion of carers; the proportion of people with long-lasting illness or disability; the ratio of people with long-lasting illness or disability divided by the number of unpaid carers; and the ratio of people aged 75 and over years old divided by the number of unpaid carers show that there is a positive spatial autocorrelation in the data. This suggests that there are areas formed by neighbouring EDs of high or low values.

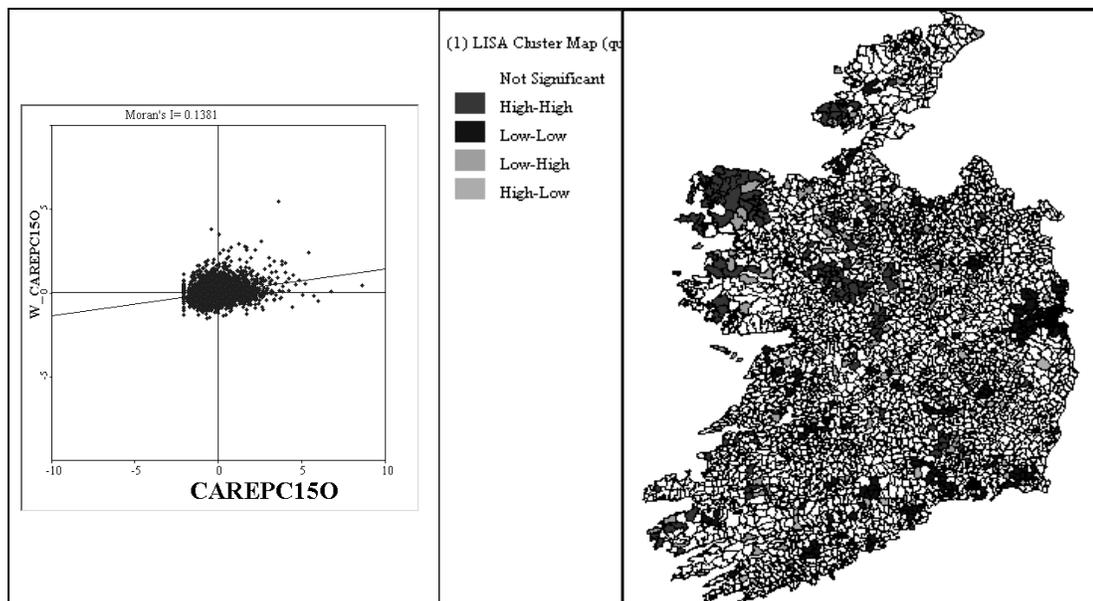


Figure 2. The Moran Scatterplot and Cluster Map for the proportion of carers providing 15 hours or more unpaid care

The Cluster Map for the proportion of carers providing 15 hours or more unpaid care is shown in Figure 2. Clusters of high proportions of carers are located mainly in Western

Ireland (Donegal, Co Mayo, parts of Co. Galway) whereas low proportions of carers are found in the East (Dublin and Kildare, Co Waterford).

Figure 3 shows the Moran Scatterplot and the Cluster Map for the proportion of people with long-lasting illness or disability. There are some outstanding spatial clusters of EDs covering large areas. Low proportions of people with long-lasting illness or disability are found in areas in the conurbations of large cities and surrounding counties (Dublin, Cork, Waterford, and Galway). In the case of Dublin, this conurbation covers three counties (Co Kildare, Co Meath and Co Wicklow). However, there are large clusters of high proportions of people with long-lasting illness or disability in inner cities (Dublin, Cork, Waterford, and Limerick) and in the North and West Ireland (Co Mayo, Co Donegal, and Co Roscommon).



Figure 3. The Moran Scatterplot and Cluster Map for the proportion of people with long-lasting illness or disability

We look at two variables we believe are more important. They are ratios of those in need divided by those providing unpaid care. Thus, the lower the value of the ratio for an ED, the higher the potential availability of care. The opposite is the case when the ratio value is high. Areas with significantly high ratio values require a closer look. In such areas there is little if any informal social support and perhaps local communities or the government should make policies to care for those in need.

Figure 4 shows the ratio of people with long-lasting illness or disability divided by the number of unpaid carers. The picture is now mixed. Several areas with high numbers of those in need are well off due to the high availability of those providing unpaid care. This is more apparent in inner cities (Dublin, Cork, Limerick, and Waterford) and the counties in the west of the country (Mayo). However, there are several areas, such as Co Wicklow and Co Cork where there is a rather low availability of unpaid care providers. The results for the ratio of people aged 75 and over years old divided by the number of unpaid carers

(map not shown) are also interesting. There is a clear inner city – suburbs divide favouring those older people living down town to have a larger pool of potential carers.

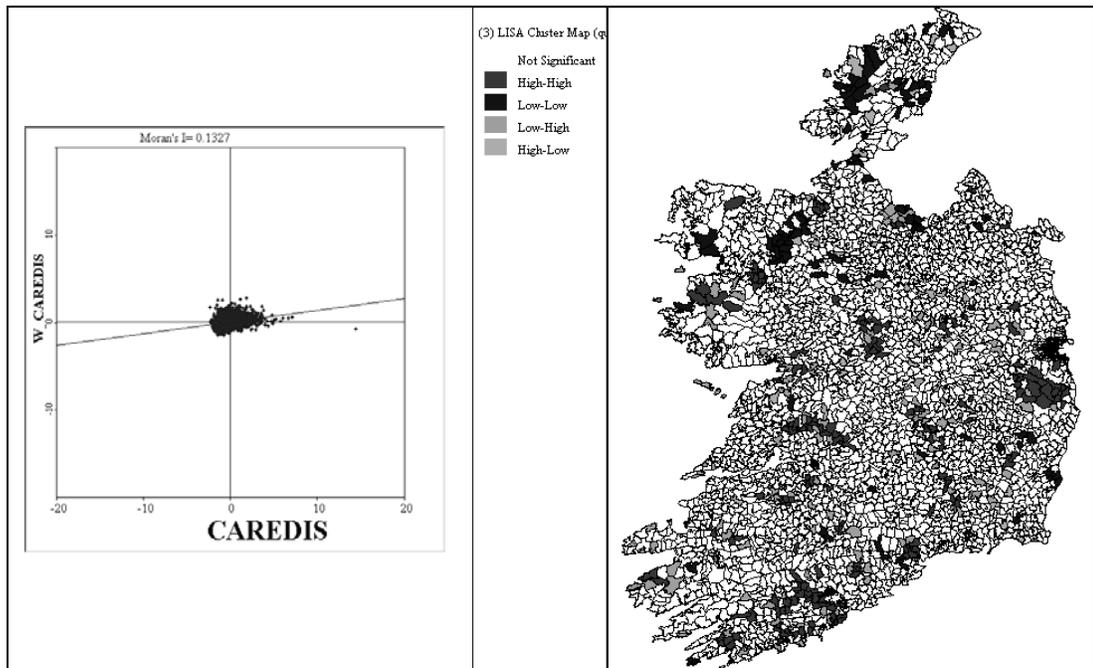


Figure 4. The Moran Scatterplot and Cluster Map for the ratio of people with long-lasting illness or disability to unpaid carers

## 5. Conclusions

The maps of carers and those in need show some interesting patterns. In many cases there is an apparent urban – rural divide and in others an east – west divide. We should look at these findings and interpret them with care. In the full version of the paper we employ other techniques, such as the Geographically Weighted Local Statistics (Fotheringham et. al., 2002). We also try to interpret our findings and link these findings with the relevant literature.

## 6. References

ANSELIN, L., 2003a, An Introduction to EDA with GeoDa, Spatial Analysis Laboratory (SAL), Department of Agricultural and Consumer Economics, University of Illinois, Urbana-Champaign, IL.

ANSELIN, L., 2003b, GeoDa 0.9 User's Guide, Spatial Analysis Laboratory (SAL). Department of Agricultural and Consumer Economics, University of Illinois, Urbana-Champaign, IL.

ANSELIN, L., 2004, GeoDa 0.95i Release Notes, Spatial Analysis Laboratory (SAL), Department of Agricultural and Consumer Economics, University of Illinois, Urbana-Champaign, IL.

CLIFF, A.D., and ORD, J.K., 1973, Spatial autocorrelation (London: Pion).

CLIFF, A.D., and ORD, J.K., 1981, Spatial processes: models and applications (London: Pion).

CSO, 2004, Central Statistics Office Ireland, Population and Labour Force Projections: 2006 – 2036 (Dublin: Stationery Office).

CSO, 2007, Census Form 2006: Question 21, Central Statistics Office Ireland, [http://www.cso.ie/census/Question21\\_000.htm](http://www.cso.ie/census/Question21_000.htm), Last accessed 2.1.2007.

FOLEY, R., 2002, Assessing the applicability of GIS in a health and social care setting: planning services for informal carers in East Sussex, England, *Social Science & Medicine*, 55, pp. 79-96.

FOLEY, R., 2007, Mapping Spatial Equity: Geographies of Informal Care in Ireland from the 2002 Census (manuscript in preparation available from the author).

FOTHERINGHAM, A.S., BRUNSDON, C., and CHARLTON, M., 2002, Geographically Weighted Regression: the analysis of spatially varying relationships (Chichester: John Wiley and Sons).

MILLIGAN, C., 2000, Bearing the burden: towards a restructured geography of caring, *Area*, 32, 1, pp. 49-58.

MILLIGAN, C., 2001, Geographies of Care: Space, Place and the Voluntary Sector (Aldershot: Ashgate).

MORAN, P.A.P., 1948, The interpretation of statistical maps, *Journal of the Royal Statistics Society, Series B (Methodological)*, 10 (2), pp. 243–251.

POWER, A. (2005) Landscapes Of Care: A Geographical Study Of Informal Care And Care Support In Ireland Using International Comparisons. Unpublished Ph.D. Thesis, National University of Ireland, Maynooth.

SHAW, M., and DORLING, D., 2004, Who cares in England and Wales? The Positive Care Law: cross-sectional study, *British Journal of General Practice*, 54, pp. 899 – 903.

WHEELER, B., SHAW, M., MITCHELL, R. and DORLING, D., 2005, Findings Report: The Relationship between Poverty, Affluence and Area (York: Joseph Rowntree Foundation).

YOUNG, H., GRUNDY, E., and KALOGIROU, S., 2005, Who Cares? Geographical Variation in Informal Caregiving in England and Wales: evidence from the 2001 Census, *Population Trends*, 120, pp. 23-34.

YOUNG, H., GRUNDY, E., and JITLAL, M., 2006, Care providers, care receivers: A longitudinal perspective (London: Joseph Rowntree Foundation).

## **Biography**

Dr Kalogirou is an affiliate of the National Centre for Geocomputation, NUI Maynooth, Ireland. He has a computing and geography background. His research areas are spatial analysis, migration modelling, population ageing and GIS. He is currently working at GeoInformation in Athens developing a geodemographic system for Greece.