The association of geographical location and neighbourhood deprivation with older people’s use of NHS Direct: a population-based study

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Abstract

Background: no research has investigated how older people’s use of NHS Direct, the 24-h telephone health advice and information service in England and Wales, varies according to geographical location and deprivation.

Objectives: to describe the geographic pattern of older people’s use of NHS Direct and examine the relationship between service use and deprivation.

Design: descriptive, exploratory, cross-sectional, population-based study.

Setting: calls to all 32-NHS Direct contact centres in England/Wales.

Participants: people aged 65 years and above who used NHS Direct between 1 December 2007 and 30 November 2008.

Results: differences in older people’s use of NHS Direct were observed in England and Wales. In England, the call rate was highest in Yorkshire and the Humber and was lowest in the West Midlands. At the postcode level, the rate of calls ranged from 0.167 (Blackburn) to 0.011 (Carlisle) per person per annum. In England, but not in Wales, the level of deprivation was associated with the rate of calls, older people living in the most deprived areas had the highest rate of calls to NHS Direct.

Conclusions: the results are useful for future planning to meet the needs of older people, and in informing national policies for the development of NHS Direct.

Keywords: older people, NHS Direct, deprivation, geography

Introduction

The increasing ageing population in the UK poses challenges to health-care providers and policy-makers. The 24-h health advice and information service, NHS Direct, was established in England and Wales in 1998 to provide advice and information on health, illness and the National Health Service to people at home and has helped to reduce demands on other NHS services, e.g. general practitioner (GP) out-of-hours services [1]. As older people rely heavily on GPs for advice on health problems and information [2–4], it is important to understand the effectiveness of NHS Direct in serving this population [5, 6]. Evidence regarding utilisation patterns in older people is required to inform these debates. Previous studies have documented NHS Direct usage based on samples of the general population [7, 8] and/or on local regions [9, 10], and examined a range of factors affecting the service use (e.g. demographics [11]; beliefs [12]; environment [13] and user satisfaction [5]). There has been, however, very little nationally representative research focusing specifically on older people’s use of NHS Direct [14] and no research has explored how service use varies geographically and relative to deprivation.

Our study examined the geographical pattern of older people’s use of NHS Direct across England and Wales and examined differences in their use according to the deprivation in their geographical area. Older people’s use of GP services has been reported to be high, particularly in deprived areas [15, 16]. To inform the development of NHS Direct, future policies and debate in health-care provision, it is important to understand how the service is used by older people and in what manner/context.
Our study provides a comprehensive analysis that examines whether geographical variations exist in older people’s use of NHS Direct and considers whether neighbourhood deprivation is associated with their use.

Methods

Study design
This is a cross-sectional, population-based study with the focus on people aged 65 and over years living in England and Wales who use NHS Direct.

Data sources
Information on older people’s utilisation of NHS Direct was obtained from the clinical records on the clinical decision support software, the clinical assessment system (CAS), used by the NHS Direct staff to handle calls. We analysed the CAS data on all calls made by, or on behalf of, people aged 65 and over years in England and Wales between 1 December 2007 and 30 November 2008 (n = 403,078) [14]. The data analysed included the age of the person about whom the call was made, the first part of the person’s home postcode (i.e. outward code; postcode district) (e.g. S1), reasons for call (e.g. falls) and outcome of calls (e.g. referral to 999). Calls with incomplete, missing or miscoded values were excluded (e.g. symptoms related to an infant) (n = 119).

Measurement of neighbourhood deprivation
The index of multiple deprivation (IMD) 2007 for England [17] and Welsh index of multiple deprivation (WIMD) 2008 [18] were used to measure the level of deprivation of the postcode district within which each caller was living, as these were the most up-to-date data at the time of analysis and correspond with the year of the data collected. The IMD and WIMD are recent composite indices, each comprising several distinct domains of deprivation with an associated weight. Because the IMD and WIMD were constructed slightly differently (i.e. domains, weights, data sources), separate analyses were conducted for England and Wales, based on the person’s home postcode.

The IMD and WIMD were produced separately by the Office for National Statistics and the Welsh Assembly Government at Lower Super Output Area level (LSOA), respectively. There were 34,378 LS0As in England and 1,896 LS0As in Wales, each having a mean of 1,500 individuals. Because an LSOA is smaller in size than a postcode district, we calculated a mean IMD and WIMD score for all the postcode districts in England (n = 1,973) and Wales (n = 181) for the purpose of this study. According to their mean IMD and WIMD score, the postcode districts in England and Wales were ranked separately and divided into deprivation quintiles, ranging from the most deprived area (quintile 5) to the most affluent area (quintile 1).

Data analysis
Call rates per person per annum were calculated for each deprivation quintile in both England and Wales using mid-2007 population estimates of older people [19].

The ArcGIS Geographic Information System (version 9.3) [20] and the digital boundary data for the 1998 English and Welsh postcode areas [21, 22] were used to map each NHS Direct call record according to their postcode districts. During the analysis, it was found that 6,788 calls did not map to a postcode district based on the 1998 postal boundary data, because the postcode district of these calls are new or were re-coded after the 1998 postal boundary data were generated (e.g. Royal Mail created new postcode to cope with increasing populations/new buildings in certain postal areas) [23]. The 1998 postcode boundary data were the latest available digital data at the time of analyses. Given that the 6,788 calls accounts for only 1.6% of the total calls (n = 402,959), this was considered to have minimal impact on the analyses, and these calls were excluded from this analysis. Overall, 396,171 calls were included in this geographic analysis. A favourable ethics opinion was obtained from South Yorkshire Research Ethics Committee; research governance approval was granted by NHS Direct.

Results
A total of 402,959 calls were made to NHS Direct by, or on behalf of, people aged 65 years and over during the 1-year study period [14]. Of these calls, 6,788 (1.6%) were excluded from this analysis due to the limitations of the postcode boundary data used, as noted above. Of the remaining 396,171 calls included in the analysis, 89.7% (n = 355,448) were concerning actual symptoms, 3.8% for dental calls (n = 15,061), 2.9% medicine enquiries (n = 11,601), 0.9% health information enquiries (n = 3,763) and 2.6% other (i.e. the calls required to be re-categorised or reprioritised by a clinical team leader) (n = 10,293). In terms of the outcome of calls, the largest category was the person being advised to see their GP, primary care service (PCS) or dentist on the same day (n = 100,694; 25.4%) and being advised to see their GP, PCS or dentist, either routinely (n = 60,341, 15.2%) or urgently (n = 58,121; 14.7%). The volume of calls being referred to 999 (emergency services, e.g. ambulance) (n = 27,190; 6.9%), A&E (accident and emergency/emergency department) (n = 21,292; 5.4%), community services (n = 7,826; 2%) and other (n = 9,830, 2.5%) was relatively small.

Geographical variations in utilisation
In terms of countries and regions, there were 373,312 calls made by, or on behalf of, older people in England 22,859 such calls in Wales. Of the nine Government Office Regions (GORs) of England, the North West (n = 53,671)
and the South East ($n = 54,533$) had the highest number of calls, and followed by Yorkshire and Humber ($n = 47,465$), London ($n = 44,005$), East of England ($n = 43,360$), South West ($n = 40,214$), East Midlands ($n = 35,340$), West Midlands ($n = 33,460$) and North East ($n = 21,267$). The pattern described for countries and regions above masks differences in call volumes that are more obvious at the postcode area level. Supplementary data available in *Age and Ageing* online, Table S1 and Figure 1a show the postcode areas ranked according to the numbers of calls made. The number of calls ranged from 12,732 (Nottingham) to 78 (London WC). There were clusters of postcode areas with very high number of calls (e.g. Midlands/Yorkshire), whereas some postcode areas had very low number of calls (e.g. London, mid Wales) (Figure 1a).

**Rate of calls per person per annum**

To offset the variation in the number of older people in the postcode areas, the volume of calls was standardised according to the population of older people. Overall, there were 0.046 calls made per person per annum (pppa) about older people living in England and Wales [14]. The call rate in England (0.046 pppa) was higher than Wales (0.043 pppa). The call rate for the regions of England varied, with the highest rate in Yorkshire and the Humber (0.057 ppa) and the lowest rate in the West Midlands (0.038 pppa). As with the patterns of call volumes, analysis at the country and regional level masks variations at the postcode area level in each region. Supplementary data available in *Age and Ageing* online, Table S1, therefore, also, show postcode areas according to the rate of calls. The rate of calls ranged from 0.167 pppa (Blackburn) to 0.011 pppa (Carlisle). Figure 1b illustrates the distribution of call rates in England and Wales, with the numbers in black colour denoting the rank of the call rate in the descending order. For England as a whole, a small cluster of postcode areas around Yorkshire and the Humber, the East Midlands and London had very high call rates (e.g. Bradford; 0.082 pppa) while those around the North West and the East of England had low call rates (e.g. Lancaster; 0.017 pppa). In Wales, two postcode areas had quite high call rates, Llandudno and Swansea, whereas the remainder had fairly low rates of calls (e.g. Shrewsbury; 0.017 pppa).

**Rate of calls per person per annum by deprivation quintiles**

The call rate in England increased with increasing deprivation (Spearman’s $\rho = 0.160$; $n = 1,972$). Supplementary data available in *Age and Ageing* online, Table S2 show the rate of calls according to the deprivation quintile in England and

![Figure 1. Distribution of the number of calls (a, left) and the call rates (b, right) by the postcode area according to quintiles. The numbers within the areas denote the overall rank of call volumes and rates (1 representing the area with the highest number of calls/rates).](https://example.com/fig1.png)
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Wales, with the highest rate in the most deprived areas (0.052 calls pppa) and the lowest rate in the least deprived areas (0.040 calls pppa). The pattern of the call rate in Wales was, however, rather different, with a less clear linear relationship between call rates and level of deprivation (Spearman’s \( r = 0.075, n = 181 \)). The highest call rate was in quintile 2 and the lowest rate in the quintile 3. The call rate in the most deprived areas (0.044 pppa) was higher than the overall average (0.042 pppa). In general, the call rates in England were higher than in Wales except for quintile 2 (areas with deprivation just lower than the middle deprivation quintile). The call rate in the most deprived areas of England (0.052 pppa) was higher than that of Wales (0.044 pppa), whereas the call rate was almost the same in the most affluent areas of both England (0.040 pppa) and Wales (0.041 pppa).

Discussion

Main findings

No previous research has examined geographic variations in older people’s use of NHS Direct. There was a substantial geographic variation in the NHS Direct use by older people in England and Wales at both the country/region level and the postcode district level during the 1-year period. Within England, clusters of postcode areas in the Yorkshire and the Humber, the East Midlands and London had higher rates of calls than those in other regions. In Wales, two postcode areas, Llandudno and Swansea, had clearly higher call rates than other areas. Older people from deprived areas made more calls than people in affluent areas, particularly in England.

Strengths and limitations of this study

Geography is a key factor for accessing health services [24], especially for vulnerable older people; this is the first study to describe the geographic pattern of older people’s use of NHS Direct across England and Wales and to examine the effect of neighbourhood deprivation on usage. The findings present an important new reference point for understanding older people’s use of the service.

One methodological difficulty in this study lies in combining different data sets that are available only at different geographic levels (e.g. NHS Direct user’s home postcode and LOSA-level deprivation indices). Because the present analyses are based on aggregated data, the grouping of small areas into larger areas (LOSA into postcode district), the postcode district figures are only estimates and this presents a limitation of these data (i.e. scale effect [25]); the results can be used to help explain older people’s use of NHS Direct and support other studies at an equal or higher aggregate level (e.g. postcode area or GORs), but it is not appropriate to draw conclusions at an individual level based on this work.

Comparison with previous studies

There have been few studies investigating neighbourhood deprivation and NHS Direct use, and most of them are limited to single regions (e.g. West Yorkshire [13]) or limited to a relatively small data set (e.g. 24,937 calls [9]; 67,091 calls [26]). The current study extends previous findings by providing a recent, complete geographic pattern of NHS Direct use in older population, based on a large population-based data set across England and Wales. The analysis adds new knowledge concerning enquiries to NHS Direct by older people in deprived and affluent areas and the patterns for which they were referred. The findings could be useful in identifying areas with higher perceived healthcare needs (e.g. in Blackburn, Huddersfield) and areas with specific needs (e.g. the most deprived areas in England, such as the postcode districts L5 (Liverpool) and E9 (London) and this information is of value in allocation of healthcare resources).

Living in a deprived area has been shown to be connected with worse health outcomes, such as higher rates of mortality [27], greater depression [28] and poorer physical function [29]. The higher use of NHS Direct in deprived areas may also indicate difficulties in accessing primary, and possibly secondary, care services; this might be modified by lower proportions of English speakers in these areas. As older people are likely to be long-term residents in an area, they may be at a higher risk of being affected by neighbourhood factors. The present findings support previous studies by showing older people living in deprived areas made more calls than those living in the most affluent areas.

Implications for future research

While a higher level of deprivation has been connected with a higher use of PCSs, at both the neighbourhood level and the individual level, NHS Direct is expected to reduce pressure on PCSs in deprived areas and to improve usage by disadvantaged groups. In the 14th year of NHS Direct operation since 1998, the results presented here show a similar pattern to that reported for previous PCSs access, with increasing area deprivation associated with increasing use.

An individual’s decision to seek medical help is affected by various factors [24]. The present study has examined the effect of geography, area deprivation on older people who use NHS Direct; further work will examine how the nature of the calls varies according to geography and deprivation. To best serve the increasing older population, further research is needed to examine the views of those who do not use the service, since willingness presents a key determinant of access. Furthermore, a better understanding of patient access is important in planning services and policy-making. The NHS reforms mean it is important to continue monitoring the geographical variation of the service usage, both in existing services and in new services, in order to improve patient access.
Major geographic differences exist in older people’s use of NHS Direct in England and Wales at both the country/region and the postcode district level. The degree of areal deprivation is clearly correlated with their usage of NHS Direct. The study findings are helpful in developing a better understanding to facilitate future planning to meet the needs of older people in specific areas and in informing debates and national policies for the development of services to meet the needs of older people.

**Key points**

- Differences in older people’s use of NHS Direct were observed in England and Wales at the region and postcode district level.
- In England, but not in Wales, there was a clear relationship between level of deprivation and older people’s use of NHS Direct.
- In England, older people living in the most deprived areas had the highest rate of calls to NHS Direct.

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**Conflicts of interest**

None declared.

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**Supplementary data**

Supplementary data mentioned in the text is available to subscribers in *Age and Ageing* online.

**References**


Guidelines for people not for diseases: the challenges of applying UK clinical guidelines to people with multimorbidity

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Abstract

Background: currently one of the major challenges facing clinical guidelines is multimorbidity. Current guidelines are not designed to consider the cumulative impact of treatment recommendations on people with several conditions, nor to allow comparison of relative benefits or risks. This is despite the fact that multimorbidity is a common phenomenon.

Objective: to examine the extent to which National Institute of Health and Clinical Excellence (NICE) guidelines address patient comorbidity, patient centred care and patient compliance to treatment recommendations.

Methods: five NICE clinical guidelines were selected for review (type-2 diabetes mellitus, secondary prevention for people with myocardial infarction, osteoarthritis, chronic obstructive pulmonary disease and depression) as these conditions are common causes of comorbidity and the guidelines had all been produced since 2007. Two authors extracted information from each full guideline and noted the extent to which the guidelines accounted for patient comorbidity, patient centred care and patient compliance. The cumulative recommended treatment, follow-up and self-care regime for two hypothetical patients were then created to illustrate the potential cumulative impact of applying single disease recommendations to people with multimorbidity.

Results: comorbidity and patient adherence were inconsistently accounted for in the guidelines, ranging from extensive discussion to none at all. Patient centred care was discussed in generic terms across the guidelines with limited disease-specific recommendations for clinicians. Explicitly following guideline recommendations for our two hypothetical patients would lead to a considerable treatment burden, even when recommendations were followed for mild to moderate conditions. In addition, the follow-up and self-care regime was complex potentially presenting problems for patient compliance.