Socio-economic determinants of casualty and NHS Direct use

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ABSTRACT

Background There is limited evidence on the social determinants of A&E use and concerns over the equity of NHS Direct utilization.

Methods We analysed data from the 2004–05 British General Household Survey, which included 20 421 participants. Logistic regression was used to examine individual casualty use in the last 3 months and household NHS Direct use in the last year.

Results Casualty use was higher for individuals living in rented accommodation or without car access, lower income groups, unskilled manual workers, current smokers and for individuals with limiting illness. In contrast, NHS Direct use was lower in households with older residents, low income, no car access and where the head of household was from a manual occupational group, a minority ethnic group or born outside the UK. The odds ratio for use of NHS Direct for households in the lowest equivalized income quintile was 0.67 (0.55–0.81). Adjustment for limiting illness increased the effect of socio-economic factors on NHS Direct use.

Conclusions Reduced access to A&E services will disproportionately affect poorer individuals, whereas increased investment in telephone services will benefit affluent populations. Current national policy may widen inequities in access to emergency care.

Introduction

Emergency care is one of the most contentious areas of NHS provision with increasing pressure for centralization of A&E services.1 Accident and emergency or casualty is the most widely used hospital service with 18 million new attendances in 2006–07, but current NHS systems or research databases do not allow a reliable description of national utilization patterns.2 Little is known about the epidemiology and determinants of A&E attendance, but available evidence suggests higher utilization in more deprived areas.3 This compares with primary care and inpatient utilization, which have been widely studied using a range of routine and research sources.4–6 These studies suggest that overall primary care and emergency inpatient utilization increase with decreasing socio-economic status, reflecting higher morbidity, but also indicate more complex variations for specific services or types of care.3–6

NHS Direct has provided emergency telephone advice nationally since 2000 and received 6.8 m calls in England in 2005–06. Early commentary on NHS Direct, including a National Audit Office report, raised concern that certain groups may be less likely to use the service despite higher need.7,8 There is some evidence from local surveys and ecological analysis on the effect of deprivation on NHS Direct use, but these do not give a clear pattern.9–12 A recent survey in a single region suggests that NHS Direct use is positively related to socio-economic position and circumstances with greatest use among the most affluent.13

National and local policy on emergency care provision needs to be guided by an understanding of utilization patterns and the impact of changes in provision on equity of access. In this paper, we present the first national description of casualty and NHS Direct use in the same population using a secondary analysis of data from the General Household Survey (GHS).

Methods

General Household Survey

The GHS is an annual survey of private households in Great Britain, which is undertaken by the Office for National Statistics to support planning by government departments and other agencies.14 The dataset for the survey is made available by the UK Data Archive to

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researchers to allow secondary analysis for specific research questions.

**Subjects**

The GHS selects households using probability stratified clustered sampling to ensure that they represent the general population. In 2004–05, 12,149 eligible households were sampled and 8,700 (71.6%) households participated. In 7,659 households, all adult members were directly interviewed with complete coverage in a further 790 households achieved through proxy interviews. In 251 households, at least one adult member was not included in the survey. This gave a household response rate of 71.6% and a complete individual response rate of 63.0%. Information on children was obtained from adults in the household. In total, 16,175 adults and 4,246 children were included in the survey.

**Main outcomes**

The GHS asked the participants about their use of health services in defined periods before the interview. All participants, including children and proxy interviewees, were asked whether they had visited a hospital casualty department as a patient in the last 3 months.

Adults who completed a direct interview were asked whether they had used NHS Direct (NHS 24 in Scotland) in the last 12 months. This question did not distinguish use for the individual interviewed or for another member of the household, including children. Therefore, NHS Direct use was analysed at household level based on whether any adult household member had used NHS Direct. Only households where information on all adult household members was available were included.

**Determinants**

The GHS asks a range of questions on individual and household circumstances including income, receipt of benefits, type of employment, tenure and access to material goods. In addition, the survey asks about individual health including whether an individual has long-standing illness, disability or infirmity, and whether this limits activity.

For household analysis, appropriate individual level variables, such as self-reported long-standing illness or smoking, were aggregated to identify households where at least one individual reported illness or smoking. For ethnicity and country of birth, the status of the household reference person (HRP) was used for analysis. The HRP is the member of the household in whose name the accommodation is owned or rented or, in the case of joint ownership, the member with the highest income.

**Statistical analyses**

All analyses were undertaken taking account of the sampling design of the study including weighting, clustering at area and household level and regional stratification using SVY commands in Stata version 9.2. Determinants of casualty and NHS Direct use were examined using logistic regression.

**Results**

**Individual casualty use**

Responses on casualty use were available for 20,106 (98.5%) individuals and 876 (4.4%, 4.1–4.7%) reported use as a patient in the last 3 months. 5.0% (4.5–5.4%) of men and 3.8% (3.4–4.2%) of women reported casualty use in the last 3 months. Casualty use was highest among children under five, teenagers and young adults, and lowest between the ages of 35 and 54.

**Household NHS Direct use**

In 7,634 (87.7%) households all adults answered the question on NHS Direct use with 1,624 households (20.7%, 19.7–21.8%) reporting use in the last year. Households, which had used NHS Direct, were more likely to have a member attend casualty (OR 2.17, 1.8–42.87).

**Determinants of casualty use**

At the individual level, after adjustment for age and sex, unskilled manual social class, living in rented accommodation, lower household income, household receipt of income support, lack of access to a car and current smoking significantly increased the likelihood of casualty use (Table 1). Long-term limiting illness was the strongest predictor of casualty use (OR 1.93, 1.60–2.32). After further adjustment for long-term illness and region, living in privately rented accommodation, lower income and smoking remained significant predictors of casualty use. The effect of other determinants was attenuated by control for long-standing and limiting illness but the trend remained for most socio-economic indicators.

**Determinants of household NHS Direct use**

NHS Direct use was higher in larger households and those with children but lower in households with older people (Table 2). After adjustment for these factors, measures of material deprivation and social status including lack of access to a car, low-equivalized household income, living in social housing, manual occupational group and receipt of
income support all significantly reduced the likelihood of NHS Direct use. In addition, NHS Direct use was markedly lower in households where the head of household was not white or born outside the UK. Long-standing and limiting illness in the household both predicted NHS Direct use. After control for household long-standing and limiting illness, the relationship between material deprivation and social status and NHS Direct use strengthened with an OR of 0.58 (0.48–0.71) for the poorest households compared with the most affluent.

Analysis of individual NHS Direct use was consistent with findings from the household level. After control for age, sex, long-standing illness and household structure,
the OR for adults living in the poorest households was 0.74 (0.61–0.90) compared with those in the most affluent.

**Discussion**

**Main findings**

We found that lower income, measures of material deprivation and lower socio-economic position were associated with higher casualty use and part of this relationship could be explained by higher levels of long-standing and limiting illness. Conversely, lower income, material deprivation and low socio-economic position were associated with low household use of NHS Direct. In addition, our findings confirm long-standing concerns that NHS Direct is markedly underused by older people, ethnic minority households and people born outside the UK. We believe that this is the first national study to report on casualty or NHS Direct use in relation to individual, rather than ecological, measures of socio-economic status. Our ability to study casualty and NHS Direct use in the same population allows the first

### Table 2 Odds ratios for household NHS Direct use in the last year

<table>
<thead>
<tr>
<th>Adjusted for</th>
<th>N</th>
<th>Adjusted for</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of persons</td>
<td>7634</td>
<td>Children, older people</td>
<td>1.27 (1.19–1.36)</td>
</tr>
<tr>
<td>Children in household</td>
<td>5618</td>
<td>older people, illness, region</td>
<td>1.24 (1.16–1.33)</td>
</tr>
<tr>
<td>None</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Under 5</td>
<td>2.58 (2.08–3.20)</td>
<td>2.83 (2.27–3.53)</td>
<td></td>
</tr>
<tr>
<td>5–15</td>
<td>1.11 (0.91–1.36)</td>
<td>1.13 (0.92–1.39)</td>
<td></td>
</tr>
<tr>
<td>Older person in household</td>
<td>1168</td>
<td>0.50 (0.41–0.62)</td>
<td>0.47 (0.38–0.58)</td>
</tr>
<tr>
<td>None</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>65–74</td>
<td>0.30 (0.23–0.39)</td>
<td>0.27 (0.21–0.35)</td>
<td></td>
</tr>
<tr>
<td>75+</td>
<td>1075</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity of HRP</td>
<td>7129</td>
<td>White</td>
<td>1.00</td>
</tr>
<tr>
<td>Asian</td>
<td>0.56 (0.38–0.81)</td>
<td>0.57 (0.38–0.85)</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.36 (0.2–10.62)</td>
<td>0.38 (0.21–0.70)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>1128</td>
<td>0.65 (0.40–1.05)</td>
<td>0.68 (0.41–1.11)</td>
</tr>
<tr>
<td>Country of birth of HRP</td>
<td>6922</td>
<td>UK</td>
<td>1.00</td>
</tr>
<tr>
<td>Non-UK</td>
<td>0.50 (0.40–0.62)</td>
<td>0.52 (0.41–0.66)</td>
<td></td>
</tr>
<tr>
<td>HRP SEG</td>
<td>460</td>
<td>Professional</td>
<td>1.00</td>
</tr>
<tr>
<td>Employer/manager</td>
<td>0.96 (0.73–1.23)</td>
<td>0.92 (0.71–1.20)</td>
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<tr>
<td>Inter-junior manager</td>
<td>2530</td>
<td>1.11 (0.87–1.42)</td>
<td>1.09 (0.85–1.39)</td>
</tr>
<tr>
<td>manager</td>
<td>1805</td>
<td>Skilled manual</td>
<td>0.89 (0.68–1.15)</td>
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<tr>
<td>Semi-skilled manual</td>
<td>0.71 (0.53–0.96)</td>
<td>0.65 (0.48–0.88)</td>
<td></td>
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<tr>
<td>Unskilled manual</td>
<td>0.71 (0.49–1.03)</td>
<td>0.62 (0.42–0.91)</td>
<td></td>
</tr>
<tr>
<td>Household</td>
<td>4160</td>
<td>Non-manual</td>
<td>1.00</td>
</tr>
<tr>
<td>Manual</td>
<td>0.77 (0.69–0.87)</td>
<td>0.72 (0.64–0.82)</td>
<td></td>
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<tr>
<td>Own or use of car</td>
<td>5649</td>
<td>Yes</td>
<td>1.00</td>
</tr>
<tr>
<td>No</td>
<td>0.66 (0.56–0.76)</td>
<td>0.64 (0.54–0.75)</td>
<td></td>
</tr>
<tr>
<td>Accommodation tenure</td>
<td>5364</td>
<td>Owner</td>
<td>1.00</td>
</tr>
<tr>
<td>Social</td>
<td>0.69 (0.59–0.81)</td>
<td>0.64 (0.55–0.76)</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>1.10 (0.93–1.33)</td>
<td>1.15 (0.96–1.38)</td>
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<tr>
<td>Household income quintile</td>
<td>1396</td>
<td>Highest</td>
<td>1.00</td>
</tr>
<tr>
<td>IV</td>
<td>1.03 (0.86–1.23)</td>
<td>0.98 (0.82–1.17)</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>0.88 (0.73–1.05)</td>
<td>0.80 (0.66–0.96)</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>0.88 (0.73–1.08)</td>
<td>0.77 (0.63–0.94)</td>
<td></td>
</tr>
<tr>
<td>Lowest</td>
<td>1415</td>
<td>0.67 (0.55–0.81)</td>
<td>0.58 (0.48–0.71)</td>
</tr>
<tr>
<td>Household income support</td>
<td>6984</td>
<td>No</td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>0.75 (0.60–0.96)</td>
<td>0.65 (0.51–0.82)</td>
<td></td>
</tr>
</tbody>
</table>

*Analysis weighted with account for clustering at postcode area.

Continued
**Limitations of this study**

Our results rely on self-reported health service utilization. It is likely that both casualty and NHS Direct use are reliably remembered by individuals, but we cannot exclude incomplete or biased recall. This is likely to be a greater problem with NHS Direct use, which required recall over a period of 1 year. However, to explain our divergent findings on socio-economic determinants, one would have to postulate a different direction of recall bias for casualty and NHS Direct use.

We adjusted for health need using self-reported, long-standing and limiting illness. This was based, a priori, on the strong association between these measures and other health service use including primary care and secondary care. We also found these measures to be strongly associated with casualty and NHS Direct use. There is concern that self-reported measures may underestimate need in more affluent populations compared with more objective measures and this could partially explain our findings. However, long-standing limiting illness is probably the best available proxy in survey data and is used in the needs element of the funding formula for primary care.15

The question on NHS Direct use in the GHS does not distinguish use for self or for others, including children. We have therefore analysed at household level rather than individual level. This does not allow for control for individual determinants of use, such as age, but we were able to control for them indirectly through household structure. Furthermore, our main measures of income, social and material statuses are appropriately measured at household level.

Our measure of service use does not capture repeated use of services by individuals and so will not equate to actual service demand. However, for examining the relationship between socio-economic factors and service use, our approach may be preferable as repeated use may capture a different aspect of need related to quality of community support and follow-up, as well as underlying health need.

**What is known already**

Our findings on NHS Direct use are consistent with a recent regional survey on NHS Direct use, which showed an inverse relationship with measures of social position and material circumstances.13 This contrasts with ecological studies, which have shown inconsistent findings with either increased use in the most deprived areas in adults but not children or have reported a complex non-linear relationship or no relationship with deprivation.9–11 All these ecological studies utilized call rates and measures of deprivation at ward level. Our divergent findings may be explained by our better measures of socio-economic status at household level or that call rates are determined by frequency of calls as well as whether the service was used by a household.

There is very limited information on the epidemiology of overall casualty use in the UK. One study has examined the epidemiology of A&E use by older people using routine data in one region.16 This reported very high utilization rates among those aged over 80, which we did not demonstrate. This may be explained by the relatively small number of participants over the age of 80 in the GHS and exclusion of older people in care homes from the sampling frame.

Most studies on socio-economic determinants of casualty use have focused on attendances for injury or childhood utilization in limited geographical areas.17–19 These studies have reported increasing utilization with increasing deprivation. Our study confirms this for all attendances and further analysis has confirmed the same pattern for adults alone. We have not been able to control for distance from A&E, which may influence A&E attendance.3 However, control for region, a possible proxy for dispersion of A&E units, did not modify our findings.

**What this study adds**

**NHS Direct**

NHS Direct provides high levels of patient satisfaction, and a large number of calls received suggests that it is popular and valued.20 However, evaluation has confirmed that its impact on demand for other emergency services is limited and it has instead increased the capacity for emergency advice provided by the NHS rather than substituting for other services.21 Our findings suggest that NHS Direct has inadvertently increased age, socio-economic and ethnic inequity in NHS provision. It is possible that NHS Direct is meeting distinct health needs, which are differently socially patterned from the needs met by existing health services. We feel this is unlikely as evidence on socio-economic variations of morbidity, accidents and self-reported health almost invariably suggests higher need in more socio-economically deprived populations.22 Our findings are consistent with the inverse care pattern described for preventative consultations in primary care.5 We were not able to examine reasons for calls to NHS Direct, but it is possible that NHS Direct is meeting the demand for reassurance or preventative advice among younger and more affluent
groups who would otherwise self-manage their concerns. This interpretation is supported by findings on satisfaction with NHS Direct.\textsuperscript{20}

Our findings may explain why NHS Direct has had a limited impact on use of other health services as the service is under utilized by groups, including older people, with the highest general practice and A&E utilization. Future development of NHS Direct needs to address these inequities. This is likely to require a more detailed understanding of the reason and social patterning of calls and an understanding of the barriers to use of NHS Direct.

Emergency care

The UK government is currently developing its strategy for urgent and emergency healthcare. This will address pressures for centralization of emergency services to meet requirements for sub-specialization and access to new technology interventions. It is likely the strategy will support centralization of major A&E services with provision of local care alternatives through emergency care networks.\textsuperscript{23}

Our findings suggest that the utilization of current A&E services does reflect the expected socio-economic pattern of health needs in the population, although we cannot say whether the services adequately or appropriately meet the needs of all groups. This compares starkly with NHS Direct, which seem to disproportionately serve populations with the lowest expected need. Furthermore, our study only included individuals in households and it is likely that groups living outside private household, including those without homes and migrants, will be more reliant on direct access rather than telephone or booked services.

Our findings need to be confirmed in specifically designed studies, which address our study limitations, particularly in relation to the measures of service utilization and coverage of the whole population. If confirmed, our findings suggest that proposals for telephone-based triage to optimize the utilization of A&E may introduce inequity into emergency care utilization and further investment in telephone-based emergency services risks increasing inequity in NHS provision. In addition, our work suggests that alternatives to A&E should continue to provide the model of high-profile direct walk in access provided by A&E, rather than telephone access, to ensure access to care for those with greatest need.

Acknowledgments

This research is based on the data from the British General Household Survey, which were produced by the Office for National Statistics and made available by the Economic and Social Data Service through the UK Data Archive. The GHS data are crown copyright. Neither the Office for National Statistics, Social Survey Division, nor the Data Archive, University of Essex, bears any responsibility for the analysis or interpretation of the data described in this paper.

References

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