Taking account of context: how important are household characteristics in explaining adult health-seeking behaviour? The case of Vietnam

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Understanding the factors affecting the utilization of health services is essential for health planners, especially in low income countries where increasing access to and use of health services is one of the main policy goals of government. While much has been written on adult health-seeking behaviour, there is comparatively little known about the influence of the broader context such as the effects of family and community on individual use of health care services in low income countries. Using Vietnam’s latest National Household Survey data, this paper empirically assesses the influence of individual- and household-level factors on the use of health care services, while controlling for the unobserved household-level effects. The estimates obtained from a multilevel logistic regression model suggest that the individual’s likelihood of seeking treatment is jointly determined by the observed individual- and household-level characteristics as well as unobserved household-level effects. The chance of seeking medical treatment when ill varies strongly with the observed individual- and household-level covariates, including health insurance status, income, the type and severity of illness, the number of other household members with an ailment and the presence of young children in the household. However, the variability implied by the unobservable household-level effects outweighs the variability implied by the observed covariates, indicating a high degree of homogeneity in health-seeking behaviour among the household members. Failure to take account of homogeneity in health-seeking behaviour among the household members leads not only to biased results but also to inefficient policy targeting. Policies aimed at increasing access to and the use of medical services need to be sympathetic to both individuals and households.

Keywords Health-seeking behaviour, multilevel analysis, unseen barriers to access, Vietnam

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KEY MESSAGES

- An individual’s likelihood of seeking treatment is jointly determined by observed individual- and household-level characteristics as well as unobserved or unobservable household-level characteristics. The latter are rather large, suggesting that homogeneity among household members is an important consideration in assessing health-seeking behaviour, at least in the context of Vietnam.
- Failure to take account of homogeneity among household members in health-seeking behaviour leads not only to biased results but also to inefficient policy targeting. Policies aimed at increasing access to and use of medical services need to be sympathetic to both individuals and households.

Introduction

Increasing access to and use of health services is a prime goal for many low income countries. One of the primary policy objectives of the Government of Vietnam, as stated in the government’s ‘Strategy for protection and care of the people’s health 2001–2010’, is ‘to strive for all the population to enjoy primary health care services, have access to and use quality health services’ (Government of Vietnam 2001). Public health care services have a very high coverage rate throughout Vietnam and private health care services have been growing very rapidly, especially in urban centres, since 1989 when private medical services were officially allowed to operate. Despite a very high coverage rate, over two-thirds of individuals with illness continue to rely on self-medication, often with Western medicines (Chang and Trivedi 2003; Giang and Allebeck 2003).

An understanding of the factors affecting the utilization of health services is essential for health planners, especially in low income countries where increasing access to and use of health services is one of the main policy goals of government. While much has been written on adult health-seeking behaviour, there is comparatively little known about the influence of the broader context, such as the effects of family and community on individual use of health care services in low income countries. Individuals live in social units such as families and communities that offer both opportunities and constraints that influence individuals’ health-seeking behaviour (Basu 1990; Berman et al. 1994; Jacobson 2000; Leyand and Groenewegen 2003; Ensor and Cooper 2004). Families are important social contexts within which illness occurs and health-seeking decisions are made. Not only do families share a common physical, economic and social circumstance, but they also share beliefs and behaviours relating to illness and health, and thereby shape each other’s use of medical services (Cardol et al. 2005). Moreover, intra-household allocation of resources in low income countries often involves significant inequities in the allocation of food and medical attention (Thomas 1990; Doss 1996). The influence that family members have on an individual’s health-seeking behaviour has some empirical support (Grossman 1975; Thomas et al. 1991; Curries and Gruber 1996).

Using an appropriate multilevel logistic regression model and the Vietnam National Health Survey 2001–02 (VNHS) (MoH and GSO 2002), this paper empirically assesses the extent to which the individual- and household-level characteristics influence adult (non-paediatric) health-seeking behaviour while controlling for unobserved household-level effects. Several studies have examined various aspects of utilization of health services in Vietnam (Gertler and Litvack 1998; Khe et al. 2002; Trivedi 2002; Trivedi and Chang 2003; Jowett et al. 2004; Sepehri et al. 2006; Wagstaff 2007a). The primary focus of these studies has been on the observed individual- and household-level characteristics; they do not account for household homogeneity.

The paper is organized as follows. The next section provides a brief review of health care utilization in Vietnam, followed by a description of the data and methods. The paper then presents and discusses the results.

An overview of health care utilization in Vietnam

In 1989 the government of Vietnam embarked on a series of health sector reforms with far-reaching consequences for the delivery and financing of health care services. More specifically, the legalization of the private provision of health services, the liberalization of the pharmaceutical industry, and the introduction of user charges effectively transformed Vietnam’s near universal, publicly funded and provided health services into a highly unregulated private-public mix system, with some adverse consequences for access, efficiency and equity. In particular, the legalization of private medicine and rising fee revenue has increasingly shifted the burden of health care financing to households, with private out-of-pocket expenditures accounting for 63% of total health expenditure in 2000 (MoH 2004). Public health spending remains low and has declined as a proportion of total government spending: public health spending accounted for less than 5.5% of total government spending in 2003 (MoH and WHO 2007). In addition to official user charges, patients also make various forms of informal payments that are often not reported to the Ministry of Health (MoH) (Tipping et al. 1994; Segall et al. 1999).

Access to and use of health services varies widely by region, ethnicity and income (Chang and Trivedi 2003). The largely unregulated pharmacies and drug vendors are the providers most commonly used by both the insured and the uninsured as well as the poor and the non-poor (MoH and GSO 2002; Chang and Trivedi 2003). Inappropriate drug use has been observed among those involved in the prescribing, sale and use of drugs (Chuc and Tomson 1999; Lönroth et al. 2000; Chalker et al. 2002; Hoa et al. 2007). The heavy reliance on self-medication is attributed to the low real price of drugs and the ease of access to medicines relative to public health facilities (Chang and Trivedi 2003). While private providers are used widely by both the poor and the non-poor, government hospitals are disproportionately used by the non-poor, and commune health...
To improve access to health care services and protect the population against the financial burden of illness, the government introduced a formal social insurance scheme in 1992. The scheme was initially compulsory but was later extended to include a voluntary scheme and a free health-card scheme for the poor. The compulsory health insurance scheme (CHI) targets civil servants, employees of large enterprises and people of merit (such as mothers, widows and orphans of veterans). The scheme does not cover family members except for the armed forces, nor does it cover government employees at or below the district level in certain provinces. The voluntary health insurance scheme (VHI) is in principle open to all those individual household members not eligible for coverage under the CHI scheme. Experiments with the VHI scheme in many provinces have had limited success, however, and school children account for 98% of total voluntary membership (Vietnam Social Security 2006). There is also an insurance scheme for the poor (HIP) covering residents of communes with very difficult socio-economic circumstances and ethnic minorities in disadvantaged provinces. Recently the scheme has been reorganized and funded more adequately under a national programme, according to which provinces and centrally run cities are instructed to establish Health Care Funds for the Poor. Unlike the CHI and VHI schemes, the health insurance scheme for the poor in principle covers all family members of eligible households, and beneficiaries are exempt from co-insurance for covered services.

Although the insurance coverage has recently expanded, the coverage rate for the population was low at the time of the VNHS survey, at about 15.8% of the population (Vietnam Health Insurance Authority 2002). Both CHI and VHI enrollees accounted for over 88% of the total insurance enrollees and they were drawn disproportionately from the middle and high income households. CHI and VHI enrollees from middle and high income households accounted for 88% and 80%, respectively, of all enrollees under these two insurance schemes (MoH and GSO 2002). Since neither CHI nor VHI cover all family members, insurance coverage among the household members remains rather low (MoH and GSO 2002).

These insurance schemes vary not only in terms of enrollees’ socio-economic profiles but also in terms of the types of benefits offered, benefit caps, coinsurance, and the types of designated health facilities where the benefits can be accessed. The schemes also vary in terms of how providers are reimbursed for services rendered under the insurance plans. Both benefits and the amount of the ‘health care fund’ (total insurance premium contributions adjusted for administrative expenses) made available to the health facilities are more generous under the compulsory scheme. This provider reimbursement system implies that the health facilities that attract relatively highly paid enrollees, especially high-income CHI enrollees, receive higher average outpatient-care reimbursements than those that attract less well paid members (Knowles et al. 2005). Although the official co-payment by insured patients is 20%, actual out-of-pocket payments, including unofficial payments per hospital contact remain relatively large (Sepehri et al. 2005).

There are also formal mechanisms in Vietnam for exempting certain classes of individuals from treatment fees, including children below 6 years of age, war veterans, the disabled, orphans, ethnic minorities and the very poor, as well as individuals with certain ailments such as malaria, tuberculosis, leprosy and sexually transmitted infections. However, the exemption mechanism works quite poorly in practice (Ensor and San 1996; World Bank et al. 2001; Toan et al. 2002).

**Data and methods**

**Data**

The data in this study are from VNHS 2001–02 (MoH and GSO 2002). The VNHS covers about 158 000 individuals from 36 000 households collected as a three-stage random stratified cluster sample with a non-response rate of less than 2% for the survey at the national level. The survey collected, among other things, information on self-reported illness, duration of illness, severity of illness, self-perceived health status, utilization of health services, and out-of-pocket expenditures. The survey also contains information on various socio-economic variables such as education, gender, marital status, age, health insurance status, and household food and non-food expenditure. A four-week recall period is used to collect information on all variables under consideration. Data on the general household characteristics were collected in the first visit, which was followed 4 weeks later by the second visit. In the first visit the respondents were requested to record health problems, health care utilization and health expenses over a four-week period. Of the total sample, about 86% of households reported at least one illness episode, over two-thirds reported two or more episodes within the recall period, and about 18% reported four or more family members sick. On average two household members reported at least one illness episode over the reference period. Since data on individual health insurance status are only collected for individuals aged 6 and older, we have chosen to limit the sample to this age group. The sample for this study is further restricted to those who reported at least one episode of illness during the reference four-week period.1

**Methods**

We use a two-level logistic random-intercept model to empirically assess the influence of individual- and household-level factors on individuals’ health-seeking behaviour, while controlling for unobserved household-level effects. To the extent that households vary in terms of their observable and unobservable characteristics, the likelihood of seeking treatment for one household member is likely to be correlated with the likelihood of seeking treatment for other members. In this case, the application of standard binary regression models such as a logistic model leads to bias (Rabe-Hesketh and Skrondal 2005). The appealing feature of a random-intercept logistic model is that the household-level unobserved heterogeneity is modelled in the same way that observed heterogeneity is modelled by simply adding a random intercept to the logistic linear predictor (Rabe-Hesketh and Skrondal 2005) (see Appendix).

To assess the overall degree of homogeneity in seeking treatment among individuals within a household, we estimate
the random intercept logistic regression model without including the observed covariates and calculate the intra-household correlation ($\rho$). The estimated intra-household correlation is 0.58, which indicates a high degree of homogeneity in seeking treatment among persons within a household.\textsuperscript{2,3} The random-intercept logistic model is then estimated using all observed individual and household characteristics. Standard errors of the estimated coefficients are corrected for intra-commune correlation (heteroscedasticity). We also apply appropriately rescaled sampling weights to produce unbiased population estimates (Rabe-Hesketh and Skrondal 2006).

The health-seeking regression model is also estimated without a random intercept using an ordinary logistic regression model. This allows us to assess the extent to which the estimated parameters and their standard errors are biased if the unobserved household-level effects are not controlled for. In contrast to the multilevel logistic regression model, an ordinary logistic regression model is a model of population-averaged probability, conditioning on the covariates, rather than a model of household-specific probability given the covariates and the random intercept. Since there are repeated observations for some household members who experienced more than one episodes of illness during the four-week reference period, we use the Stata’s \textit{cluster} option which controls for the potential lack of independence among observations on individual household members.

\section*{Results}

\subsection*{Descriptive analysis}

Figure 1 presents the percentage of all episodes of illness/injury for which treatment was sought by health insurance status and income quintile. The insured patients are more likely to seek treatment than the uninsured. The influence of insurance on adult health-seeking behaviour is more pronounced for those with CHI coverage than the other two insurance schemes. As Figure 1 indicates, individuals’ likelihood of seeking treatment varies across income quintiles from 22\% for those in the lowest income quintile to 32\% for those in the richest income quintile.

Figure 2 displays the percentage of all episodes of illness/injury for which treatment is sought by duration and severity of illness. Patients are twice as likely to seek treatment for injuries than for illnesses (27\% versus 54\%). Individuals’ likelihood of seeking treatment varies greatly by the duration and severity of illnesses. While slightly over half of patients sought treatment for illness episodes lasting between 1 and 3 weeks, only 14.6\% sought treatment for episodes lasting less than 4 days. Similarly, the likelihood of seeking treatment rises sharply with the perceived severity of illness. Patients sought treatment for 54\% of all severe episodes of illness compared with 14\% of all mild episodes.

Although not shown here, the likelihood of seeking treatment also varies with the number of household members with ailments. An individual’s likelihood of seeking treatment declines by 24\% in households with three or more other members sick compared with households with no other individual sick. Finally, middle and high income household members are more likely to seek treatment if there are young children in the household (32\% versus 26.5\%).

\subsection*{Econometric results}

Adult health-seeking behaviour is influenced by a wide range of individual- and household-level variables that we observe. The former includes health insurance status (CHI, VHI, HIP), gender, age, marital status, education, types of illness, and duration and severity of illness. The observable household-specific variables include household income, ethnicity, geographical location, the number of other sick persons in the same household, the presence of young children (aged 5 and less), and distance to the nearest health facility. Table 1 provides summary statistics for the dependent variable and all observed individual and household covariates.

The dependent variable, seeking medical treatment or not, is a broad measure of access to care which takes the value of one if an individual seeks medical treatment from outside sources, including both western medical practitioners and traditional practitioners, and zero if an individual uses self-medication or does not seek outside treatment. We include informal providers with formal providers for three reasons. First, consideration of both formal and informal treatment allows us to examine the impact of health insurance on access to all health care providers.
Table 1 Description of the variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sought treatment</td>
<td>0.2732</td>
<td>0.4456</td>
</tr>
</tbody>
</table>

Individual characteristics

- Compulsory insurance (CHI) 0.1291 0.3354
- Voluntary insurance (VHI) 0.0718 0.2582
- Insurance for the poor (HIP) 0.0227 0.1489
- Gender 0.4175 0.4932
- Age 37.0680 20.6103
- No education (reference category) 0.1142 0.3181
- Primary 0.4477 0.4973
- Secondary 0.3643 0.4812
- Post-secondary 0.0736 0.2611
- Marital status 0.6704 0.4701
- Acute (reference category) 0.7311 0.4434
- Old chronic 0.2107 0.4078
- New chronic 0.0301 0.1707
- Injury 0.0282 0.1654

Days sick

- 1–3 0.4604 0.4984
- 4–7 0.2934 0.4553
- 8–21 0.1244 0.3301
- 22+ 0.1218 0.3271

Perceived severity of illness

- Severe 0.1294 0.3357
- Moderate 0.3721 0.4834
- Mild (reference category) 0.4985 0.5000

Household characteristics

- Income quintile 1 (reference category) 0.1619 0.3683
- Income quintile 2 0.1959 0.3969
- Income quintile 3 0.2089 0.4065
- Income quintile 4 0.2302 0.4210
- Income quintile 5 0.2031 0.4023
- Urban 0.3145 0.4643
- Ethnicity 0.8719 0.3342
- Region 1 0.2115 0.4083
- Regions 2, 4 0.2231 0.4163
- Region 3 0.0973 0.1895
- Regions 5–7 0.2765 0.4473
- Region 8 0.2517 0.4340

Number of other persons sick in the household

- 0 0.2382 0.4260
- 1–2 0.5843 0.4928
- 3+ 0.1775 0.3821

Children (aged <6) in the household 0.2746 0.4463

Distance to nearest hospital (km) 7.6864 7.9731

*Region 1 (Red River Delta); Region 2 (Northeast); Region 3 (Northwest); Region 4 (North Central Coast); Region 5 (South Central Coast); Region 6 (Central Highlands); Region 7 (Southeast); Region 8 (Mekong Delta). While allowing for any insurance-induced substitution that might arise across types of providers. Second, focusing only on western practitioners may lead to selection bias as there may be unobservable factors that are correlated with the individual choice of western providers versus traditional practitioners. Third, as noted earlier, traditional practitioners are used widely across all socio-economic backgrounds, although they account for only a small share (3.9%) of all service contacts.

Health insurance status is represented by three dummies, indicating Vietnam’s three schemes, and level of education of the respondent by four dummies: no education (reference category), primary, secondary and post-secondary education. The education variable for children aged 15 and younger refers to education of the head of household. Marital status is represented by a dummy variable that equals one if the individual is married. Illnesses and injuries are grouped into four types: acute (the reference group), newly diagnosed chronic, old chronic and injuries. The perceived severity of illness is measured by three dummies: severe, moderate and mild (the reference category).

Household economic status is measured by the per capita consumption expenditure quintile, referred to as the income quintile throughout this paper. Ethnicity is represented by a dummy variable equal to one if an individual is a member of the ethnic majority kinh. Geographical location is measured by rural-urban and regional dummies. The number of other persons sick in the same household is represented by three dummies: households with no other member sick (the reference group), households with one or two other members sick, and households with three or more members sick. Similarly, the presence of young children is represented by a dummy variable which takes the value of one for households with children aged 5 or less, and zero otherwise.

The results obtained from random-intercept logistic and ordinary logistic models are presented in Table 2. The estimate of intra-household correlation continues to remain high, suggesting the importance of household membership as a determinant of individuals’ health-seeking behaviour. To facilitate interpretation, the estimated coefficients are converted into odds ratios. The estimated values for the variance of the random intercept term ($\psi$) and the intra-household correlation ($\rho$) are shown at the bottom of Table 2.

In general, the explanatory variables in the multilevel (random-intercept) logistic model have the expected sign. The results suggest that the influence of insurance on individuals’ likelihood of seeking treatment varies across the three insurance schemes. The influence of insurance is more pronounced for the CHI enrollees than for enrollees of the two other insurance schemes. On average, the CHI enrollees are twice as likely to seek care as the uninsured, while the VHI and HIP schemes increase access by 32% and 44%, respectively.

As expected, the likelihood of seeking treatment is influenced by gender, age and education. Females are more likely to seek care than males, and similarly married individuals are more likely to seek care than singles. The estimated odds ratios for age and age-squared suggest that the likelihood of seeking care decreases with age but at a smaller rate as age rises. Education increases the likelihood of using health services by as much as 72% and 50% for those with post-secondary and secondary education, respectively, compared with those with no education.
### Table 2: Regression results for the random intercept logistic and ordinary logistic models of seeking care

<table>
<thead>
<tr>
<th></th>
<th>Random intercept logistic model</th>
<th>Ordinary logistic model</th>
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<tbody>
<tr>
<td></td>
<td>Odds ratio</td>
<td>Robust std error</td>
</tr>
<tr>
<td><strong>Fixed part</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Individual characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compulsory (CHI)</td>
<td>2.084***</td>
<td>0.101</td>
</tr>
<tr>
<td>Voluntary (VHI)</td>
<td>1.316***</td>
<td>0.078</td>
</tr>
<tr>
<td>Poor (HIP)</td>
<td>1.442***</td>
<td>0.147</td>
</tr>
<tr>
<td>Gender</td>
<td>0.831***</td>
<td>0.023</td>
</tr>
<tr>
<td>Age</td>
<td>0.951***</td>
<td>0.004</td>
</tr>
<tr>
<td>Age squared</td>
<td>1.000***</td>
<td>0.000</td>
</tr>
<tr>
<td>Married</td>
<td>1.604***</td>
<td>0.096</td>
</tr>
<tr>
<td>Level of education</td>
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<td></td>
</tr>
<tr>
<td>Primary</td>
<td>1.295***</td>
<td>0.067</td>
</tr>
<tr>
<td>Secondary</td>
<td>1.496***</td>
<td>0.090</td>
</tr>
<tr>
<td>Post-secondary</td>
<td>1.721***</td>
<td>0.141</td>
</tr>
<tr>
<td>Types of illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New chronic</td>
<td>14.060***</td>
<td>1.234</td>
</tr>
<tr>
<td>Old chronic</td>
<td>1.076</td>
<td>0.043</td>
</tr>
<tr>
<td>Injury</td>
<td>4.838***</td>
<td>0.365</td>
</tr>
<tr>
<td>Days of illness</td>
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<td></td>
</tr>
<tr>
<td>4–7</td>
<td>2.889***</td>
<td>0.098</td>
</tr>
<tr>
<td>8–21</td>
<td>5.585***</td>
<td>0.255</td>
</tr>
<tr>
<td>22+</td>
<td>2.478***</td>
<td>0.133</td>
</tr>
<tr>
<td>Severity of illness</td>
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<td></td>
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<tr>
<td>Severe</td>
<td>11.430***</td>
<td>0.585</td>
</tr>
<tr>
<td>Moderate</td>
<td>4.437***</td>
<td>0.162</td>
</tr>
<tr>
<td><strong>Household characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income quintiles</td>
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<td></td>
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<tr>
<td>Income 2</td>
<td>1.199***</td>
<td>0.070</td>
</tr>
<tr>
<td>Income 3</td>
<td>1.260***</td>
<td>0.082</td>
</tr>
<tr>
<td>Income 4</td>
<td>1.414***</td>
<td>0.092</td>
</tr>
<tr>
<td>Income 5</td>
<td>1.752***</td>
<td>0.122</td>
</tr>
<tr>
<td>Urban</td>
<td>0.840***</td>
<td>0.030</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td>0.059</td>
</tr>
<tr>
<td>Regions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regions 2, 4</td>
<td>0.750***</td>
<td>0.037</td>
</tr>
<tr>
<td>Region 3</td>
<td>0.513***</td>
<td>0.052</td>
</tr>
<tr>
<td>Regions 5, 6, 7</td>
<td>1.335***</td>
<td>0.063</td>
</tr>
<tr>
<td>Region 8</td>
<td>1.928***</td>
<td>0.097</td>
</tr>
<tr>
<td>Number of other household members sick</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–2</td>
<td>0.841***</td>
<td>0.030</td>
</tr>
<tr>
<td>3+</td>
<td>0.632***</td>
<td>0.034</td>
</tr>
<tr>
<td>Children (age&lt;6) in the household</td>
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<td></td>
</tr>
<tr>
<td>Children * Income 12</td>
<td>1.033</td>
<td>0.059</td>
</tr>
<tr>
<td>Children * Income 345</td>
<td>1.223***</td>
<td>0.057</td>
</tr>
<tr>
<td><strong>Random part</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \phi )</td>
<td>2.381***</td>
<td>0.092</td>
</tr>
<tr>
<td>( \beta )</td>
<td>0.420</td>
<td></td>
</tr>
<tr>
<td>Log likelihood</td>
<td>(-30.216.042)</td>
<td>(-31.929.054)</td>
</tr>
<tr>
<td>No. of level 1 units</td>
<td>65744</td>
<td></td>
</tr>
<tr>
<td>No. of level 2 units</td>
<td>29087</td>
<td></td>
</tr>
</tbody>
</table>

Likelihood ratio test of \( \sigma_\xi = 0 \): chi-squared(1) = 3606.024, \( P = 0.000 \)

*10% significance level; **5% significance level; ***1% significance level.

*Variance of the random intercept term.

\( \lambda \) Intra-household correlation.
As expected, the likelihood of seeking care also increases with the type, duration and severity of illness. Patients with a newly diagnosed chronic condition are almost 13 times more likely to seek care than those with an acute condition (the reference category), while those with an old chronic condition are only 8% more likely to seek care. The estimated odds ratios for the duration of illness suggest that the likelihood of seeking treatment rises with the duration of illness lasting 3 weeks or shorter and then declines for those lasting longer than 3 weeks. Compared with those experiencing a short illness episode (less than 4 days, the reference category), patients are more likely to seek treatment by as much as 4.6 times for illnesses lasting between 8 and 21 days, and by 1.9 times for illnesses lasting between 4 and 7 days. In contrast, patients are only 1.5 times more likely to seek treatment for illnesses lasting longer than 3 weeks.

The use of health care services is also influenced by household characteristics. The estimated odds ratios for income quintiles indicate a strong income gradient for access in terms of the use of health services. Individuals in the highest income quintile are 75% more likely than those in the poorest income quintile to seek care. In contrast, individuals in the second lowest income quintile are only 20% more likely than those in the poorest income quintile to seek care. There is no statistically significant difference in health-seeking behaviour by ethnicity, once other individual and household characteristics are accounted for, but there is significant variation in health-seeking behaviour across some of Vietnam’s eight regions. In general, residents of the northern regions outside the Red River region (regions 2–4) are less likely to seek care than those of the Red River region (the reference category), while residents of the southern regions are more likely to seek treatment. The residents of Vietnam’s poorest North Western region (region 3) are least likely to seek care.

The estimated odds ratios for the number of household members with an ailment indicate that the likelihood of an individual using health care services declines with the number of persons sick in the same household. An individual household member is less likely to seek care by as much as 37% if there are three or more other household members ill than if there are no other household members ill. The results also indicate that adult health-seeking behaviour is positively influenced by the presence of children under 6 in the same household. The presence of young children in middle and high income households increases other household members’ likelihood of seeking treatment by as much as 22% compared with households with no children. In contrast, the presence of children in the lower income households has no statistically significant effect on health-seeking behaviour of other household members. Finally, distance to the nearest hospital was not found to have a statistically significant effect on individuals’ likelihood of seeking care and this variable was dropped from the list of covariates.

The ordinary logit model estimates of health-seeking for the same set of observed individual and household covariates are reported on the right-hand-side of Table 2. As the results indicate, all coefficients have identical signs as those obtained from a multilevel logistic model. However, as expected the point estimates of the regression coefficients and their standard errors are generally smaller. These differences are particularly large for the perceived severity of illness (e.g. 5.7 versus 11.4 for severe illnesses), for illness episodes lasting between 8 and 21 days (3.7 versus 5.6.), and for newly diagnosed chronic illnesses (8.0 versus 14.1). Differences in point estimates are also larger for the highest two income quintiles than for the middle income quintiles, and larger for CHI than for the other two insurance schemes. These differences suggest much larger effects when we control for unobserved household-level effects, a result that implies that unobserved household-level effects are an important consideration in assessing health-seeking behaviour, at least in the context of Vietnam.

**Predicted proportions seeking care**

The results obtained from the multilevel logistic regression model highlight the importance of both observed individual- and household-level characteristics as well as unobserved household-level effects on the likelihood of seeking care. However, it is rather difficult to assess the relative influence of the observed and unobserved effects on the likelihood of seeking treatment. To assess the relative variability implied by the unobserved and observed parts, we obtained the predicted probabilities for a selective number of covariates. The predicted probabilities are reported in Table 3. To make the number of predicted probabilities and their interpretation manageable, we have chosen one household-specific covariate, namely, income, and one individual-specific characteristic, individual health insurance status. In addition, we have selected three values for the household-level random term (−1.5, 0 and 1.5, which respectively represent one standard deviation below the average household, the average household, and one standard deviation above the household average). These three households are denoted as below-average, average and above-average in Table 3. The predicted probabilities are then obtained by setting the value of the (dummy) covariate under consideration at zero and one, while setting all other covariates at their observed values and the household random term at −1.5, 0 or 1.5, respectively.

The predicted values again highlight the importance of unobserved household-level effects on an individual’s likelihood of seeking care. As Table 3 indicates, the likelihood of seeking treatment for the uninsured varies greatly from as low as 8.1% for those with below-average household effects to as high as 43.3% for those with above-average household effects. Similarly, the influence of health insurance on adult health-seeking behaviour varies considerably across individuals with below- and above-average household effects. The CHI enrollees with above-average household effects are 4 times more likely to seek treatment than their counterparts with below-average household effects. The implied household-level variation is even larger for those with VHI and HIP coverage. Both VHI and HIP enrollees with above-average household effects are 5.2 times more likely to seek treatment than their below-average counterparts. As Table 3 indicates, the implied variations in health-seeking behaviour due to the unobserved household-level effects—column (d)—are far larger than those due to insurance effect—row (iii). Insurance increases the likelihood of seeking treatment by a factor of 1.9 for the CHI enrollees with below-average household effects and by 1.4 for those with
above-average household effects. Insurance increases the likelihood of seeking treatment less for those with VHI and HIP coverage. Similarly, as Table 3 indicates, the variability implied by the unobserved household-level effects—column (d)—is far larger than that implied by household income—row (vi). Low income individuals with above-average household effects are 5.9 times more likely to seek treatment than their counterparts with below-average household effects (41.6% versus 7.1%). In contrast, moving from low to high income increases an individual’s likelihood of seeking treatment by a factor of between 1.2 and 1.5, depending on the household effects.

### Discussion and conclusions

Using a multilevel modelling framework and Vietnam’s latest National Household Survey data, this paper empirically assesses the influence of individual- and household-level characteristics on the use of medical services while controlling for unobserved household-level effects. The results suggest that the individual’s likelihood of seeking treatment is jointly determined by the observed individual- and household-level characteristics as well as unobserved household-level effects. The latter are rather large, suggesting that homogeneity among household members is an important consideration in assessing health-seeking behaviour, at least in the context of Vietnam. Failure to take account of homogeneity in health-seeking behaviour among the household members leads not only to biased results but also to inefficient policy targeting.

The empirical results show that while insurance increases the odds of seeking treatment, the influence is more pronounced for Vietnam’s CHI scheme than for the other two insurance schemes. The observed effect of insurance schemes likely underestimates the true effect of insurance, since having insurance diverts patients from self-medication mainly towards public hospitals where insurance benefits can be accessed. Our estimates of the insurance effect may also be subject to endogeneity bias if there is adverse selection into Vietnam’s health insurance schemes. CHI (and perhaps HIP as well) is unlikely to be affected by selection because of categorical eligibility. While self-selection into VHI is plausible, the results do not suggest that endogeneity bias is a serious problem. Adverse selection is less likely to be serious given the predominance of school children among the voluntary insurance enrollees and the observed weak association between insurance status and the incidence of illness and its severity (Jowett et al. 2004). Our results on the influence of other individual-level characteristics including age, gender, marital status and education are generally in line with those reported for Vietnam and other low income countries (Henderson et al. 1994; Tipping and Segall 1996; Nguyen et al. 2002; Toan et al. 2002; Trivedi 2002; Giang and Allebeck 2003; Hjorsberg 2003; Jowett et al. 2004; Su et al. 2006).

The odds of seeking treatment are also significantly associated with observed household-level characteristics including income, region, the number of other household members with an ailment, and the presence of children under six in the household. The results suggest a strong income gradient for access in terms of the use of health services. The observed regional differences in adult health-seeking behaviour may reflect differences in the availability and quality of care. The availability and quality of both public and private providers varies greatly across regions, with the mountainous regions having a coverage rate and quality of care far below the other regions (MoH and GSO 2002; WHO 2003). The observed regional differences may also partly reflect the variation in the relative size of ethnic minorities in the total population of each region. The estimated odds ratio for ethnicity increases and becomes statistically significant when the regional dummies are excluded from the regression.

The finding that an individual household member is less likely to seek treatment when there are other sick persons in the same household may reflect the strain on household resources, at least to the extent to which the financial access

### Table 3

Predicted percentages seeking treatment, by selected covariates and by average, below-average and above-average household effects

<table>
<thead>
<tr>
<th>Household effects</th>
<th>Below average (a)</th>
<th>Average (b)</th>
<th>Above average (c)</th>
<th>[(c)/(a)] (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Uninsured</td>
<td>8.1</td>
<td>21.3</td>
<td>43.8</td>
<td>5.4</td>
</tr>
<tr>
<td>(ii) Insured</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. CHI</td>
<td>15.4</td>
<td>35.5</td>
<td>61.3</td>
<td>4.0</td>
</tr>
<tr>
<td>2. VHI</td>
<td>9.1</td>
<td>23.4</td>
<td>47.2</td>
<td>5.2</td>
</tr>
<tr>
<td>3. HIP</td>
<td>9.7</td>
<td>25.7</td>
<td>50.4</td>
<td>5.2</td>
</tr>
<tr>
<td>(iii) Insurance effect [(1)/(ii)]</td>
<td>1.9</td>
<td>1.7</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) Low income</td>
<td>7.1</td>
<td>19.6</td>
<td>41.6</td>
<td>5.9</td>
</tr>
<tr>
<td>(v) High income</td>
<td>10.9</td>
<td>26.7</td>
<td>50.7</td>
<td>4.7</td>
</tr>
<tr>
<td>(vi) Income effect [(v)/(iv)]</td>
<td>1.5</td>
<td>1.4</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>

*a* Below-average, average and above-average household effects denote predictive probabilities obtained by setting the household-level random term (c) equal to −1.5, 0 and 1.5, which respectively represent one standard deviation below the average household, the average household, and one standard deviation above the household average.

*b* The lowest two income quintiles.

*c* The highest two income quintiles.
to health care is family based and determined by the pooled economic resources of family members. The results also indicate that the presence of young children increases the likelihood of seeking treatment by other household members. The presence of young children may potentially increase exposure to a formal health care environment as young children are more likely to use formal health care services in the form of both curative care and preventive care such as immunization (Leclere et al. 1994). Moreover, to the extent that young children are exempt from user charges at the public health facilities, a lower cost of access increases the likelihood of seeking treatment for young children, while it may increase or decrease the use of health services by adult household members depending on the relative strength of income and substitution effects (Jacobson 2000).

The results indicate that the unobserved household-level effects are very important determinants of the use of health care services in Vietnam, even after controlling for a large number of observed individual and household characteristics. The variability implied by the unobserved household effects is far larger than that implied by the observed covariates. Inadequate measurement of households’ command over resources, the cost (both money and time) of accessing services, and the quality of the available health services might partly account for the observed household heterogeneity, but the observed relatively large degree of household heterogeneity suggests that there are other unseen barriers to care. These unseen barriers potentially include a wide range of factors including differences in health beliefs about disease etiology and appropriate forms of treatment, variations in habit persistence, organization, advice seeking, and the ability to use the available resources (Basu 1990; Das Gupta 1990; Pebley et al. 1996; Sinha et al. 2006). Language and cultural barriers are found to be associated with the low use of health services, especially public health services, by Vietnam’s ethnic minorities (Toan et al. 2002; WHO 2003).

These findings have important implications for health policy. The finding that an individual’s likelihood of seeking treatment is influenced jointly by observed individual- and household-level factors, as well as by unobserved household-level effects, suggests that policies aimed at increasing access need to view both the individual and the household as appropriate units for policy targeting. More specifically, the finding that all three insurance schemes, including the insurance scheme for the poor, increase individuals’ likelihood of using health services when they are sick represents a positive result for health planners and policy makers both in Vietnam and in other lower income countries that have already introduced or are introducing a health care fund for the poor. The government’s most recent policy of increasing the coverage and scope of health insurance, especially the HIP scheme, is likely to make the insurance effect more substantial and dampen the extent of self-medication (Chang and Trivedi 2003).

The finding that the likelihood of an individual using health care services declines sharply with three or more other persons sick in the same household also suggests that the potential influence of insurance, especially HIP, is likely to be larger for the poor and near poor households with larger household size. Greater access is likely to enhance both efficiency and equity to the extent that insurance allows lower income individuals to seek timely and efficient treatment (Ensor and San 1996). The large degree of homogeneity among the household members suggests, however, that the potential influence of changes in observed individual- and household-level covariates such as higher insurance coverage and household income on access to and use of medical services is likely to remain modest unless other unseen but important household-level barriers are directly addressed. Clearly, additional research remains to be done to understand the unseen household-level determinants of care seeking and how these barriers can be addressed by policy.

While the quality of the data in this study is quite high for a developing country, common data limitations remain. Illness is self-reported and thus may be prone to subjectivity. Our estimates may also be subject to bias if household income is endogenous. However, health shocks other than death are found to have little impact on earned income in Vietnam, suggesting that health shocks are followed by some compensating adjustments in labour supply (Wagstaff 2007b). The reported results are based on cross-sectional data and may not adequately capture many changes taking place in a rapidly changing transitional economy. The data on the health status of children aged 6 and 15 is provided by their parents, and yet this data is not treated differently from data collected directly from adults. Moreover, the study does not adequately control for geographic access to health care services, especially the distance to a primary care facility. Other studies in Vietnam have shown that the distance to a primary care facility influences individual health-seeking behaviour (Ensor 1996; Segal et al. 2000). Finally, the definition of a household based on a fixed structural definition such as co-residence is often used in surveys, which may conceal a category of much greater complexity (Berman et al. 1994).

Endnotes

1 This might lead to selection bias if there are unobservable factors that are correlated with both the likelihood of reporting illness and seeking treatment, but the selection bias is not likely to be serious given the large number of sample households (86%) reporting at least one episode of illness.

2 The likelihood test clearly rejects the ordinary logistic model in favour of the random intercept logistic model, rejecting the hypothesis that the standard deviation of the random intercept term (sigma_0 or alpha_0) is zero (chi-squared(1) = 1985.65, P = 0.000).

3 We also fitted a three-level logistic model which included commune level in addition to individual and household levels. The estimated intra-commune correlation was too small (0.13) to justify a separate level of hierarchy.

4 We also used the number of bed-driven days as a measure of severity of illness. The results were found to be robust to the measurement of severity.

5 To assess the extent to which the influence of insurance varies across income quintiles, we used two interaction terms, one between CHI and income quintile and one between VHI and income quintile, but no clear patterns emerged.

6 Testing for equality of the coefficients on the regional dummies suggested that certain regions could be aggregated, as shown in Table 2.

7 Since data on the distance from the commune health centre to the nearest hospital is available only for some communes, the inclusion of distance leads to a smaller sample.

8 Since the total residual variance for the random-intercept logistic model (2) (psi_2 + sigma_2^2/3) is greater than the residual variance for an ordinary logistic regression model (sigma_2^2/3), the coefficients in the
random-intercept regression model must increase to produce an equivalent value for the population-averaged probability that the observed response is one (Rabe-Hesketh and Skrondal 2005, pp. 122–23).

References


**Appendix**

Suppose the likelihood of seeking treatment for individual in household is given by:

$$\logit[Pr(y_{ij} = 1|x_{ij}, \zeta_j)] = \alpha + \beta x_{ij} + \zeta_j$$  \hspace{1cm} (1)

where $\alpha$ is the constant or intercept, $\beta$ is a vector of regression coefficients corresponding to observed household and individual covariates $x_{ij}$, and $\zeta_j$ is a random intercept. The random intercept represents the combined effect of all omitted household-level covariates that cause some households to seek health care services. The random intercept is assumed to be normally distributed with a zero mean and variance $\psi$. Assuming that underlying the observed dichotomous response $y_{ij}$, there is an unobserved or latent continuous response $y_{ij}^*$. The random-intercept logistic regression (1) can alternatively be specified as a linear regression model:

$$y_{ij}^* = \alpha + \beta x_{ij} + \zeta_j + \epsilon_{ij} = (\alpha + \zeta_j) + \beta x_{ij} + \epsilon_{ij}$$  \hspace{1cm} (2)

where $\epsilon_{ij}$ is a transitory error term, which varies between individuals as well as households, and is assumed to have a standard logistic distribution with a zero mean and variance $\psi^2$. The two errors are assumed to be independent from each other with the $\zeta_j$ being independent over households and the $\epsilon_{ij}$ over households and individuals. The total residual variance is:

$$\text{Var}(\xi_{ij}) = \psi^2 + \frac{\psi^2}{3}$$

where $\xi_{ij}$ denotes the total residual ($\xi_{ij} = \zeta_j + \epsilon_{ij}$). According to the latent-response regression model (2), observations in the same household share the same random term $\zeta_j$ and hence they are correlated. The degree of dependence or correlation between observed responses on two persons $i$ and $j$ from the same household can be quantified in terms of the intraclass correlation ($\rho$) of the latent responses $y_{ij}^*$ as:

$$\rho = \frac{\text{Cor}(y_{ij}^*, y_{ij}^* | x_{ij}, x_{ij})}{\text{Cor}(\zeta_j, \zeta_j)} = \frac{\text{Cov}(y_{ij}^*, y_{ij}^* | x_{ij}, x_{ij})}{\text{Var}(\xi_{ij}) \sqrt{\text{Var}(\xi_{ij})}}$$

$$= \frac{\psi}{\sqrt{\psi + \frac{\psi^2}{3}}} \sqrt{\psi + \frac{\psi^2}{3}}$$

The higher is the degree of dependence among the observed responses within a household, the higher would be the proportion of the total variance that is between households, or due to households.