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Monika Sander

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Is there migration-related inequity in access to or in the utilisation of health care in Germany?

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Abstract

This paper analyses immigrants' access to health care and utilisation of health care services in Germany. Thereby, it is investigated if there is inequity in access to or in the utilisation of health care services due to a lack of language skills or due to a lack of information about the health care system (approximated by years since migration) among first- and second-generation immigrants. The data used are drawn from eleven waves of the SOEP (1995-2006). With regard to the probability to contact a physician (as a proxy for access), German language skills are found to have no significant influence for all groups of immigrants. The hypothesis of inequity in access to health care due to access barriers caused by a lack of German language skills is therefore not supported by the data. However, mother tongue language skills seem to be important for the contact probability of the first- and second-generation: Having only good or poor mother tongue language skills reduces the probability of a doctor contact. The effect is found to be significant for first- and second-generation men. For the frequency of doctor visits (utilisation), poor German language skills are found to exert a significant influence: Those reporting poor language skills have a lower expected number of doctor visits. The effect is found to be significant for first-generation men and for second-generation men and women. Hence, there seems to be inequity in health care utilisation due to a lack of German language skills. With the exception of first-generation men – where it is found that poor mother tongue language skills reduce the expected number of doctor visits significantly, no significant effect is found for mother tongue language skills. With regard to the duration of residence, the results indicate that years since migration have an impact on the contact decision of first-generation immigrant women, whereby a significant positive influence is found. Hence, missing knowledge about the health care system could create additional access barriers and yield inequity in access to health care in the group of first-generation women. The duration of residence seems to have no influence on the frequency decision.

Keywords: Utilisation of health care, inequity, immigrants, SOEP

JEL-Classification: C23, D63, I10

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I. Introduction

One of the fundamental goals of the health care system of nearly all OECD countries is to establish 'equal access for equal need'. To measure 'access' it is usually distinguished between a contact and a frequency decision, whereby the contact decision is seen as a proxy for access and the frequency decision measures utilisation.

Attention to inequity in access to health care has steadily grown in recent years. Most studies examining inequity in health care utilisation have focused on income-related inequity (see, among others, O'Donnell and Propper 1991; Wagstaff et al. 1991; van Doorslaer and Wagstaff 1997; Gerdtham 1997; Gerdtham and Trivedi 2000; van Doorslaer et al. 1992, 1993, 1997, 2000, 2004; Wagstaff and van Doorslaer 2000a). However, equity should be guaranteed not only independent of income, but also independent of other factors like ethnicity, gender, education, place of residence, and so on. So far, only little attention has been paid to inequity regarding the immigrant population of a country. Additionally, only little is known about the utilisation behaviour of immigrants.[2]

Hence, the purpose of this paper is to provide an analysis of the factors determining utilisation of health care services within the immigrant population in Germany, and to consider whether "equal utilisation for equal need" or "equal access for equal need" has been achieved in the German health care system.

The selection of possible determinants of health care utilisation relies on the behavioural model of Ronald M. Andersen, whereby the main factors influencing utilisation are categorised into predisposing characteristics, enabling factors, and need. Analysing the utilisation behaviour of immigrants it is necessary to control not only for factors such as health status, age, education, marital status, and so on, but also for language ability, years since migration, or the share of foreigners on the regional level to control for possible network effects as well as for the possibility to visit doctors who can speak a foreign language.

The data used are drawn from eleven waves of the German Socio-Economic Panel (SOEP). Regional information (i.e., share of doctors and share of foreigners on the county level) is additionally matched from data provided by the 'Federal Office for Building and Regional Planning' (*Bundesamt für Bauwesen und Raumordnung*, BBR).

[2] There is a recent publication by Tiesmeyer et al. (2007), which concentrated on the "blind spot" concerning inequities in health care utilisation. However, none of the book chapters was dedicated to inequities in health care utilisation within the immigrant population.

Analysing utilisation behaviour, in this study the number of doctor visits in a given time, requires the application of count data models. Assuming a principal-agent framework, the decision to contact a physician and the number of doctor visits can be seen as the result of two separate decision-making processes, and thus a hurdle model can be estimated. The usage of panel methods offers the possibility to take time-constant individual-specific unobserved heterogeneity into account. This allows, for instance, to account for different behavioural attitudes, health beliefs, preferences, risk aversion, or genetic frailty, which are all likely to influence the utilisation of health care.

The outline of the paper is as follows. In section II Andersen's behavioural model of utilisation is described. Section III provides a discussion about the principles of equity in health care. The description of the data and the specification of the econometric model can be found in section IV. Section V discusses the empirical findings and chapter VI concludes.

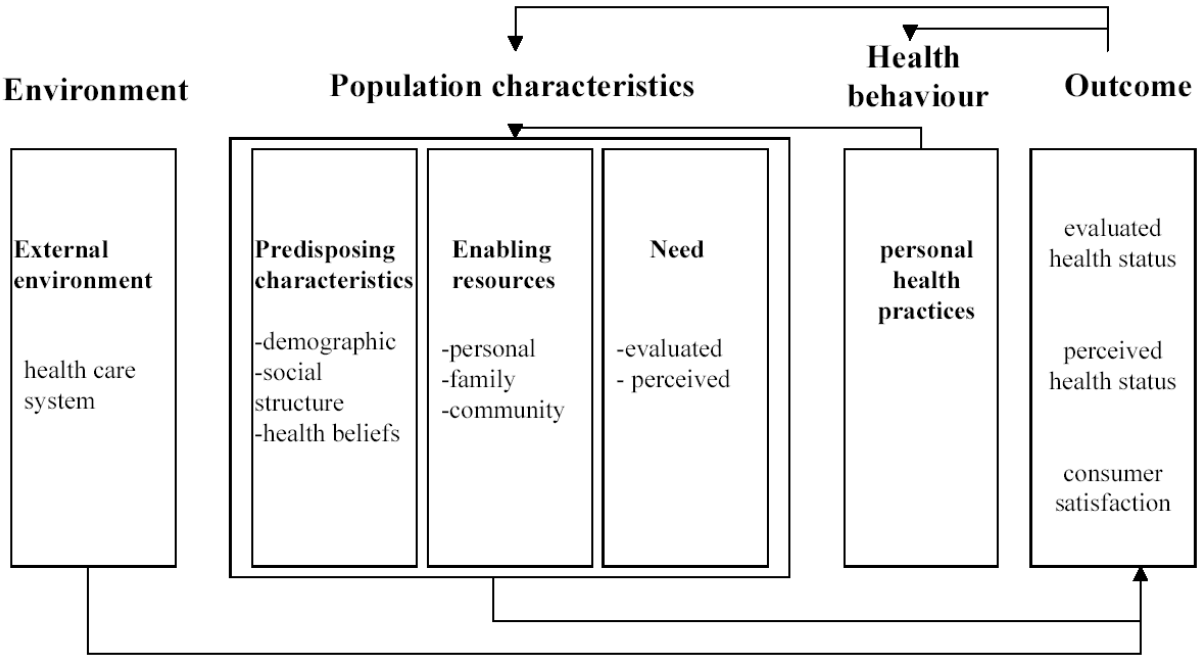
II. Behavioural model of health services use

Health care utilisation depends on a broad array of different factors. Ronald M. Andersen proposed in the late 1960s the so-called 'Behavioural Model of Health Services Use', which provides a possibility to structure and categorise these different factors. Since the first presentation of the model, it has been modified, revised, and extended several times – by Andersen himself as well as by others (see Aday and Andersen 1974; Andersen 1968, 1995 and Andersen and Newman 2005). Today, it has become a standard model in the international utilisation research.

The following presents a short outline of the Andersen model and focuses especially on possible extensions with regard to the utilisation behaviour of immigrants. A detailed description of the included variables is presented in the empirical part of the paper (see chapter V).

The core of the Andersen model lies in the categorisation of the so-called **population characteristics** into three groups: *predisposing* characteristics, *enabling* factors, and *need* (see figure 1).

Figure 1: The behavioural model of health services use of Ronald M. Andersen



Source: Own compilation according to Andersen 1995

Predisposing characteristics include all factors that influence utilisation in an indirect way and can be categorised into demographic variables, social structure, and health beliefs, as well as factors like genetic disposition or psychological factors.

Demographic variables such as age and sex represent "biological imperatives" suggesting the likelihood that people will need health services (see Hulka and Wheat 1985: 446f.). Social structure covers all determinants related to

> "the status of a person in the community, his or her ability to cope with presenting problems and commanding resources to deal with these problems, and how healthy or unhealthy the physical environment is likely to be" (Andersen 1995: 2).

Measures include usually variables such as education, social status, occupational status, housing conditions, or social networks. Regarding the immigrant population of a country, also variables like ethnicity or country of origin should be included.

Health beliefs encompass attitudes, values, and knowledge that people have about health and health care services. They influence an individual's perception of need and therefore the individual's decision to seek health care.

> "Health beliefs are not considered to be a direct reason for using services but do result in differences in inclination toward use of health services" (Andersen and Newman 2005: 15).

It can be assumed that differences in health beliefs due to cultural and religious influences play a major role in the immigrants' help seeking behaviour and can thus be seen as a key

explanation for differences in access (utilisation) by ethnic populations (see Szczepura 2005: 144). Unfortunately, the identification of health beliefs is rather difficult due to their subjective character. In addition, health beliefs are very closely related to other factors, which hampers the assessment of their influence (see Andersen and Schwarze 2003: 14).

Enabling resources are the necessary conditions, which *enable* utilisation (e.g., community resources, personal, or family related resources). First, community resources – hence the availability of health care services – are necessary conditions precedent for utilisation to take place. Second, individuals must have the means and know-how to get to the services available. Hence, personal or family related resources include the income and insurance situation of the individual or the family.

Regarding the immigrant population, there might be additional problems related to a lack of specific knowledge or information about the structure or organisation of the health care system of the host country, especially if the health care systems of the home and host country are differently organised (for Germany, this has been emphasised by David and Borde 2001 and Grieger 2002). Additionally, language skills can be seen as enabling resource, because at the one hand, they make it easier to get the necessary information (about the organisation of the health care system and so on), and at the other hand, language skills are necessary to communicate with doctors. Given the possible availability of doctors speaking the mother tongue of the immigrants, mother tongue language skills could be an additional enabling resource for which one should control for. Language difficulties might create access barriers and hamper the utilisation of health care services.

In addition, the share of other immigrants residing in the same area might be of importance; because one can assume that network or neighborhood effects might play a role for immigrants' access to and utilisation to health care services (see Deri 2005). Ethnic neighbourhoods or areas with a large number of immigrants can be seen as a source of information and guidance. Hence, a high concentration of immigrants in one area will be beneficial for individuals if others can provide information, for example about the organisation of the health care system or specific providers. Additionally, networks can even change the demand for health care services when they influence the individuals' perception of health or health care seeking (e.g., 'through augmenting the desirability of the available services' (Deri 2005: 1076)).

For example, LeClere et al. (1994: 373) remarked that the case of recent immigrants in the United States showed that immigrant groups (Koreans in Los Angeles and Cubans in

Miami) benefit from ethnic solidarity and geographic concentration. However, it has also been suggested that the insularity of ethnic enclaves could result in access problems to the best available health care (see Chiswick et al. 2006: 6).

Differences in **need** are seen as the most important factors explaining utilisation. It can be differentiated between the need a person perceives (*perceived need*), and an objective need (*evaluated need*). Most empirical studies rely on perceived need as most of the surveys do not include objective health measures.

Additionally, the resources and organisational structure of **health care systems** can be seen as important external determinants of health care utilisation. An often included variable is the share of doctors in a specific region to account for supply side effects (see, for example, Andersen and Schwarze 1997).
Additionally, in a region with a high share of immigrants it can be assumend that also more foreign doctors are settled. If those foreign doctors can speak the mother tongue of the immigrants and originate from the same cultural background, possible language and cultural barriers to access to health care can be released and boost utilisation. Deri (2005) provided first evidence that immigrants' health care utilisation increases with an increasing number of doctors in the neighborhood who can speak their language. Hence, not only regarding possible network effects as described above, but also with regard to the possibility to go to foreign doctors, the share of foreigners in the immigrants' neighborhood should be controlled for.

Health behaviour (such as smoking, dietary habits, or sports) is also seen as an important influence factor on health care utilisation. However, there is so far no clear evidence on how it influence help care seeking beahviour. Additionally, only little is known about the health behaviour of immigrants and about the interaction between health behaviour and help seeking behaviour in the immigrant population.

The inclusion of **outcome** gives the model a dynamic dimension: Health status is not only a factor influencing the use of medical services, but also an outcome of this use, hence there is a "feedback loop" (see Andersen 1995). This simultaneity imposes problems in the estimation process, which ought to be controlled by using information on the lagged health status (see, for example, Schellhorn 2002).

III. Principles of equity in health care

Equity focuses on how to distribute resources in a fair and just way. In the field of health care it is usually recognized to be a very important objective; sometimes it is even seen to take precedence over all other objectives, even efficiency (see Wagstaff and van Doorslaer 2000b). Some authors argued that – in spite of the existence of a vast literature on 'equity in health or health care' – there is only little agreement on the exact meaning of this notion (see Oliver and Mossialos 2004). However, as for example Wagstaff and van Doorslaer (1993) showed, there is a rather broad agreement of policy-makers in several OECD countries about what is meant by equity. Also researchers from quite "different health care systems as Britain and the United States have adopted much the same notion of equity in their analysis" (Wagstaff and van Doorslaer 2000b: 1807), which reflects a rather Marxist or pro-egalitarian view of equity. Hence, there is huge agreement that the distribution of health care should be according to need and payments according to the ability to pay.[3]

Two often discussed principles of equity are '**equal access for equal need'**, and '**equal utilisation for equal need'**.[4] These two concepts are also referred to as "horizontal equity", which induces that equals are treated equally.[5]

The terms access and utilisation are often used interchangeable. Without doubt, these two concepts are closely related (especially in their empirical application); but nevertheless, one should at least try to distinguish these two terms on a theoretical basis, which is tried to be done in the following.

Access to health care is a complex concept for which no uniform definition exists. Access can be referred to as the availability or the adequate supply of health services. Hence, access is concerned with the opportunity to obtain health care when it is wanted or needed. Mooney (1983) as well as Le Grand (1982) suggested from a health economic perspective that equality of access is achieved if all individuals face the same money and time costs in obtaining care. This approach has been criticised – also by Le Grand (1991) himself – that it is unsatisfactory to say that if two people face the same time and money costs, they have the same access

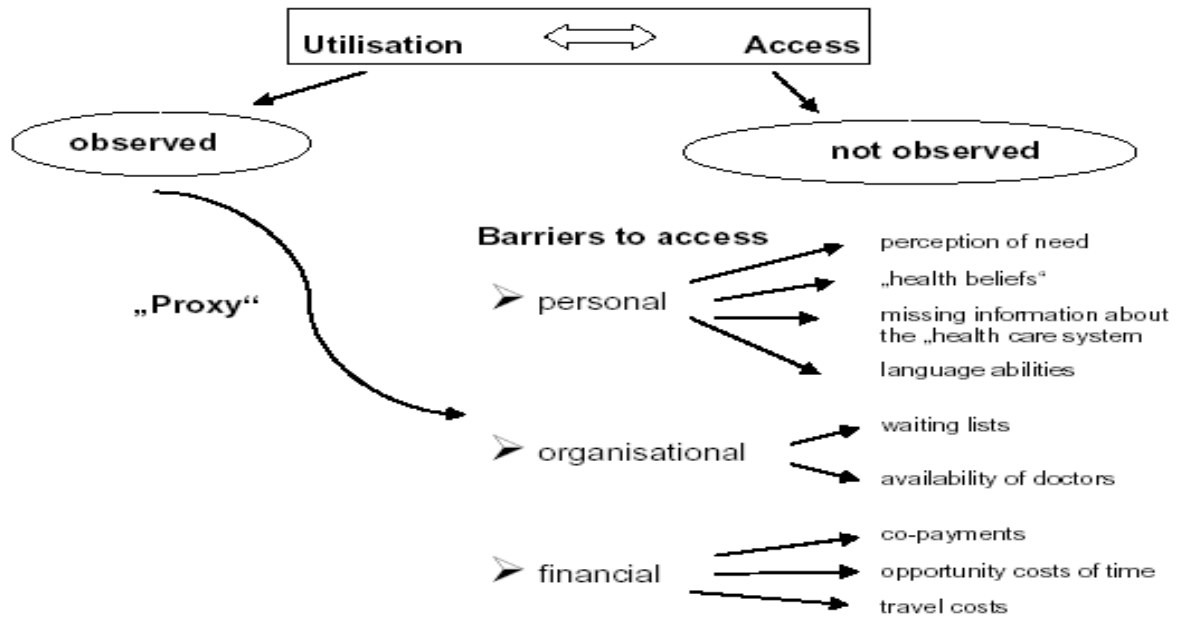
[3] The great deal of literature on equity and its relation to the theories of social justice cannot be replicated here. For an overview on the philosophical background see, among others, Gillon 1986, Pereira 1993, Williams 1993, and the references therein.

[4] Other principles are, for example, equality of expenditure per capita, or equality of health outcome. Williams and Cookson (2000), for example, discussed equity in health.

[5] In contrast, vertical equity implies that unequal people are treated differently, hence those with unequal needs have unequal access to health care or individuals with different abilities-to-pay make unequal contributions to the financing of health care. Empirical literature focuses mainly on the question of horizontal equity, usually in terms of access or utilisation. The question of vertical equity is usually not addressed – as it imposes quite a lot of problems in the empirical application; a notable exception is Sutton (2002).

irrespective of their income (see Le Grand 1991). Hence, personal resources should be taken into account. Pechansky and Thomas (1981) extended the concept of access in considering personal, financial, and organisational barriers. Personal factors include the patients' perception of their needs as well as their attitudes and health beliefs, which can be influenced by social factors. As stated above, health beliefs and the perception of need are both largely influenced by cultural and religious factors. If the health care system does not account for these factors by supplying a kind of "cultural sensibility", immigrants can face additional access barriers. In addition, immigrants might be confronted with access barriers due to missing knowledge about the health care system as well as due to a lack of language skills. Financial barriers can arise in the presence of out-of-pocket payments. But even in a health care system in which medical care at the point of utilisation is free, individuals may experience financial barriers, for example due to travelling costs or opportunity costs due to time lost from work. Organisational barriers can result, for example, from long waiting lists or from the unavailability of doctors (see Pechansky and Thomas 1981). Hence, all variables characterised as enabling factors in the Andersen model could create access barriers and should therefore be of special interest in analysing "equal access for equal need". Regarding the immigrant population it can be assumed that especially the personal barriers might play an important role.

Figure 2: Barriers to access in health care



Source: Own compilation

The important question remains how to measure access. As Aday and Andersen (1974) noted in their early contribution: "It is perhaps most meaningful to consider access in terms of whether those who need care get into the system" (ibid: 218). Hence, in this view, the term access can describe either the potential or the actual entry of an individual to the health care system. 'Having access' denotes a potential to utilise a service if required, whereas 'gaining access' refers to the initiation into the process of utilising a service; thus 'realised access'. As Mooney (1983) noted, there has been much confusion from these two distinct uses of the term access. He argued – to avoid further confusion – to regard access as only a question of supply. He highlighted that

> "It is important to stress that equality of access is about equal opportunity: the question of whether or not the opportunity is exercised is not relevant to equity defined in terms of access" (ibid: 182).

Hence, what we expect from a health care system from a normative point of view are equal opportunities: Individuals in equal need should have equal opportunities, thus equal access, to seek health care. However, this concept of access is rather difficult to implement in empirical studies, because 'opportunities' cannot be observed. In this study – and in accordance with the literature (see, for example, Bago d'Uva 2005) the **contact decision is seen as a proxy for access**. The idea is that in the first step, it is the patient who decides to visit a doctor (contact decision), whereas it is the physician who determines the intensity of the treatment (frequency decision). Hence, the first contact of a physician is supposed to measure access and the number of contacts (the frequency decision) measures utilisation.[6]

To **measure inequity** a multivariate regression analysis approach is used. The underlying idea is to investigate whether need (and demographic variables) are the principal determinants of health care utilisation (see Andersen 1968), which should be the case in an equitable health care system. Hence, a value judgement is needed on which components should explain access and utilisation in an equitable health care system. For example, if income or ethnicity are seen as factors which should not influence the access and utilisation of health care in an equitable health care system, then equity is not achieved if income and ethnic variables are significant independent predictors of access (hence, of the contact decision) or of utilisation (hence, of the frequency decision).

[6] Both terms are measured purely quantitative. The quality of treatment cannot be regarded here due to data limitations. This might be a severe drawback if the quality of treatment varies between different population groups. For example, assuming that a good treatment depends on the relationship between the doctor and the patient, there might be problems if this relationship is distorted due to language or cultural aspects.

With regard to the immigrant population, it is assumed from a normative point of view, that language skills and years since migration – used as a proxy for knowlegde of the health care system – should not be independent predictors of access and utilisation. However, differences in access to or in utilisation of health care according to country of origin can also arise due to behavioural aspects, and thus due to differences in preferences and risk aversion, and are thus not regarded here as inequity.

Hence, it is defined that migration-related inequity in access (utilisation) will exist if

- language skills and / or
- years since migration

are significant predictors of the contact decision (frequency decision).

IV. Data and econometric methods

Data source

The data used are drawn from the German Socio-Economic Panel (SOEP).[7] This is a representative longitudinal survey of currently about 12,000 randomly selected private households. Since its start in 1984 each household member above the age of 16 is asked questions on a yearly basis on a broad range of socio-economic indicators covering 'population and demography', 'education, training and qualification', 'earnings and income', 'health', 'basic orientation', as well as questions on 'satisfaction with life and with certain aspects of life'. Additionally, the head of the household is asked to fill in a household related questionnaire covering household income, housing, and questions on children in the household up to the age of 16.

One of the most important features of the SOEP is the over-sampling of two immigrant groups. Sample B, which started in 1984 with approximately 1,300 households, covers those households whose head is either from Italy, Greece, Spain, former Yugoslavia, or Turkey, that means Sample B covers individuals from the so-called former "guest worker countries". In 1994/95, Sample D was started, which consists of households in which at least one household member had moved from abroad to West Germany after 1984. Therefore especially

[7] For more detailed information see Haisken-DeNew and Frick 2005, SOEP Group 2001, Wagner et al. 2007, and references therein. The SOEP data are available as a "scientific use" file (see Wagner et al. 1993).

immigrants from Eastern Europe are included, and thus Sample D covers to a broad extent the so-called ethnic Germans (*Aussiedler*).[8]

The SOEP contains additionally the information in which region the household is living in, which offers the possibility to merge regional macro-indicators provided by the 'Federal Office for Building and Regional Planning' (*Bundesamt für Bauwesen und Raumordnung*, BBR). In this chapter, the share of foreigners and the share of doctors on the county level is merged to the SOEP data.[9]

The counties in Germany differ largely according to the share of foreigners as well as according to the number of doctors per 100,000 inhabitants. In 2005, the highest share of foreigners can be found in Offenbach (26.2%), Munich (24%), Stuttgart (23.7%), and Mannheim (22.0%), the lowest share of foreigners can be found in Sömmerda (0.7%), Saalkreis (0.9%), and Annaberg (1.0%). Regarding the number of doctors per 100,000 inhabitants, in 2005, the highest proportion can be found in Bamberg city (335), Regensburg (321), Rosenheim (312), and Munich (312), the lowest proportion can be found in Saalkreis (69), Bamberg county (86), and Bayreuth county (86).

Empirical specification

As the number of doctor visits is a discrete variable that can only take non-negative integer values, the application of count data models is appropriate.

Estimates of the utilisation of health care services are known to depend heavily on the empirical specification used in the analysis (see Deb and Holmes 2000: 475). This highlights the importance to be cautious with the interpretation of estimation results and the choice of the empirical method.

A standard benchmark model for count data is the **Poisson regression model** (PRM) (see, for example, Cameron and Trivedi 1998). A main characteristic of this model is the equality of mean and variance. This so-called *equidispersion assumption* is usually taken as one of the major shortcomings of the PRM (see Greene 2003: 744), because it is often violated in empirical data, especially in data about utilisation behaviour. One reason, which yield

[8] The term "Aussiedler" is used for ethnic Germans, who moved back to Germany after the fall of the iron curtain. They usually lived in Eastern European countries before.

[9] According to data protection rules, this part of the research using regional information was carried out at the DIW Berlin. I thank the staff for making the information available.

overdispersion is the large large proportion of zero users. In this case, the PRM will mostly predict much fewer zeros than there are in the data. This problem is called the "*excess zero*" or "*zero inflation*" problem (see Winkelmann 2000). Another critical assumption of the PRM lies in the postulated *independence of the events over time*. That means in the case at hand that a doctor visit in t should not have any influence on subsequent doctor visits. This might be an unrealistic assumption if an illness spell leads to several doctor visits which are not independent from one another.

An alternative to the PRM is the **negative binomial (Negbin) model** (see, for example, Cameron and Trivedi 1998). This model allows a more flexible modelling of the variance. However, the Negbin model is also not able to account for the large proportion of zero users usual in health utilisation data sets and yield poor fits (see Gurmu 1997). Additionally, the Negbin model as well as the PRM assume that there is only one underlying process that generates the zeros and positive observations. This assumption has been shown to be too restrictive in the case of health care utilisation (see Jones et al. 2007: 286).

The so far described single equation models take a rather traditional consumer theory approach (Grossman 1972; Muurinen 1982), where the demand for health care services is seen as primarily determined by the patient (see Deb and Trivedi 1997: 313). However, as proposed by Zweifel (1982), the decision to contact a physician at all and the actual number of visits are the result of two separate decision-making processes. This principal-agent approach is quite often highlighted in the literature: The idea behind is that in a first step, it is the patient who decides to visit a doctor (contact decision), whereas it is the physician who determines the intensity of the treatment (frequency decision) (see, among others, Manning et al. 1987: 109; Pohlmeier and Ulrich 1995: 340; Gerdtham 1997: 308). It is thereby assumed that the (individual's) decision to contact a physician is generated separately from the (physician's) decision on successive utilisation of health services.
Hence, so-called **hurdle models**, which distinguish between the contact and the frequency decision, have often been discussed to analyse health service utilisation. It has been demonstrated – for instance by Grootendorst (1995), Pohlmeier and Ulrich (1995), or Andersen and Schwarze (1997) that it might be a better option to estimate two-part models instead of one-part models if the dependent variable is characterised by a large proportion of zeroes and of the dependent variable results from two separate decision-making processes.

> "The idea underlying the hurdle formulations is that a binomial probability model governs the binary outcome of whether a count variate has a zero or a positive realization. If the realization is positive, the "hurdle" is crossed, and the conditional distribution of the positives is governed by a truncated-at-zero count data model" (Mullahy 1986: 345)

Hence, the first part models the decision to seek care and the second part models the positive counts for those individuals that receive some care. It is thereby assumed that the physician determines the frequency of visits as he/she acts as the agent for the patient (the principal) once the first contact has been established by the patient.

As the two parts are assumed to be independent and generated by two different processes it is possible to estimate the two parts of the hurdle model separately. The independent variables can be different for each of the two processes, or they can be the same, but may be interpreted differently depending on the stage of the decision-making process. For instance, the variable 'physician density' represents at the first stage an availability effect, whereas at the second stage it may reflect competition among physicians, and thus supplier-induced demand (see Pohlmeier and Ulrich 1995: 344).

A binary model has to be defined for the participation or contact decision. The underlying distribution is usually either logit, probit, Poisson, or Negbin. In the case at hand, a random-effects probit model is estimated, which allows to control for individual-specific unobserved heterogeneity (see Baltagi 2001 and Greene 2003 for a detailed discussion of the model).

For the frequency decision a truncated-at-zero count data model has to be defined, whereby the underlying distribution is commonly either Poisson or Negbin. In the case at hand, a zero-truncated negative binomial (ztnb) model is estimated. The special feature of the ztnb model lies in the structurally exclusion of zero counts. Hence, in the case at hand, the model is only estimated for those individuals who accessed the health care system. For a detailed outline of the ztnb model see Hilbe (2007: 160-164).[10]

[10] The sharp distinction between users and non-users is often critised, and so-called latent class or finite mixture models are proposed, which discriminate between frequent and less frequent users (see, among others, Deb and Holmes (2000), or Deb and Trivedi (1997, 2002). Although they have some advantages (see Deb and Trivedi (1997) or Cameron and Trivedi (1998), Jiménez-Martin et al. (2002: 306) mentioned that they are only driven by statistical reasoning, whereas the hurdle model can be seen as a natural extension of the principal-agent model. Additionally, the finite mixture model is sometimes difficult to estimate, because the mixing distribution has to be estimated jointly with the rest of the model parameters, which can yield over-parameterisation (see Jiménez-Martin et al. 2002: 306). In the case at hand, the hurdle model is used as described above as it provides the possibility to apply the principal-agent framework and thus to explicitly model the contact and the frequency decision. This is necessary to identify barriers to access as well as to identify the role of language skills and years since migration for access and utilisation, respectively.

Sample design

In the SOEP, information on the country of origin and on nationality is given. In the empirical, it is distinguished between first-generation immigrants and the second-generation. The first-generation is defined as being born abroad, irrespective of nationality. The group of ethnic Germans is therefore included in this group. The second-generation is defined as being born in Germany and either have no German nationality or having German nationality, but not since birth.[11]

The first- and the second-generation is analysed separately, because one can assume that German language skills and mother tongue language skills are differently distributed in these groups. First-generation immigrants should have a high proficiency in their mother tongue and maybe more difficulties in speaking German. For the second-generation the language skills should be distributed the other way round. Hence, combining the first- and the second-generation might cancel out the effect of language skills. Additionally, the cultural perception of health or the health care seeking behaviour might vary between the first- and the second-generation as the second-generation is assumed to be more influenced by the German culture through, for example, schooling.

Dependent variable

In the SOEP there are two questions relating to the utilisation of health services: one relating to inpatient and one to outpatient services. However, this study concentrates only on doctor visits. Unfortunately, only in five waves (1984-1987 and 1994) it has been asked separately for the use of general practitioners and specialists. Hence, the general question is used, which has been asked in all the other waves:

> *"Have you gone to a doctor within the last three months? If yes, please state how often".*

This is a rather gross measure of health care utilisation and can therefore be criticised. A better alternative would be specific measures related to a particular condition or the type of services or practitioners. Nevertheless, general doctor visits are widely used in empirical studies and can serve to provide first insights to inequity in access to or inequity in the utilisation of health care services.

[11] The question with regard to 'German nationality since birth' has only been introduced in 2003.

Table 1 gives an overview of the number of doctor visits for the first-generation and for the second-generation, and for men and women, respectively. The dependent variable is highly skewed to zero. The variance exceeds in all cases the mean; hence there is evidence for overdispersion.. For all groups, women show higher utilisation rates than men. Especially, second-generation women have about two times the mean of second-generation men. Second-generation men show the lowest mean of the number of doctor visits (1.24), and first-generation women the highest (2.83).

Table 1: Doctor visits: Descriptive analysis

number of doctor visits	first-generation		second-generation	
	men	women	men	women
0	0.41	0.29	0.53	0.34
1-2	0.30	0.33	0.31	0.31
3-6	0.20	0.28	0.14	0.27
7-10	0.05	0.06	0.02	0.05
>10	0.04	0.04	0.01	0.03
mean	2.42	2.83	1.24	2.49
std. deviation	4.67	4.40	3.13	4.13
n	10,065	9,692	1,610	1,596

Note: Share of total observations in percent; not controlled for other characteristics like age or health
Source: Own computation, SOEP, waves 1995-2005, not weighted

Independent variables

The inclusion of the independent variables is guided by the behavioural model of Andersen and the following explanatory variables are included: A dummy variable for ***sex*** (taking the value one for males); three dummy variables for ***age*** (one for the age category 26-50 years, one for the age category 51-65 years, and one that takes the value one if the respondent is older than 66, with the age of 16-25 years acting as reference group); dummy variables for the ***country of origin*** (i.e., a dummy variable for being born in European countries, a dummy variable for those born in Turkey, a dummy for being born in Eastern European countries, and a dummy for being born in all other countries); a dummy variables for the ***marital status*** (i.e., taking the value one for being married, with being single, widowed, or separated acting as reference group); a dummy variable for having ***children*** (aged 0-4 years); ***years of education***; ***occupational status*** (i.e., dummy

variables covering the following possibilities: 'blue collar worker', 'white collar worker', 'training', 'self-employed', 'pensioner, or 'public servant' (with 'non-working' or 'jobless' acting as reference group); logarithm of ***post-governmental household income,*** logarithm of ***size of the household***[12]; a dummy variable indicating if the person has ***health insurance*** (taking the value one for having no insurance, and zero otherwise); a dummy variable for ***German citizenship***; four dummy variables for ***lagged self-rated health*** ("good", "fair", "poor", or "very poor" with "very good" acting as reference group); a dummy variable indicating if the individual has been officially registered as having a reduced capacity for work or ***being severely disabled***; two dummy variables for ***German language skills***[13] ("good/fair", "poor/not at all" with "very good" acting as reference group); ***mother tongue language skills***[14] ("good/fair", "poor/not at all" with "very good" acting as reference group); ***years since migration***; ***ysm²***; ***number of doctors*** per 100,000 inhabitants according to the county level, the ***share of foreigners*** according to the county level, and a set of time dummy variables (one dummy for each year).

Health behaviour (smoking, body mass index, sports activities) cannot be included in the analysis as these variables have only been asked in three waves up to now.

Another important variable for women is pregnancy. It can be assumed that doctor visits and pregnancy are correlated with higher numbers of doctor visits for pregnant women. However, in the SOEP, the information if a woman has been pregnant at the time of the interview is only available from wave 2002 onwards. Hence, this information cannot be included in the estimation.

Descriptive characteristics of the sample

Table 2 presents descriptive characteristics of the sample. In the following, only a few important issues are highlighted: About one third of first-generation immigrants have German nationality, and most of them are ethnic Germans. With regard to German language skills, there is a huge difference between first- and second-generation immigrants. Whereas in the first-generation 62% of men and 58% of women rate their language skills as very good or good, the ratio in the second-generation amounts to 98% for men and 93% for women. The ratio of second-generation men assessing their language

[12] Schwarze (2003) showed that the inclusion of logarithm of household income and logarithm of household size is more flexible, because it is not necessary to make any assumptions about the equivalence scale.

[13] These are constructed from a self-assessed question: "In your opinion, how well do you speak German?"

[14] Mother tongue language skills are also constructed from a self-assessed question: "In your opinion, how well do you speak your native language?"

skills as poor or very poor is below one percent; and for women only 2%. This should be taken in mind regarding the interpretation of the estimation results. Regarding mother language skills, about 91% of first-generation immigrants report to speak either very good or good. In the second-generation, 70% of men and 77% of women rate their skills as very good or good. Again, there is only a very small percentage in the sample which rates their skills as poor or very poor (3% in the first-generation and about 9% in the second-generation). Again, this should be taken into account in the interpretation of the estimation results. The average duration of residence in Germany is rather high, with an average of 21.3 years for first-generation men and 19.2 years for first-generation women.

Table 2: Descriptive characteristics of the sample

Variable	first-generation immigrants		second-generation	
	men	women	men	women
sex	0.51	0.49	0.50	0.50
age (in years)	45.2 (14.3)	43.8 (13.9)	28.3 (10.88)	28.2 (10.36)
married	0.80	0.79	0.31	0.42
children young (0-4)	0.17	0.18	0.19	0.23
years of education (in years)	10.3 (2.2)	10.0 (2.5)	10.9 (2.4)	10.8 (2.2)
occupational status				
jobless / not working	0.15	0.39	0.12	0.31
blue collar	0.52	0.27	0.33	0.13
white collar	0.09	0.16	0.25	0.31
pensioner	0.16	0.12	0.03	0.02
public servant	0.00	0.00	0.01	0.00
training	0.04	0.04	0.24	0.21
self-employed	0.05	0.02	0.05	0.02
household income	29506.2 (15684.4)	28300.4 (15575.1)	31138.0 (13774.2)	28305.7 (14822.9)
size of household	3.5 (1.6)	3.4 (1.6)	3.4 (1.6)	3.3 (1.6)
no health insurance	0.01	0.01	0.01	0.01
lagged self-rated health				
very good	0.12	0.08	0.30	0.22
good	0.43	0.41	0.50	0.49
fair	0.28	0.30	0.15	0.20
poor	0.14	0.16	0.04	0.07
very poor	0.04	0.04	0.01	0.02
disability	0.11	0.06	0.03	0.04
German nationality	0.30	0.33	0.09	0.09
country of origin[a]				
other EU-countries	0.28	0.25	0.46	0.43
Turkey	0.29	0.26	0.30	0.28
Eastern Europe	0.40	0.46	0.15	0.19
other countries	0.03	0.04	0.01	0.02
German language skills				
very good	0.23	0.23	0.66	0.72
good	0.39	0.35	0.32	0.21
fair	0.29	0.27	0.02	0.04
poor	0.09	0.13	0.01	0.01
very poor	0.01	0.02	-	0.01
mother tongue				
very good	0.52	0.53	0.27	0.32
good	0.39	0.37	0.43	0.45
fair	0.06	0.07	0.20	0.16
poor	0.02	0.02	0.06	0.06
very poor	0.01	0.01	0.03	0.02
years since migration	21.3 (10.6)	19.2 (10.2)	-	-
# observations	10,065	9,692	1,610	1,596

Note: Standard deviation in parentheses
[a] for the second-generation the values refer to nationality
Source: SOEP, waves 1995-2005, not weighted

V. Estimation results

Estimation results for the contact decision

The results for first-generation immigrants with regard to the first part of the hurdle model, namely the random-effects probit model, are presented in table 3. The estimation is conducted for the total sample (column 2) and for men and women separately (column 3 and column 4) to allow for a possible different influence of certain independent variables on health care utilisation of men and women, respectively. Overall, the results are in line with the existing literature on health care utilisation.

In this study, I restrict the interpretation of the coefficients to a qualitative approach, with a positive sign indicating a higher probability of visiting the doctor, and a negative sign indicating a decreasing probability.

Being born in Turkey has no significant influence on the probability of a doctor visit compared to those born in an European country. For women, the coefficient of 'born in Turkey' is positive, though not significant, which is a rather unexpected finding as it is often assumed that especially Turkish women suffer from cultural barriers to health care. In contrast, being born in Eastern Europe and in 'other countries' lowers the probability of a doctor contact significantly (in the total sample). Explanations for that finding can be twofold: On the one hand, it could reflect cultural barriers to access to health care. On the other hand, it could reflect different preferences or a different utilisation behaviour.

In contrast to the hypothesis, having only good or poor *German language skills* increases the probability of a doctor visits for men, and – in line with the hypothesis – it decreases the probability of a doctor contact for women. However, none of the coefficients is significant. The hypothesis of an existing inequity in access to health care due to additional access barriers due to a lack of German language skills is therefore not supported by the data.

As explained above, given the possibility to go to doctors, who can speak the immigrant's mother tongue, it is necessary to control additionally for *mother tongue langue skills*. And indeed, the estimation results show that having only good or poor mother tongue language skills lowers the probability of a doctor contact for men and women, whereby the effect is only significant for 'good or fair mother tongue langue skills' for men. Hence, having poor language skills in the mother tongue might hamper the possibility to go to foreign doctors. With regard to the definition of inequity in access, it can be concluded that

mother tongue language skills matter and should be taken into account in the assessment of inequity in access to health care.

The inclusion of both, mother tongue language skills and German language skills, in the estimation equation might yield somewhat misleading results, because those who speak their mother tongue well and thus go to foreign doctors, they do not need German language skills to access the health care system. The same holds for the other way round, hence, those with good German language skills. To take into account the effect of poor language skills, either in German or in the mother tongue, I constructed three dummy variables: A dummy variable taking the value one if an individual has either very good German language skills or very good mother tongue language skills, a dummy variable taking the value one if the individual has either good or fair German or mother tongue language skills, and a dummy variable taking the value one if the individual has either poor German or mother tongue language skills or speaks none of these languages at all. The estimation result show – in line with the hypothesis of language skills acting as an access barrier – that having only good/fair or poor language skills lowers the probability of a doctor contact. But again, the coefficient is only significant in the men sample. The results can be found in table A1 in the appendix. Overall, regarding the definition of inequity in access, it can be suggested, that for men, language skills play a role for the contact decision, and hence, inequity in access with regard to language skills exist.

The estimation results for *ysm* and *ysm²* indicate that increasing duration of residence augments the probability of a doctor contact (positive sign of ysm, only significant for women), but to a decreasing degree (negative sign of ysm², again only significant for women). This is in line with the hypothesis, whereby duration of residence is assumed to be connected with knowledge about the health care system. Hence, increasing knowledge about the health care systems highers the probability of a doctor contact as access barriers due to a lack of knowledge are reduced.

Having *German nationality* lowers the probability of a doctor visit significantly for women. At first view, this results seems striking, as one would assume that naturalisation goes hand in hand with factors associated with a facilitating of access to health care. However, it should be taken in mind, that a large part (around 84%) of the first-generation immigrants in the sample with German nationality are ethnic Germans, which means that they have received German nationality upon arrival in Germany due to their German roots and not due to integration aspects.

The *share of foreigners* (on the county level) has a negative influence on the probability of a doctor contact. Though the influence is not found to be significant, this result contradicts the idea that a higher share of foreigners in a region could ease the first contact decision for the immigrants living there, for example, due to possible network effects. Including regional information yield three-level structure of the data, and ignoring the existence of such a hierarchical structure will generally underestimate the standard errors of the regression coefficient, and thus mislead inference (see Moulton 1990). However, as the coefficients for the share of foreigners are not significant even though the standard errors are probably underestimated, I will not provide the results of a multilevel model.
So far, another possible influence factor has been ignored, namely *religious affiliation*. In the timeframe of the analysis, the question has only been asked in 1997 and 2003 in the SOEP. It can be distinguished between undenominational individuals, Christians, and other religions. The group of 'other religions' includes Buddhism, Islam, and Jehovah's Witness, whereby most of the individuals in this groups (about 95%) are Moslems. Including religious affiliation reduces the sample size from 19,757 observations to 13,382 observations. The influence of religious affiliation is different for men and women, and none of the estimated coefficients is significant. The estimation results can be found in table A2 in the appendix.

With regard to the control variables, it is found that men have a significant lower probability to contact a physician. A higher *age* comes along with a higher probability to contact a physician. This has been expected as age reflects also physical circumstances, and morbidity is expected to increase with age. *Married* individuals show a higher probability of a doctor contact in comparison to singles, widowed, or divorced individuals. However, the effect is only significant in the total sample. In the literature, the influence of being married is controversially discussed. Overall, living together with a partner is seen as an important social resource for a positive coping strategy (see Thode et al. 2004: 30), and hence, having a partner is assumed to be an important factor influencing the contact decision. However, the direction of influence is not that clear: Whereas the partner might be worried about the health status of his/her spouse and hence, insists on a doctor visit, a partner can also help to cope with minor illnesses, and hence, hamper the doctor contact. The presence of *young children* (aged 0 to 4 years) in the household augments the probability of a doctor contact. However, the influence is only found to be significant in the women sample. This is reasonable as women might consult the doctor

according to reasons linked to childbearing or they might consult a doctor with the baby and record this visit as a doctor visit for themselves. In the literature, there is no consistent explanation for the influence of *years of education.* Whereas more educated individuals have a better recognition of need and a better recognition of the benefits of preventive care, they are also said to be more able to cure trivia on their own. The results show a positive influence of years of education on the contact decision, but the effect is only significant for the total sample and for men. Regarding the *occupational status*, being a blue or white collar worker and being self-employed reduces the probability of a doctor contact significantly in comparison with being non-working or jobless. Being a pensioner, a public servant, and in training increases the probability of a doctor contact, but not significant. *Household income* is found to increase the probability of a doctor visit (significantly in the total sample and in the women sample). The *size of the household* has a significant negative influence on the contact decision. Having *no health insurance* lowers the probability of a doctor contact, but the result is not significant (the insignificance might be caused by the very low proportion reporting to have no health insurance). This negative impact has been expected, because being not insured is an access barrier, which hampers the contact with the health care system. *Lagged self-rated health* has for all subsamples the expected significant and positive influence: Evaluating the state of health worse than very good higher the probability of a doctor visit. Additionally, having a reduced capacity to work or being severely disabled yield a higher probability to contact a physician.

In table 4 the estimation results of the first part of the hurdle model for the second-generation are provided.

There is one problem in the interview design of the SOEP with regard to the language skills of the second-generation: The questionnaire has been constructed in a way that the language question is not asked if an individual has German nationality and was born in Germany. In 2003, an additional question has been included in the SOEP questionnaire, namely if the individual has German nationality since birth. If not so, the language question has been asked. Due to the lack of information about language skills for those born in Germany with German nationality, but with migration background, there are excluded from the analysis until 2003.

As for the first-generation, the estimation is conducted for the total sample and separately for men and women. The sample consists of 631 individuals, 323 men and 308 women. Overall, the total sample consists of 3,206 person-years (1,610 person-years in the men sample and 1,596 in the women sample).

For the first-generation, the country of origin was included in the analysis. This is not possible for the second-generation as all of them were born in Germany. Hence, for the second-generation, the nationality is included in the analysis, which German nationality (those that have German nationality but not since birth) acting as reference. However, none of the estimated coefficients for nationality is significant. With regard to German language skills, it is found that having only poor language skills reduces the probability of a doctor contact for all subsamples, but the effect is only significant for the total sample. This result contradicts the findings for the first-generation and supports the idea of access barriers due to a lack of German language skills among the second-generation. The results with regard to mother tongue language skills are in line with the results found for the first-generation:

Table 3: Estimation results for first-generation immigrants with regard to the contact decision (random-effects probit model)

variables	total sample		men		women	
country of origin						
other EU-countries	-		-		-	
Turkey	0.003	(0.049)	-0.008	(0.066)	0.031	(0.075)
Eastern Europe	-0.102**	(0.051)	-0.115	(0.070)	-0.098	(0.074)
other countries	-0.190**	(0.091)	-0.162	(0.133)	-0.196	(0.125)
German language						
very good	-		-		-	
good / fair	0.020	(0.035)	0.037	(0.048)	-0.006	(0.051)
poor / not at all	0.014	(0.055)	0.030	(0.079)	-0.021	(0.079)
mother tongue						
very good	-		-		-	
good / fair	-0.031	(0.028)	-0.046	(0.038)	-0.013	(0.041)
poor / not at all	-0.326***	(0.094)	-0.450***	(0.129)	-0.187	(0.138)
ysm	0.015**	(0.006)	0.011	(0.009)	0.024**	(0.009)
ysm²	-0.000	(0.000)	-0.000	(0.000)	-0.000**	(0.000)
German nationality	-0.094**	(0.043)	0.029	(0.061)	-0.199***	(0.061)
share of foreigners	-0.004	(0.004)	-0.007	(0.005)	0.000	(0.006)
control variables						
male	-0.413***	(0.035)				
aged 16-25	-		-		-	
aged 26-50	0.047	(0.055)	0.054	(0.084)	0.078	(0.075)
aged 51-65	0.262***	(0.068)	0.318***	(0.101)	0.246**	(0.096)
above 66 years	0.522***	(0.098)	0.651***	(0.139)	0.421***	(0.141)
married	0.070*	(0.042)	0.055	(0.061)	0.063	(0.061)
children 0-4 years	0.056	(0.035)	0.007	(0.049)	0.129**	(0.053)
years of education	0.020***	(0.007)	0.023**	(0.011)	0.017	(0.011)
occupational status						
non-working /jobless	-		-		-	
blue collar	-0.134***	(0.036)	-0.118**	(0.055)	-0.126**	(0.051)
white collar	-0.169***	(0.048)	-0.209**	(0.084)	-0.123**	(0.061)
pensioner	0.026	(0.062)	0.025	(0.084)	0.032	(0.093)
public servant	0.370	(0.289)	0.220	(0.345)	0.706	(0.549)
training	0.079	(0.074)	0.069	(0.104)	0.129	(0.108)
self-employed	-0.582***	(0.081)	-0.693***	(0.105)	-0.323**	(0.138)
log hh income	0.067**	(0.034)	0.060	(0.051)	0.076*	(0.046)
log size of household	-0.201***	(0.058)	-0.163**	(0.079)	-0.261***	(0.086)
no health insurance	-0.240	(0.198)	-0.031	(0.249)	-0.533	(0.325)
lag srh very good	-		-		-	
lag srh good	0.126***	(0.039)	0.130**	(0.052)	0.114*	(0.060)
lag srh fair	0.343***	(0.044)	0.341***	(0.059)	0.342***	(0.066)
lag srh poor	0.649***	(0.053)	0.711***	(0.074)	0.590***	(0.079)
lag srh very poor	0.936***	(0.095)	0.941***	(0.127)	0.947***	(0.143)
disability	0.838***	(0.069)	0.784***	(0.083)	0.907***	(0.129)
number of doctors	0.001***	(0.000)	0.001**	(0.001)	0.001**	(0.001)
time dummy variables	yes		yes		yes	
constant	-0.117	(0.159)	-0.583**	(0.227)	-0.070	(0.230)
Log likelihood	-10923.78		-5759.4131		-5138.3116	
Pseudo-R²	0.05		0.06		0.05	
# observations	19,757		10,065		9,692	
# individuals	3,276		1,661		1,615	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Table 4: Estimation results for second-generation immigrants with regard to the contact decision (random-effects probit model)

variables	total sample		men		women	
nationality						
Germany	-		-		-	
other EU-countries	-0.131	(0.131)	-0.147	(0.187)	-0.099	(0.186)
Turkey	-0.210	(0.136)	-0.118	(0.195)	-0.289	(0.192)
Eastern Europe	0.055	(0.146)	-0.100	(0.206)	0.211	(0.209)
other countries	0.377	(0.362)	-0.024	(0.612)	0.706	(0.475)
German language						
very good	-		-		-	
good	0.005	(0.073)	-0.054	(0.094)	0.108	(0.117)
fair / poor / not at all	-0.336**	(0.158)	-0.180	(0.252)	-0.315	(0.215)
mother tongue						
very good	-		-		-	
good	-0.125*	(0.071)	-0.183*	(0.095)	-0.041	(0.106)
fair / poor / not at all	-0.183**	(0.083)	-0.248**	(0.111)	-0.114	(0.126)
share of foreigners	-0.011	(0.008)	-0.026**	(0.011)	0.003	(0.012)
control variables						
male	-0.456***	(0.073)	-		-	
aged 16-25	-		-		-	
aged 26-50	0.159**	(0.077)	0.181*	(0.108)	0.182	(0.113)
aged 51-65	0.147	(0.256)	0.309	(0.323)	-0.447	(0.460)
above 66 years	-0.059	(0.452)	-1.126	(0.776)	0.868	(0.702)
married	0.125	(0.082)	-0.017	(0.120)	0.231**	(0.116)
children 0-4 years	0.144*	(0.086)	0.069	(0.127)	0.193	(0.122)
years of education	0.009	(0.017)	-0.011	(0.022)	0.031	(0.026)
occupational status						
non-working /jobless	-		-		-	
blue collar	0.064	(0.090)	0.245*	(0.131)	-0.073	(0.144)
white collar	0.047	(0.092)	0.188	(0.150)	0.053	(0.125)
pensioner	0.336	(0.415)	1.316*	(0.721)	-0.081	(0.632)
public servant	-0.211	(0.534)	1.015	(0.806)	-	
training	0.042	(0.094)	0.207	(0.137)	-0.033	(0.138)
self-employed	-0.717***	(0.181)	-0.446*	(0.235)	-0.961***	(0.309)
log hh income	0.050	(0.071)	0.079	(0.104)	0.006	(0.101)
log size of household	-0.355***	(0.121)	-0.180	(0.170)	-0.429**	(0.179)
no health insurance	-0.240	(0.388)	-0.755	(0.554)	0.140	(0.620)
lagged SRH						
very good	-		-		-	
good	0.147**	(0.066)	0.207**	(0.086)	0.094	(0.101)
fair	0.324***	(0.088)	0.406***	(0.122)	0.236*	(0.130)
poor	0.726***	(0.143)	0.624***	(0.208)	0.842***	(0.208)
very poor	0.901***	(0.317)	0.919*	(0.543)	0.921**	(0.414)
disability	0.728***	(0.224)	0.736**	(0.303)	0.589*	(0.358)
number of doctors	-0.001	(0.001)	-0.002	(0.001)	-0.000	(0.001)
time dummy variables	yes		yes		yes	
constant	0.937***	(0.331)	0.546	(0.461)	0.534	(0.490)
Log likelihood	-1944.985		-1013.346		-900.817	
Pseudo-R^2	0.03		0.02		0.03	
# observations	3,206		1,610		1,596	
# individuals	631		323		308	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Having only poor mother tongue language skills decreases the probability of a doctor contact significantly. As for the first-generation, the coefficient is not significant in the women sample.

For men, the share of foreigners on the county level is found to insert a significant negative influence. Hence, the higher the share of foreigners, the lower the contact probability. However, so far, the three-level structure of the data is ignored, and this will generally underestimate the standard errors (see Moulton 1990). Therefore, a multilevel model is estimated taking into account the hierarchical structure of the data. The results of the multilevel fro men are presented in table 5. The control variables are not displayed, but available upon request. Overall, the results of the multilevel model are in line with the results of the random-effects probit model, and the significance of the coefficient of 'share of foreigners' is confirmed. This is an interesting result as it has been suggested that networks can provide information and thus yield to an improved access to health care services. An explanation for this finding might be related to the findings of Deri (2005): She found an ambiguous influence of networks depending on the specific area: For individuals living in an area with a high utilisation of the language group, access to health care is increased. However, living in an area with a low utilisation of the language group decreases access to health care (ibid: 1090).

Table 5: Estimation results for the second-generation, multilevel model

variables	**men**		**women**	
German language				
very good	-		-	
good	-0.073	(0.158)	0.150	(0.203)
fair / poor / not at all	-0.235	(0.421)	-0.608	(0.373)
mother tongue				
very good	-		-	
good	-0.301*	(0.160)	-0.070	(0.183)
fair / poor / not at all	-0.379**	(0.189)	-0.226	(0.217)
share of foreigners	-0.047**	(0.021)	0.010	(0.022)
log likelihood	-1011.247		-892.478	
σ_{kkz}	0.352	0.162	0.000	0.248
$\sigma_{individual}$	0.735	0.126	1.041	0.121
# observations	1,610		1,596	
# individuals	323		308	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Estimation results for the frequency decision

In table 6 the estimation results for the frequency decision (zero-truncated negative binomial model) for the first generation are presented. In comparison to the contact decision, the sample size is reduced to 2,952 individuals (1,451 men and 1,501 women). Hence, 324 individuals had no contact with a doctor in the last three month prior to the interview.

With regard to the *country of origin*, no significant effect is found. For *German language skills* the results are similar to the results of the contact decision: Having only good/fair or poor language skills lowers the expected number of doctor visits. As for the contact decision, the effect is only significant for having poor language skills in the men sample. Hence, there seems to be inequity in health care utilisation due to lacking language skills for first-generation immigrant men. Additionally, also *mother tongue language skills* influence the frequency decision: Having only good/fair or poor mother tongue language skills lowers the frequency of doctor visits for all subsamples, but the effect is again only significant for men. A possible explanation for this finding could be that patients with poorer language skills suffer from communication problems with the doctors. Hence, they might not feel comfortable and substantially reduce doctor visits to emergency visits. Additionally, they might not understand the instruction of the doctor to come back or they might not see the need to come back if there are difficulties in understanding the diagnosis. *Years since migration* seem to have no influence on the frequency of doctor visits, which seems to fit into the hypotheses of years since migration as a proxy for knowledge about the health care system. Whereas this knowledge is essential for the contact decision, once an individual has already accessed the health care system, knowledge plays a minor part assumed that the physician determines the frequency of doctor visits. Overall, the results show that language skills – German and mother tongue language skills – are also of importance in the frequency decision.

As shown in the descriptive statistics, the proportion of immigrants evaluating their language skills as poor or very poor is rather small and only a minority group is therefore affected by the inequity. Nevertheless, it is an important group and one can assume that there might not only be inequity in health care, but also in all other fields where language skills might be important.

As for the contact decision, the share of foreigners on the county level is not found to influence the frequency decision.

In table 7 the estimation results for the frequency decision (zero-truncated Negbin model) for the second-generation are presented. In comparison to the contact decision, the sample size is reduced to 533 individuals (265 men and 268 women). Hence, 98 individuals have not accessed the health care system. It should be taken in mind that the sample size for the frequency decision of the second-generation is therefore rather small.

As the country of origin for the first-generation, the *nationality* of the second-generation seems to have no influence on the frequency decision. Also with regard to *German language skills*, the results are similar to that of the first-generation: Having only good or poor language skills lowers the expected number of doctor visits in comparison to very good German language skills. In contrast to the first-generation, where the effect has only found to be significant for men, for the second-generation, the coefficient of good language skills is significant for women. Hence, there seems to be inequity in health care utilisation due to lacking language skills for second-generation men and women. In contrast to the first-generation, *mother tongue language skills* seem to have no significant influence on the frequency of doctor visits for the second-generation.
The *share of foreigners* on the county level is found to influence the frequency of doctor visits significantly positive for women. Again, so far, the hierarchical structure of the data has been ignored, thus misleading inference (see Moulton 1990). To the best of my knowledge, there is so far no software package, which can estimate a zero-truncated negative binomial model. Hence, I re-estimated the model by controlling for fixed regional effects by including dummy variables for the regions. Unfortunately, this model is not converging. A possible explanation for that can be the loss of degrees of freedom due to the inclusion of a large amount of dummy variables. Hence, the results with regard to the share of foreigners has to be taken with caution.

Table 6: Estimation results for first-generation immigrants with reagrd to the frequency decision (zero-truncated negative binomial model)

variables	total sample		men		women	
country of origin						
other EU-countries	-		-		-	
Turkey	0.009	(0.055)	-0.022	(0.087)	0.037	(0.070)
Eastern Europe	-0.045	(0.056)	-0.126	(0.093)	0.006	(0.069)
other countries	-0.030	(0.109)	-0.020	(0.174)	-0.022	(0.130)
German language						
very good	-		-		-	
good / fair	-0.079	(0.051)	-0.108	(0.080)	-0.061	(0.059)
poor / not at all	-0.170**	(0.074)	-0.336***	(0.109)	-0.058	(0.093)
mother tongue						
very good	-		-		-	
good / fair	-0.019	(0.035)	-0.014	(0.054)	-0.018	(0.043)
poor / not at all	-0.267**	(0.110)	-0.517***	(0.185)	-0.150	(0.126)
ysm	-0.001	(0.008)	0.006	(0.014)	-0.005	(0.010)
ysm²	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
German nationality	-0.141**	(0.055)	-0.097	(0.084)	-0.174**	(0.068)
share of foreigners	0.000	(0.004)	-0.002	(0.006)	0.002	(0.005)
control variables						
male	-0.062	(0.044)	-		-	
aged 16-25	-		-			
aged 26-50	-0.065	(0.117)	-0.141	(0.270)	-0.017	(0.081)
aged 51-65	-0.032	(0.135)	-0.079	(0.296)	0.004	(0.099)
above 66 years	-0.010	(0.148)	-0.010	(0.308)	-0.004	(0.124)
married	-0.037	(0.053)	0.055	(0.096)	-0.079	(0.062)
children 0-4 years	-0.112**	(0.047)	-0.137*	(0.080)	-0.064	(0.057)
years of education	-0.008	(0.010)	-0.024	(0.015)	0.008	(0.012)
occupational status						
non-working /jobless	-		-		-	
blue collar	-0.166***	(0.050)	-0.296***	(0.092)	-0.076	(0.053)
white collar	-0.335***	(0.065)	-0.505***	(0.126)	-0.265***	(0.070)
pensioner	-0.081	(0.059)	-0.207**	(0.096)	0.000	(0.074)
public servant	-0.195	(0.406)	-1.124***	(0.305)	0.555	(0.468)
training	-0.258***	(0.095)	-0.300*	(0.176)	-0.218**	(0.104)
self-employed	-0.197	(0.145)	- 0.273	(0.206)	-0.251	(0.193)
log hh income	-0.034	(0.039)	-0.021	(0.069)	-0.038	(0.047)
log size of household	-0.053	(0.080)	-0.120	(0.136)	-0.007	(0.089)
no health insurance	-0.452	(0.331)	-0.021	(0.454)	-1.093***	(0.161)
lagged SRH						
very good	-		-		-	
good	0.119	(0.074)	0.177	(0.121)	0.064	(0.084)
fair	0.451***	(0.079)	0.560***	(0.129)	0.365***	(0.089)
poor	0.863***	(0.082)	0.979***	(0.130)	0.768***	(0.097)
very poor	1.211***	(0.097)	1.412***	(0.153)	1.009***	(0.117)
disability	0.484***	(0.049)	0.423***	(0.070)	0.548***	(0.065)
number of doctors	-0.001	(0.000)	-0.000	(0.001)	-0.001	(0.001)
time dummies	yes		yes		yes	
constant	1.251***	(0.201)	1.342***	(0.362)	1.095***	(0.238)
log likelihood	-27603.561		-12730.654		-14803.766	
# observations	12,836		5,958		6,878	
# individuals	2,952		1,451		1,501	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Table 7: Estimation results for second-generation immigrants with regard to the frequency decision (zero-truncated negative binomial model)

variables	total sample		men		women	
nationality						
Germany	-		-		-	
other EU-countries	-0.135	(0.182)	0.191	(0.279)	-0.217	(0.222)
Turkey	-0.145	(0.187)	0.275	(0.281)	-0.294	(0.235)
Eastern Europe	-0.235	(0.196)	-0.271	(0.312)	-0.138	(0.217)
other countries	-0.139	(0.237)	1.156*	(0.599)	-0.229	(0.288)
German language						
very good	-		-		-	
good / fair	-0.150	(0.103)	-0.089	(0.129)	-0.228*	(0.128)
poor / not at all	-0.543***	(0.210)	-0.897**	(0.402)	-0.262	(0.218)
mother tongue						
very good	-		-		-	
good / fair	-0.037	(0.106)	0.120	(0.139)	-0.157	(0.130)
poor / not at all	-0.097	(0.115)	-0.079	(0.173)	-0.102	(0.142)
share of foreigners	0.021**	(0.010)	0.005	(0.015)	0.025**	(0.012)
control variables						
male	-0.395***	(0.096)	-		-	
aged 16-25	-		-		-	
aged 26-50	-0.105	(0.123)	0.066	(0.156)	-0.054	(0.137)
aged 51-65	-0.925***	(0.277)	-0.468	(0.323)	-1.538**	(0.610)
above 66 years	-1.035***	(0.354)	-0.845*	(0.464)	-0.833	(0.683)
married	0.199*	(0.113)	-0.152	(0.166)	0.354***	(0.127)
children 0-4 years	-0.069	(0.122)	-0.102	(0.191)	0.042	(0.141)
years of education	-0.008	(0.022)	-0.030	(0.030)	0.015	(0.025)
occupational status						
non-working /jobless	-		-		-	
blue collar	-0.381**	(0.168)	-0.473*	(0.265)	-0.194	(0.159)
white collar	-0.489***	(0.137)	-0.602**	(0.255)	-0.312**	(0.139)
pensioner	0.381	(0.324)	0.355	(0.398)	0.581	(0.671)
public servant	0.704	(0.555)	0.248	(0.492)	-	
training	-0.608***	(0.198)	-0.744***	(0.278)	-0.320*	(0.168)
self-employed	-0.565	(0.383)	-1.134***	(0.360)	-0.152	(0.434)
log hh income	-0.177*	(0.106)	-0.129	(0.136)	-0.196	(0.125)
log size of household	0.002	(0.172)	0.071	(0.247)	-0.039	(0.193)
no health insurance	-0.540	(0.354)	-0.495	(0.614)	-0.506*	(0.268)
lagged SRH						
very good	-		-		-	
good	-0.029	(0.123)	-0.078	(0.155)	0.076	(0.111)
fair	0.302**	(0.134)	0.084	(0.185)	0.476***	(0.137)
poor	0.624***	(0.145)	0.995***	(0.207)	0.503***	(0.148)
very poor	0.457*	(0.237)	-0.061	(0.459)	0.606**	(0.248)
disability	0.604***	(0.195)	0.667***	(0.187)	0.403*	(0.239)
number of doctors	-0.001	(0.001)	-0.001	(0.002)	-0.001	(0.001)
time dummy variables	yes		yes		yes	
constant	1.795***	(0.471)	1.288*	(0.708)	1.565***	(0.479)
log likelihood	-3524.824		-1252.706		-2226.341	
# observations	1,809		756		1,053	
# individuals	533		265		268	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

VI. Conclusion and discussion

Using eleven waves (1995-2005) from the SOEP, this study analyses if there exists inequity in access to or in the utilisation of health care services due to a lack of language skills – German language skills or mother tongue language skills – or due to a lack of information about the health care system (approximated by years since migration) among first- and second-generation immigrants in Germany.

Table 8 summarises the findings with regard to language skills and years since migration. Regarding the contact decision, German language skills have no significant influence on the probability to contact a doctor for all groups of immigrants. The hypothesis of inequity in access to health care due to access barriers caused by a lack of German language skills is therefore not supported by the data. However, mother tongue language skills seem to be important for the contact probability of the first- and second-generation: Having only good or poor mother tongue language skills reduces the probability of a doctor contact. The effect is found to be significant for first- and second-generation men. This might be explained by the fact that immigrants might go to doctors speaking their mother tongue, but having only poor language skills in the mother tongue hampers the possibility to go to foreign doctors.

For the frequency decision, poor German language skills are found to exert a significant influence – in contrast to the contact decision: Those reporting poor language skills have a lower expected number of doctor visits. The effect is found to be significant for first-generation men and for second-generation men and women. Hence, there seems to be inequity in health care utilisation due to lacking German language skills. With the exception of first-generation men – where it is found that poor mother tongue language skills reduce the expected number of doctor visits significantly, no significant effect is found for mother tongue language skills.

Overall, there seem to be significant gender differences with regard to the role of language skills. For women, a significant effect has only been found for German language skills in the frequency decision, whereas for men, language skills seem to be more influential. To explain these different results for men and women, or rather the underlying mechanism, more qualitative studies are needed.

Table 8: Summary of the results with regard to language skills and ysm

	first-generation		second-generation	
	men	**women**	**men**	**women**
contact decision				
German language skills				
good / fair	(+)	(-)	(-)	(+)
poor / not at all	(+)	(-)	(-)	(-)
mother tongue language skills				
good / fair	(-)	(-)	-	(-)
poor / not at all	---	(-)	--	(-)
years since migration	(+)	++	n.a.	n.a.
frequency decision				
German language skills				
good / fair	(-)	(-)	-	-
poor / not at all	---	(-)	--	(-)
mother tongue language skills				
good / fair	(-)	(-)	(+)	(-)
poor / not at all	---	(-)	(-)	(-)
years since migration	(+)	(-)	n.a.	n.a.

+: positive influence, -: negative influence, (): not significant
+++ significant at 1%, ++ significant at 5%, + significant at 10%
n.a.: not available
Source: Own compilation

The results indicate that years since migration have an impact on the contact decision of first-generation immigrant women, whereby a significant positive influence is found. Hence, missing knowledge about the health care system could create additional access barriers and yield inequity in access to health care in the group of first-generation women. The duration of residence seems to have no influence on the frequency decision.

It should be taken in mind that the results depend largely on the assumption that we really observe an illness period, or rather that the first contact that is observed is in fact the first contact and not the frequency visit from the time interval before.

Additionally, it should be taken in mind that we can only observe the first contact as a proxy for access. Hence, more (qualitative) studies are necessary to shed more light on the concept of "access". More qualitative studies are also desirable to ensure that the influence of language skills is not confounded with other factors such as cultural or behavioural aspects (that could so far not captured by country of origin or religion) or other kinds of integrational aspects.

Finally, it should be mentioned that self-assessed language skills might be measured with measurement error, especially if the perception what constitutes ‘good’ or ‘poor’ language skills changes with duration of residence. Future studies should therefore also use additional information in the SOEP connected to language skills (e.g., language spoken at home, contact to Germans, language of newspapers).

Appendix

Table A1: Estimation results, first part of the hurdle model, first-generation, language index

variables	total sample		men		women	
country of origin						
other EU-countries	-		-		-	
Turkey	0.008	(0.049)	-0.007	(0.065)	0.037	(0.075)
Eastern Europe	-0.106**	(0.051)	-0.118*	(0.070)	-0.100	(0.074)
other countries	-0.188**	(0.091)	-0.161	(0.133)	-0.194	(0.125)
language skills						
very good	-		-		-	
good / fair	-0.023	(0.034)	-0.007	(0.047)	-0.039	(0.049)
poor / not at all	-0.076*	(0.043)	-0.104*	(0.061)	-0.063	(0.061)
ysm	0.013**	(0.006)	0.007	(0.009)	0.023**	(0.009)
ysm²	-0.000	(0.000)	0.000	(0.000)	-0.000**	(0.000)
German nationality	-0.112***	(0.042)	0.003	(0.060)	-0.207***	(0.060)
share of foreigners	-0.003	(0.004)	-0.006	(0.005)	0.001	(0.006)
control variables						
male	-0.416***	(0.035)				
aged 16-25	-		-		-	
aged 26-50	0.063	(0.055)	0.080	(0.084)	0.085	(0.075)
aged 51-65	0.289***	(0.068)	0.358***	(0.099)	0.259***	(0.095)
above 66 years	0.549***	(0.097)	0.696***	(0.138)	0.434***	(0.141)
married	0.081*	(0.042)	0.069	(0.061)	0.067	(0.060)
children 0-4 years	0.051	(0.035)	0.000	(0.049)	0.127**	(0.053)
years of education	0.019**	(0.007)	0.022**	(0.011)	0.017	(0.011)
occupational status						
non-working /jobless	-		-		-	
blue collar	-0.136***	(0.036)	-0.120**	(0.055)	-0.126**	(0.051)
white collar	-0.177***	(0.048)	-0.218***	(0.084)	-0.128**	(0.061)
pensioner	0.024	(0.062)	0.025	(0.084)	0.030	(0.093)
public servant	0.356	(0.289)	0.211	(0.345)	0.691	(0.551)
training	0.064	(0.074)	0.046	(0.104)	0.123	(0.107)
self-employed	-0.588***	(0.081)	-0.698***	(0.105)	-0.326**	(0.138)
log hh income	0.064*	(0.034)	0.055	(0.051)	0.074	(0.046)
log size of household	-0.195***	(0.058)	-0.158**	(0.079)	-0.256***	(0.086)
no health insurance	-0.241	(0.198)	-0.039	(0.248)	-0.528	(0.325)
lagged SRH						
very good	-		-		-	
good	0.127***	(0.039)	0.128**	(0.052)	0.116*	(0.060)
fair	0.345***	(0.044)	0.339***	(0.059)	0.345***	(0.066)
poor	0.654***	(0.053)	0.714***	(0.073)	0.594***	(0.079)
very poor	0.937***	(0.095)	0.941***	(0.127)	0.950***	(0.143)
disability	0.836***	(0.069)	0.780***	(0.082)	0.906***	(0.129)
number of doctors	0.001***	(0.000)	0.001**	(0.001)	0.001**	(0.001)
time dummy variables	yes		yes		yes	
constant	-0.072	(0.159)	-0.535**	(0.226)	-0.038	(0.229)
Log likelihood	-10928.59		-5764.5096		-5138.6226	
Pseudo R²	0.05		0.05		0.05	
# observations	19,757		10,065		9,692	
# individuals	3,276		1,661		1,615	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Table A2: Estimation results, first part of the hurdle model, first-generation, inclusion of religion

variables	total sample		men		women	
other EU-countries	-		-		-	
Turkey	0.084	(0.092)	0.012	(0.127)	0.154	(0.136)
Eastern Europe	-0.078	(0.060)	-0.108	(0.087)	-0.064	(0.084)
other countries	-0.168	(0.105)	-0.117	(0.162)	-0.182	(0.138)
udenominational	-		-		-	
Christian	-0.044	(0.071)	-0.165	(0.102)	0.067	(0.099)
other religion	-0.050	(0.090)	-0.149	(0.123)	0.072	(0.133)
German language						
very good	-		-		-	
good / fair	0.024	(0.042)	0.059	(0.059)	-0.019	(0.060)
poor / not at all	0.077	(0.070)	0.117	(0.100)	0.011	(0.098)
mother tongue						
very good	-		-		-	
good / fair	-0.026	(0.034)	-0.043	(0.047)	-0.012	(0.049)
poor / not at all	-0.226**	(0.115)	-0.378**	(0.160)	-0.079	(0.165)
ysm	0.017**	(0.008)	0.009	(0.011)	0.028**	(0.011)
ysm²	-0.000	(0.000)	-0.000	(0.000)	-0.001**	(0.000)
German nationality	-0.114**	(0.051)	0.009	(0.075)	-0.219***	(0.070)
share of foreigners	-0.006	(0.005)	-0.010	(0.007)	-0.000	(0.007)
control variables						
male	-0.403***	(0.042)	-		-	
aged 16-25	-		-		-	
aged 26-50	0.034	(0.075)	-0.025	(0.116)	0.100	(0.099)
aged 51-65	0.222**	(0.089)	0.199	(0.135)	0.257**	(0.121)
above 66 years	0.487***	(0.120)	0.570***	(0.177)	0.372**	(0.168)
married	0.082	(0.053)	0.158**	(0.078)	-0.009	(0.074)
children 0-4 years	0.022	(0.046)	0.001	(0.065)	0.056	(0.068)
years of education	0.019**	(0.009)	0.015	(0.014)	0.021*	(0.013)
non-working /jobless	-		-		-	
blue collar	-0.137***	(0.044)	-0.075	(0.070)	-0.167***	(0.061)
white collar	-0.166***	(0.058)	-0.171	(0.105)	-0.163**	(0.071)
pensioner	0.027	(0.076)	0.022	(0.107)	0.063	(0.110)
public servant	0.428	(0.306)	0.376	(0.377)	0.653	(0.549)
training	0.127	(0.093)	0.211	(0.135)	0.084	(0.131)
self-employed	-0.533***	(0.099)	-0.584***	(0.133)	-0.383**	(0.162)
log hh income	0.094**	(0.043)	0.128*	(0.066)	0.088	(0.056)
log size of household	-0.326***	(0.073)	-0.354***	(0.103)	-0.361***	(0.107)
no health insurance	-0.236	(0.251)	-0.074	(0.326)	-0.393	(0.394)
lag SRH very good	-		-		-	
lag SRH good	0.131***	(0.048)	0.144**	(0.065)	0.104	(0.072)
lag SRH fair	0.327***	(0.054)	0.327***	(0.074)	0.312***	(0.080)
lag SRH poor	0.676***	(0.066)	0.756***	(0.092)	0.594***	(0.096)
lag SRH very poor	0.988***	(0.122)	1.040***	(0.164)	0.949***	(0.182)
disability	0.928***	(0.087)	0.942***	(0.107)	0.847***	(0.149)
number of doctors	0.001**	(0.000)	0.001*	(0.001)	0.001	(0.001)
time dummies	yes		yes		yes	
constant	-0.053	(0.220)	-0.471	(0.318)	-0.018	(0.311)
Log likelihood	-7435.884		-3820.6478		-3593.2928	
Pseudo-R²	0.05		0.04		0.05	
# observations	13,382		6,702		6,680	
# individuals	2,291		1,138		1,153	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

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