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Social Capital and Administrative Contextual Determinants of Lack of Access to a Regular Doctor: A Multilevel Analysis in Southern Sweden

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Abstract

Background: The aim of this study was to investigate the influence of contextual (social capital and administrative/neo-materialist) and individual factors on lack of access to a regular doctor.

Methods: The 2000 public health survey in Scania is a cross-sectional study. A total of 13,715 persons answered a postal questionnaire, which is 59% of the random sample. A multilevel logistic regression model, with individuals at the first level and municipalities at the second, was performed. The effect (intra-class correlations, cross-level modification and odds ratios) of individual and municipality (social capital and health care district) factors on lack of access to a regular doctor was analysed using simulation method. The deviance information criterion (DIC) was used as information criterion for the models.

Results: The second level municipality variance in lack of access to a regular doctor is substantial even in the final models with all individual and contextual variables included. The model that results in the largest reduction in DIC is the model including age, sex and individual social participation (which is a network aspect of social capital), but the models which include administrative and social capital second level factors also reduced the DIC values.

Conclusions: This study suggests that both administrative health care district and social capital may partly explain the individual's self reported lack of access to a regular doctor.

Key words: access, regular doctor, multilevel, social capital, social participation, health care district, neomaterialism

Introduction

One objective of the World Health Organization is to ensure that subpopulations such as socioeconomic groups, ethnic groups and subpopulations within different geographic areas have equal access to health care (1). Access to a regular provider has often been used as a measure of access to health care (2,3,4,5). Access to a regular doctor has been shown to give better access to health care than just having a regular provider, but no regular doctor (6). In one American study access to a regular doctor was of greater importance than health insurance status for the access to health care (3). Another study showed that the sharing of patients between doctors leads to lower utilisation of health care, despite unchanged needs (7). In Sweden, the aim of all programs and policies for the organisation of the primary health care system in recent decades has been to provide a regular doctor to all individuals and families in order to provide equal access to health care for all. It is thus reasonable to use access to a regular doctor as an indirect measure of access to health care.

A study of access to health care or to a regular physician should be related to individual perception of health, because poor self-reported health is highly associated with care seeking (8,9,10,11). Age, sex, household income, education (8) and country of origin (12) have also been shown to be associated with health care utilisation.

Contextual factors may also affect health care utilisation, access to health care and access to a regular doctor. In recent years social capital has been introduced as an important contextual determinant of different aspects of health and access to health care. Social capital has mostly been operationalised as either social participation or trust. Putnam has suggested that they represent different aspects of social capital (13). Furthermore, a distinction must be made between social participation as an individual characteristic (social network) and social participation/social integration measured as a collective characteristic (contextual level). Several studies have e.g. shown an independent effect of the social context on self-reported health in both the United States (14) and Sweden (15). Social capital has been suggested by its proponents to be associated with low mortality, high self-reported health, benevolent health related behaviours, lower risks of crime and violence, and higher levels of access to health care and amenities (14). The association between social capital and access to health care seems to be the least investigated of these fields of social capital and public health research.

The research on social capital and public health has, however, not remained unquestioned. One level of critique concerns the meaning and operationalisation of the social capital concept itself. The lack of clarity and distinct definitions may be exemplified by the fact that Macinko and Starfield have identified at least four different levels on which analyses of social capital have been conducted in public health: the macro (countries and regions), the meso (neighbourhoods), the micro (individual social networks and social participation), and the psychological (trust) levels (16). A second level of critique, expressed by the neo-materialists, claims that the research on social capital and public health only serves to obscure underlying ideological, political, administrative and economic determinants of health inequalities and other public health issues. The neo-materialists emphasise the importance of political programs, active governments, active welfare politics, good administration and good economic preconditions for the realisation of public health programs instead of social capital. The neo-materialists have also accused the social capital authors within the public health literature for “blaming the victim”, i.e. to suggest that the source of health problems of deprived groups is caused by their own lack of initiatives in forming formal and informal social networks (17,18,19). The social capital literature is more specifically criticized for introducing an artificial dichotomy between civil society and political society/the state (20), for creating an artificial dichotomy between material and psychosocial factors which according to the critics are determined by the same socioeconomic factors, for ignoring the importance of politics and welfare for health, and for reintroducing the psychosocial theory which previously has proved to accumulate scientific knowledge poorly (21). The debate between the social capitalists and the neo-materialists is ongoing and not resolved. It is also plausible that social capital and the conditions professed by the neo-materialists influence different aspects of public health in a complex way. One way to illuminate this issue is to conduct multilevel analyses including both individual and contextual factors to measure their influence on different health or health related outcomes. The contextual factors should include both measures of social capital and measures of contextual factors derived from the neo-materialist critique, e.g. administrative factors, in the same statistical model. Simultaneously, the model should include individual level social participation and generalized trust in other people. Investigations have been conducted to disentangle differences between different measures of social capital and other non social capital measures of e.g. participation (22). It should be noted that the definition of social participation as an aspect of social capital is narrower than the general and very wide definition of social participation as community participation. Social activities such as e.g. visiting a theatre/cinema, an arts exhibition, a

church service, a sports event, a night club or writing a letter to the editor of a newspaper/journal could be suspected in some cases to be completely solitary activities which do not comprise the transmission of the norms and values of society. All these items are still included in this study for two reasons. First, they have previously been included as an index consisting of thirteen items in the investigation of the association between social participation and health related behaviours (23). Second, these items may in some cases be regarded as indirect mediators of the norms and values of community (24). Trust which is another important aspect of social capital has been stressed as an important factor for improving health outcomes of deprived populations as well as ensuring access to resources and infrastructure (25).

The health care sector in Sweden is divided into regions (*landsting* and *regioner*) which independently make decisions on taxes to finance the health care sector, to some extent decide on priorities within the health care sector (within the limits set by national laws) and independently decide how to administer the health care sector within each regional area. Policy decisions at the highest level are made by a political assembly of politicians elected in general elections every fourth year within each of the counties and regions. Some of the 22 counties and regions of Sweden are run by non-socialist majorities, others by socialist majorities. The region of Scania (Skåne) was run by a non-socialist majority in 1998-2002. Prior to 1998 the present region of Scania was divided into three different smaller counties (*landsting*): the City of Malmö, the county of Malmöhus and the county of Kristianstad. Since 1998 the region of Scania has been divided into five administrative health care districts. The general policy during 1998-2002 was the same for the five districts. However, there could still be variations in implementation as well as variations in the extent to which the administrative management directors within each of the districts follow the directives of the politicians and the director of the whole region in e.g. keeping the budget. This study is an attempt to conduct an analysis on the health related issue lack of access to a regular doctor, which is a politically central issue in the health policy debate in Sweden. It may be hypothesized that there might be differences between the five administrative health care districts, and thus the municipalities, in lack of access to a regular doctor in Scania (Skåne). It may also be hypothesized that there may be social capital differences between the municipalities leading to lack of access to a regular doctor. In fact, reports and debate in the mass media in recent years have clearly indicated that the middle district has the highest compliance when it comes to following the directives, e.g. cutting budget costs, of the politicians and the regional director for the entire

region of Scania. A complementary hypothesis may be that social capital measured as social participation and trust, respectively, at the individual level may have different effects on lack of access/access to a regular doctor in different municipalities depending on the aggregate prevalence of access/lack of access to a regular doctor in the municipalities, i.e. a slope-intercept covariance. In municipalities with a high prevalence of lack of access, social capital may be much more weakly associated with access than in municipalities with a low prevalence of lack of access to a regular doctor.

The aim of this study is to investigate the influence of contextual factors such as social capital, measured as social participation aggregated at the municipality level as well as social participation and generalized trust in other people at the individual level, and administrative district, derived from the neo-materialist critique, on lack of access to a regular doctor in southern Sweden in a multilevel analysis.

Material and methods

Population

This public health survey in Scania (Skåne) 2000 cross-sectional study is based on the population investigated by a postal questionnaire in Scania in southern Sweden in November 1999- February 2000. The postal questionnaire was sent to 24,922 randomly chosen persons aged 18-80 that were registered as living in Scania. Two reminders were also sent to the respondents. A total of 1,207 persons could not be reached during this period. A total of 13,715 persons answered the questionnaire, which represents 59% of the net selection of respondents, but 111 persons lacked information on sex and/or age. The 2000 population sample in Scania contains people aged 18-80 years. The strata are defined by the 60 municipalities/city quarters according to age (three age groups), sex, and geographic area (60 areas), giving 360 different strata and corresponding values of the weight variable. In the statistical calculations of this study this has been corrected by a weighting variable, so that the representative prevalences (%) for the entire Scania region are given. The differences in prevalences between the uncorrected and corrected data are very small.

Definitions

Access to a regular doctor is defined according to the answer to the question "Do you have a regular doctor whom you consult when needed?". The options private doctor/family medicine, doctor/occupational medicine, specialist doctor in other specialities, hospital or other doctor, and different combinations of these are all defined as access to a regular doctor. The alternative "No, not any doctor in particular" is defined as no access to a regular doctor. The variable is dichotomised into "access to" or "lack of access to" a regular doctor.

Age groups are divided into the age groups 18-34, 35-44, 45-54, 55-64 and 65-80 years.

In regard to *country of origin*, all persons born in other countries than Sweden are merged into a single category. The two categories used in the analysis are "Sweden" or "other".

Education is divided by length of education into <9 years, 10-12 years and 13 years of education or more.

Self reported health was assessed by an item consisting of seven alternatives. The first alternative entails a completely bad health ("bad, couldn't be worse"). The second alternative is a straightforward "bad", and the third "somewhat bad". The fourth alternative is neutral, followed by "somewhat good", "good" and "good, couldn't be better". In this study, self reported health is dichotomised into bad (the first three alternatives) and not bad (the four latter, remaining alternatives).

Economic stress is categorised by the answer to the question "How many times during the past year did you not have money enough to afford the food or the clothes you and your family need?". The respondents are classified into four groups: a) "every month", b) "approximately 6 months a year", c) "very occasionally" and d) "never". The economic stress variable is dichotomised with a)-c) as one alternative and d) as the other.

Social participation (during the past year) describes how actively the person takes part in the activities of formal and informal groups in society. Respondents were asked whether in the previous 12 months they had been involved in any of the following activities: study circle/course at workplace, other study circle/course, union meeting, meeting of other organisations, theatre/cinema, arts exhibition, church, sports event, letter to the editor of a newspaper/journal, demonstration, night club/entertainment, large gathering of relatives, private party. It was measured as an index consisting of 13 items and dichotomised. If three alternatives or less were indicated, the social participation of that individual was classified as low.

Generalized trust in other people/horizontal trust is a self reported variable which reflects the respondent's perception of generalized trust in other people. It was assessed by the item "Generally, you can trust other people", which contains four alternatives: "Do not agree at all", "Do not agree", "Agree", and "Completely agree". It was dichotomized with the two first alternatives as low trust and the two latter alternatives as high trust.

Municipalities

The Scania region consists of 33 municipalities. Each municipality represents a political and social context of its own, because in each municipality a local municipal council is directly

elected by universal suffrage every fourth year to decide in local matters such as primary schools, basic care for the elderly, housing for the elderly and handicapped, refuse collection etc. The number of inhabitants in the municipalities range from 6,808 (the municipality of Perstorp) to 257,574 (the city of Malmö) within the Scania region (January 1 2000). All 33 municipalities are included in this study, and approximately 200-250 respondents are included from each of the 29 smaller municipalities and considerably higher numbers from Malmö, Helsingborg, Lund and Kristianstad. The municipality variable was included as the second level in the multilevel logistic regression.

Administrative districts

The Scania region also constitutes a political and administrative region and a political context of its own, because a political council directly elected by universal suffrage is responsible for the management of both the primary and the secondary health care for the population within the Scania region. This regional political unit is administratively divided into five districts: the northwestern (Helsingborg, Båstad, Ängelholm, Höganäs, Örkelljunga, Klippan, Bjuv, Åstorp), the northeastern (Kristianstad, Bromölla, Hässleholm, Osby, Perstorp, Östra Göinge), the southeastern (Simrishamn, Sjöbo, Skurup, Tomelilla, Ystad), the southwestern (Malmö, Svedala, Trelleborg, Vellinge) and the middle district (Lund, Burlöv, Eslöv, Hörby, Höör, Kävlinge, Landskrona, Lomma, Staffanstorps, Svalöv). The 33 municipalities are classified according to the administrative health care district they belong to and, thus, have five possible nominal values on this contextual variable. The health care districts are included as dummy variables (i.e. fixed effects) using the northwestern district as reference in the comparisons.

Contextual social capital

We measured municipality social capital as the aggregated proportion of individuals with low individual social participation in each municipality (for description and definitions of the social participation item, see above).

Statistics

The prevalences (%) of lack of access to a regular doctor in the five administrative health care districts in Scania (Skåne) were calculated (Table 1).

The prevalences (%) of lack of access to a regular doctor as well as all other individual and contextual variables were calculated after stratification into quartiles of municipality lack of access to a regular doctor, and quartiles according to prevalences of the other variables (Table 2).

Multilevel logistic models (26) with individuals (first level) nested within municipalities (second level) were fitted to the data. The dependent variable was the dichotomous outcome (lack of access to a regular doctor as opposed to access to a regular doctor). For the estimation we use RIGLS with 2nd order Taylor expansions and PQL, and thereafter we apply MCMC. To assess the fit of the models we used the Deviance Information Criterion (DIC) and considered a three-point decrease in the DIC as a model improvement (27). The MlwiN, version 1.1 software package (28) was used to perform the analyses.

We performed several consecutive models. In the first model, no variables were entered (i.e., the empty model). In the second model, age and sex, together with one other variable were also included. In the third model, all individual level variables were added together. In the final model, the contextual variables (i.e. social capital and administrative health care district) were included together with all the individual variables. We obtained the intercept variance, and we allowed the coefficient of the association (i.e. slope) between on the one hand the individual social participation or trust variables and on the other hand lack of access to a regular doctor to be random at the municipality level. However, since the slope variance was non significant and close to 0, the random slope was not included in the final analyses.

Calculation of the intra-class correlation

In multilevel logistic regression the individual-level variance (V_I) and the area-level variance (V_A) are not directly comparable. Whereas the area-level residual variance is on the logistic scale, the individual-level residual variance is on the probability scale and, moreover, it depends on the prevalence of the outcome (i.e. the probability). On this background Goldstein

and others (29,30) have described some alternative approaches for computing the intra-class correlation (ICC) in the case of logistic regression. In the present study we used the simulation method (29). The principle of the simulation method is to translate the area-level variance from the logistic to the probability scale in order to have both components of variance on the probability scale. These two components of variance can then be used on the probability scale to compute the ICC with the usual formula

$$ICC = V_A / (V_A + V_I)$$

As noted previously, the individual-level variance and, therefore, the ICC depends on the prevalence. In consequence there will be one different ICC for each different category of individuals.

In order to convert the area-level variance to the probability scale, we simulated 50 000 area-level residuals based on the area-level variance V_A , and calculated the predicted probability (p) in each of these 100 000 simulated areas as

$$p = \exp((\text{Intercept} + \text{area residual}) / (1 + \exp(\text{Intercept} + \text{area residual}))).$$

We computed the area-level variance on the probability scale as the variance of these predicted probabilities. The overall individual-level variance was computed as the mean of the individual-level variances computed as $p(1-p)$ for each of the 500 000 simulated values. Since the predicted probability is a function of the variables in the model and there are many variable combinations, we a priori calculated the ICC for two groups of individuals. One group was defined by including the category of each variable with the highest prevalence of lack of access. For example, males, individuals with low SRH, low education, economic stress, low social participation and low trust presented a higher prevalence of lack of access than their opposite categories. We calculated the predicted probability of lack of access to regular doctor for these two groups, and use this information in the simulation method of calculating the ICC.

Results

Characteristics of the population

Table 1 shows that the prevalence of lack of access to a regular doctor is highest (55.8%) in the middle district and lowest (26.5%) in the northwestern health care district.

Table 2 shows the properties of the municipalities included in the analysis (n=33). The municipality mean proportion of inhabitants that reported lack of access to a regular doctor was 25.2 % in the lowest quartile, and 37.7 %, 45.1 % and 56.7 % in the following quartiles. The proportion of individuals that reported lack of access to a regular doctor in the study was 43.3%.

Individual determinants of lack of access to a regular doctor in the municipality

The odds ratio of lack of access to a regular doctor was 6.98 (6.20-7.85) times higher in the youngest age group (18-34 years) compared to the oldest. The gender adjusted odds ratio of lack of access to a regular doctor was 1.34 (1.25-1.43) times higher among women than among men. The odds of lack of access to a regular doctor was not significantly higher for the group born in other countries, 1.10 (0.98-1.24), than for the group born in Sweden. The probability of lack of access to a regular doctor was significantly lower in all lower educational level categories compared to the reference group with the highest educational level. Participants with poor self reported health had a significantly lower propensity of lack of access to a regular doctor than participants with good self reported health. The lack of access to a regular doctor was significantly higher among individuals experiencing economic stress. The probability of lack of access to a regular doctor was somewhat higher in the group with low social participation, 1.18 (1.09-1.28), and in the group with low trust, 1.29 (1.20-1.39), compared to the high social participation and high trust reference groups, respectively. (Table 3)

Municipality determinants of lack of access to a regular doctor in the municipality

Direct cross-level effect

The crude second level (municipality) variance was 0.224 (0.065). Table 3 shows that the age adjusted second level variance was 0.273 (0.079), i.e. an increase. Further addition of the country of origin, education, self reported health, economic stress, individual social participation, individual trust, and contextual social participation variables did not affect the municipality level variance. In contrast, the administrative health care area decreases the municipality level variance to 0.154 (0.052). Table 3 indicates that the Deviance Information Criterion (DIC), which is the test of the fit of the model, decreases from 17154 in the empty model to a lowest value of 13900 in the age-, sex-, and individual social participation-adjusted model. Consequently, this model was the best fitted model, and it was even better than the final model including all the variables (DIC=13954) presented in table 4.

Cross-level effect modification

The covariances between the individual associations between lack of access to a regular doctor and the individual social participation and trust variables in each municipality (i.e., slopes), and lack of access to a regular doctor at the municipality level (i.e., intercepts) were close to 0 and not significant.

Intra-class correlations for the two models

Table 5 shows that the intra-class correlations for the group with the highest lack of access to a regular doctor was 11.0% and for the groups with the lowest lack of access the ICC was 10.4%. These intra-class correlations informs of a substantial area (municipality) effect on lack of access to a regular doctor.

Discussion

The results of this study suggest that both administrative health care district and social capital may explain the individual's self reported lack of access to a regular doctor. The variable which reduced the information criterion (i.e., DIC) value the most was individual social participation (only adjusted for individual level age and sex), which may be regarded as a micro level aspect of social capital according to the classification by Macinko and Starfield (2001) of different levels of analyses to analyse social capital. However, both administrative health care district and municipality level social capital also reduced the DIC value (in the models similarly adjusted for only age and sex). The full model (adjusted for all individual and contextual variables) reduced the DIC value substantially but still somewhat less than the model which only included age, sex and individual social participation. The intra-class correlations (ICC) are very substantial, which suggests that the municipality variation in lack of access to a regular doctor are very relevant even after adjustment for all individual and contextual variables. The results call for further studies of the social capital and administrative determinants of lack of access to a regular doctor because of the composite nature of the findings. The results also suggest that the debate between proponents of the social capital theory as opposed the neo-materialist critics of the social capital literature may have no clear-cut but instead rather complex answers. Both social capital and neo-materialist factors may be important determinants of lack of access to health care which in the article has been measured as lack of access to a regular doctor.

The individual level distribution according to age, sex and educational level of the respondents in the public health survey in Scania 2000 correspond very well with the distribution of these variables in the general population in Scania according to official registers. The only variable differing from this pattern of very good correspondence between the survey and the general population is country of origin, the proportion of people born abroad being lower in the survey (31). The second level municipalities are not an important source of selection bias, because all 33 municipalities in Scania are included in the study. The risk of selection bias is thus reasonably low.

Self reported access to a regular doctor has often been regarded and used as a valid measure of access to health care (2,3,4,5). The reliability and validity of the social participation variable has been assessed in a previous paper which found an acceptable validity and

reproducibility (24). The social participation index variable has been used to measure social participation in Sweden since the 1960s and 1970s, and it is also generally regarded as a valid and reliable measure (33). Trust is a self reported variable which is impossible to validate, but the item in this study is the one most commonly used in the international literature (34).

Age, sex, country of origin, education, self reported health, economic stress and individual social participation might be confounders of the associations between social capital and lack of access to a regular doctor, and administrative district and lack of access to a regular doctor, respectively. Adjusting for these possible confounders affected the estimates as illustrated in tables 3, 4 and 5.

The debate between the proponents of the social capital theory and the neo-materialist critics of the social capital theory concerning the causes behind contextual effects on health in particular could be properly illuminated by the inclusion of both contextual measures of social capital and contextual measures of neo-materialist characteristics in the same empirical analysis. The effect and importance of social capital and neo-materialist factors on health and health related outcomes will most plausibly vary depending on the specific empirical research topic being studied. The empirical world is multifaceted. The debate between social capitalists and neo-materialists will thus probably in the end not be resolved by any “either-or” answer. In contrast, the result of this discussion will probably have a “to what extent” answer character. In the present study effects of individual demographic, socioeconomic, social network and self reported health characteristics as well as contextual social capital and neo-materialist (administrative health care district) factors on municipality variance in lack of access to a regular doctor were studied. The empty (crude) model showed a significant municipality level variance in lack of access to a regular doctor. Several individual factors were significantly associated with lack of access to a regular doctor. The individual level variable which reduced the information criterion DIC value to the highest extent was individual level social participation. This finding suggests that micro level social capital, i.e. being a part of formal and informal social networks, may be a mediator for access to health care and amenities, which is a notion previously suggested by Kawachi et al. (14). Also adjustments for individual level generalised trust in other people (including age and sex in the model) reduced the information criterion DIC value. Both individual level aspects of social capital thus affected the DIC value. However, contextual level social capital and administrative health care district also reduced the information criterion DIC values, which

implies the importance of both contextual and individual as well as social capital and neo-materialist factors as possible explanations for lack of access to a regular doctor.

It should also be noted that the boundaries of the Malmöhus and Kristianstad counties which prior to 1998 constituted their own health care regions (*landsting*) cut through both the northwestern, the middle and the southeastern health care districts, a fact which suggests that the old counties and their separate policies before 1998 are of less importance for the 1999/2000 patterns.

The findings of this study raise some questions concerning differences between the five health care districts in Scania. Can these systematic differences be explained by differences at the policy/management administrative level? Can they be explained by differences in organisation, attitudes or routines within the health care district at lower levels within the organisation? These questions can not be completely answered in this study. They call for further research on the five health care districts. It seems plausible that some of the differences in lack of access to a regular doctor may be due to administrative differences between the health care districts.

The findings also imply that social participation, a micro level aspect of social capital, may be an important factor for access to health care and amenities and, as in this study, access to a regular doctor. It is generally accepted and widely held that social participation is important for empowerment (35). The fact that individual level social participation reduced the DIC value much more than individual level trust in other people supports this empowerment interpretation. One alternative way to increase access to a regular doctor may thus be to actively encourage empowerment.

Conclusion. This study suggests that both administrative health care district and social capital may explain the individual's self reported lack of access to a regular doctor. However, a considerably high municipality variance in lack of access to a regular doctor remains unexplained and deserves more investigation.

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Table 1. Prevalence (%) of lack of access to a regular doctor in the five health care districts in Scania 2000. The public health survey in Scania 2000.

	Prevalence (%)
Northwestern	26.5
Northeastern	42.7
Southwestern	47.7
Southeastern	41.1
Middle	55.8

Table 2. Characteristics of the population according to the distribution of individual variables in relation to municipality groups in quartiles, and according to individual level data.

	Municipalities (N=33) (means at the area level within quartiles for each of the variables)				Individuals (N=13,604)
	First quartile	Second quartile	Third quartile	Fourth quartile	Proportion
Lack of access to a regular doctor	25.2%	37.7%	45.1%	56.7%	43.3%
Sex (males)	41.2%	44.4%	46.2%	51.5%	45.6%
Country of origin (not Sweden)	3.8%	6.6%	9.3%	16.9%	10.7%
Educational level					
>12 years	26.1%	31.9%	38.9%	42.0%	31.3%
10-12 years	33.7%	39.3%	41.4%	43.6%	38.8%
9 years or less	12.4%	15.0%	22.4%	33.5%	24.9%
Bad self reported health	9.2%	11.0%	12.1%	14.1%	12.0%
Economic stress: 6 months a year/every month	5.9%	8.8%	10.3%	12.2%	9.8%
Low social participation (three activities or less)	26.2%	33.9%	35.9%	40.7%	32.5%
Low generalized trust in other people	36.7%	41.0%	44.4%	49.1%	42.3%
Low social participation (contextual)	26.2%	33.8%	35.9%	40.7%	-

Table 3. Individual level odds ratios (OR) and 95% confidence interval (95% CI) of lack of access to a regular doctor, and municipality level variance of lack of access to a regular doctor (N= 13,604 individuals and 33 municipalities) in function of individual characteristics, and Deviance Information Criterion (DIC). The 2000 public-health survey in Scania.

			Municipality level variance (standard error)	Deviance Information Criterion (DIC)
Empty model			0.224 (0.065)	17154
		<u>OR (95%CI)</u>		
Age- and sex-adjusted models				
Age				
	65-80 years	Reference	0.273 (0.079)	15678
	55-64 years	1.59 (1.40-1.81)		
	45-54 years	2.29 (2.03-2.59)		
	35-44 years	3.09 (3.51-4.51)		
	18-34 years	6.98 (6.20-7.85)		
Sex				
	Women	Reference	0.222 (0.065)	17083
	Men	1.34 (1.25-1.43)		
Country of origin				
	Sweden	Reference	0.281 (0.083)	15430
	Not Sweden	1.10 (0.98-1.24)		
Educational level				
	>12 years	Reference	0.290 (0.082)	14916
	10-12 years	0.71 (0.64-0.77)		
	9 years or less	0.67 (0.61-0.75)		
Self reported health				
	Good	Reference	0.295 (0.086)	14387
	Poor	0.57 (0.51-0.64)		
Economic stress				
	Never/occasionally	Reference	0.285 (0.083)	14209
	6 months a year/every month	1.22 (1.11-1.35)		
Social participation (individual level)				
	Four activities or more	Reference	0.289 (0.084)	13900
	Three activities or less	1.18 (1.09-1.28)		
Generalized trust in other people				
	High trust	Reference		15087
	Low trust	1.29 (1.20-1.39)		
Social participation (contextual level)				
	High	Reference	0.271 (0.081)	14249
	Low	1.87 (0.82-4.29)		
Administrative health care district				
	Northwestern	Reference	0.154 (0.052)	15577
	Northeastern	2.16 (1.88-2.47)		
	Southwestern	2.09 (1.77-2.47)		
	Southeastern	2.42 (2.13-2.76)		
	Middle	3.39 (2.98-3.86)		

Table 4. Individual level odds ratios (OR) and 95% confidence interval (95% CI) of lack of access to a regular doctor, and municipality level variance of lack of access to a regular doctor (N= 13,604 individuals and 33 municipalities), in function of individual characteristics, and Deviance Information Criterion (DIC). The model with all individual and contextual variables. The 2000 public-health survey in Scania.

		OR (95%CI)	Municipality level variance (standard error)	Deviance Information Criterion (DIC)
All individual and contextual variables				
Age				
	65-80 years	Reference		
	55-64 years	1.46 (1.26-1.68)		
	45-54 years	2.08 (1.80-2.39)		
	35-44 years	3.56 (3.06-4.13)		
	18-34 years	6.40 (5.52-7.41)		
Sex				
	Women	Reference		
	Men	1.44 (1.33-1.56)		
Country of origin				
	Sweden	Reference	0.155 (0.044)	13954
	Not Sweden	1.10 (0.97-1.26)		
Educational level				
	>12 years	Reference		
	10-12 years	1.04 (0.93-1.16)		
	9 years or less	1.48 (1.32-1.66)		
Self reported health				
	Good	Reference		
	Poor	0.61 (0.53-0.69)		
Economic stress				
	Never/occasionally	Reference		
	6 months a year/every month	1.23 (1.12-1.37)		
Social participation (individual level)				
	Four activities or more	Reference		
	Three activities or less	1.09 (0.99-1.19)		
Generalized trust in other people				
	High	Reference		
	Low	1.25 (1.17-1.34)		
Social participation (contextual level)				
	High	Reference		
	Low	1.85 (0.80-4.23)		
Administrative health care district				
	Northwestern	Reference		
	Northeastern	2.11 (1.86-2.41)		
	Southwestern	1.98 (1.69-2.37)		
	Southeastern	2.33 (2.01-2.64)		
	Middle	3.26 (2.86-3.75)		

Table 5. Intra-class correlations for the two models. The 2000 public-health survey in Scania.

	Intra-class correlation
Model 1 (Higher access) ^a	11.0%
Model 2 (Lower access) ^b	10.4%

a All individual and contextual variables included in the model. The category of each variable with the highest prevalences of lack of access to regular doctor were used as reference category

b All individual and contextual variables included in the model. The category of each variable with the lowest prevalence of lack of access to a regular doctor were used as reference category