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Assessing the variation in workload among general practitioners in urban and rural areas: An analysis based on SMS time sampling data

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SUMMARY

Objective: An important reason why general practitioners (GPs) are less inclined to work in rural areas is a perception of a higher workload. This study assesses the differences in the workloads of GPs in rural and urban areas. We used two definitions of rurality, one based on the number of addresses per square kilometre, and a second defined by the expected decline in population.

Methods: We collected time use data over 1 year by sending SMS text messages to Dutch GPs who each participated during a period of 1 week. This data was matched with those from GPs' registration and practice location. Data from 596 self-employed GPs were analysed using descriptive statistics and multiple regression analyses.

Results: In group practices, the patient list size of rural GPs was, on average, 231 patients more than those of urban GPs. They worked 3.5 more hours per week, with 2.6 more hours directly related to patients. A small significant relation was found between degree of urbanisation and the dependent variables list size and working hours. Working in a depopulation area had no significant effect on the workload indicators. Furthermore, GPs in group practices worked significantly fewer hours, and had smaller list sizes, than GPs in single-handed practices.

Conclusion: The results show that the assumption of a higher workload in rural practices does not completely match the objective workload of GPs in these areas. Rural GPs have a higher workload in certain cases, but the type of a practice seems a more important determinant.

1 BACKGROUND

It has become more difficult in many countries to recruit and retain a sufficient level of primary care services in specific areas.1, 2 This problem can be recognised, in particular, in rural areas where the numbers of employed general practitioners (GPs) are often relatively small while they need to serve a more geographically dispersed patient population. Retirement or closure of just one GP practice could lead to serious problems in the local provision of primary care services.3 Shortages in rural areas could mean that both patients and GPs have to travel longer distances to obtain, or provide primary care services. This is particularly relevant in areas with declining populations. Here, the population remaining is ageing, and thus increasingly suffering from chronic conditions while, at the same time, the level of other services, as well as informal care, is also difficult to maintain.

Shortages of GP services in rural areas have been studied, particularly in the United States, Canada, Australia, and New Zealand.1, 3-6 In these countries, rural areas are characterised by the need to travel long distances and by large areas with hardly any GP. However, shortages of rural GPs have also been experienced in different European countries such as Germany, Finland, France, and Spain.7, 8 The Netherlands is smaller, and the distances GPs are required to travel shorter. A study conducted in 2009 showed that regional differences in the provision of GP services are relatively small.9 Furthermore, the increase of GPs over the years has remained almost the same in different areas. Nevertheless, it has been suggested that shortages of Dutch GPs working in rural areas are imminent. This view is supported by reports in the media covering these rural areas that GPs could not find successors for their practices when they retire.10-12 In response to this, the monitoring of health care use has been developed, and data supplied, for these areas where the population is declining.13 It is mainly the rural areas further away from cities, defined as areas of declining population, and who are faced with the problems of an ageing population. In 2014, almost 17% of the Dutch population lived in an area with a population that was already declining or that will be declining in the near future. An important reason for developing this monitoring is the necessity to make sufficient numbers of GPs available to meet the demand for care in these areas.14 It offers a new perspective on how deprived mostly rural areas can be defined.

In the literature, different reasons can be found for the willingness of GPs to work, or not, in rural areas. These reasons are, for example, related to living conditions or concerns about the distance from family, friends, or their partners' work.10, 15 Another important argument, often cited, is that rural areas are associated with working long hours because of the large, and geographically dispersed, practice population, and the need to be available for patients around the clock. Combined, these have a negative impact on the work-life balance of GPs.16, 17 It is also suggested that the demand for care of rural patients is much higher because of a higher exodus of the young people resulting in a higher proportion of older inhabitants.18 Furthermore, an Australian study showed that the more rural an area, the more likely a GP is to be engaged in complex care for patients, which will have an impact upon the workload.19 Considering these findings, it is important to gain objective numbers and insight into differences in the regional workload, as a higher workload could discourage new generations of GPs from working in rural areas.17 In several countries, the higher workload in rural areas has been investigated and confirmed to a certain extent.20, 21 In a smaller country such as the Netherlands, less

research is available. An exception is the study by Grol et al,22 who found that the workload of GPs in general had actually decreased but that this was not the case for GPs in single-handed practices and GPs in rural areas. This finding contradicts the results of Van der Velden et al9 who reported limited variations in workload over the country. Both studies were conducted some time ago, but different workload indicators were used, and the results were based on data with limitations concerning their reliability and validity.

In this paper, we will use more recent and valid working time and workload data. The main question is whether there are differences between rural and urban areas, if GPs' time use is used as a measure of their objective workload. We use two definitions of the degree of urbanisation of an area. The first is rurality, based on the number of addresses per square kilometre. This definition from Statistics Netherlands (in Dutch: CBS) has been commonly used for many years in several Dutch studies.23 Secondly, we define rurality as areas where the population is expected to decline. We believe, especially in areas of declining population, that it is important to monitor the workload of GPs, as it is widely recognised that these areas are likely to have to deal with shortages in the near future.14, 24 This would place the level of health care provision under pressure. Other factors that can also have an impact upon workload, such as the type of practice, will be included in the analysis as well. In order to answer the main question, we will analyse data obtained during 2012 to 2014 in which the working hours of GPs were measured using SMS text messaging and a time sampling technique.

2 METHODS

2.1 Data

2.1.1 Time sampling data and survey

During the period from December 2012 to January 2014, the working hours of GPs were measured by a time sampling method using SMS text messaging. Over the course of 1 week, every GP received SMS text messages randomly within time slots of 3 hours. These messages contained the question: “What are you doing at this particular moment?” This was followed by a time stamp. In response, GPs could reply: (1) I am not working, or; (2) I am doing an activity directly, or; (3) indirectly, or; (4) not related to an individual patient. In response, they had to send the corresponding letter of the alphabet and the number of the SMS text message to connect the answer to the correct messages sent. At 7:00 AM and 7:00 PM, they could unsubscribe for certain parts of the day in order to avoid receiving obsolete messages. Messages not sent were counted as “not working.”

In total, 1051 individual GPs participated in the period studied. On average, 19 GPs participated per week, with 44 GPs participating twice. The study resulted in 61 320 time data point measurements. All groups of GPs, based on gender and employment position, were represented sufficiently in most of the SMS weeks.

The number of hours worked, based on the replies collected by SMS from GPs, was determined by multiplying the number of times they indicated they were working by three as this was the length in hours of the time slot in which every SMS measurement was sent. For example, a GP who replied 13 times with the answer b (direct patient-related activity), c (indirect patient-related activity), or, d (activity not

related to patients), over a 7-day working week, was coded as working (13 × 3=) 39 hours per week. For an individual GP, this is a rough estimate of the working hours, but for the aggregated group of over 1000 GPs, this resulted in an accurate measurement. For the time sampling study, the different background variables of the GPs were obtained by a survey conducted prior to the weeks in which their working hours were measured.

2.1.2 Data from the NIVEL registration of GPs and statistics Netherlands

Practice addresses were linked, on the basis of four-digit postcodes, with data, available through Statistics Netherlands, on the degree of urbanicity, and on the decline in the population. A rural area was defined as an area with fewer than 1000 addresses per square kilometre. An area of declining population is defined as an area with an anticipated drop of 16% or more by 2040, while this is 4% or less for a so-called "anticipation area." In this paper, both types of areas were counted as declining in population in order to gain enough cases and increase the reliability of the analyses.

2.2 Variables

2.2.1 Dependent variables

The following dependent variables were used:

- *Patient list size*, ie, number of patients registered as patients with an individual GP, not practice, measured by the survey among GPs as part of the SMS time sampling study and used as a continuous variable.
- *Hours worked per week by the GP*, derived from the time sampling dataset used as a continuous variable.
- *Direct patient-related hours worked per week*, also obtained from the time sampling dataset and used as a continuous variable.

2.2.2 Independent variables

The following independent variables were used:

- *The degree of urbanisation of GPs' practices* based on linking the practice addresses of the NIVEL registration with information from Statistics Netherlands. This was originally coded on a scale from 1 (very strongly urbanised) to 5 (not urbanised). This variable was recoded into three categories for the analyses:

- 1 = urban, 1500 or more addresses per square kilometre;
- 2 = intermediate, 1000 to 1500 addresses per square kilometre;
- 3 = rural, fewer than 1000 addresses per square kilometre.

These categories were transformed into dummy variables with urban as the reference category. This enabled us to use this variable for regression analyses.

- *Area of declining population in which the GPs' practices are located*, based on linking the practice addresses of the NIVEL registration with information from

Statistics Netherlands. This was used as a dummy variable (0 = area of stable population, 1 = area of declining population).
- *Type of practice,* obtained from the survey conducted prior to the SMS weeks. This variable contains three categories:

- Single-handed practice (one GP at one practice address);
- duo practice (two GPs at one practice address);
- health community centre or group practice (three or more GPs working at one practice address).

These categories were transformed into dummy variables with single-handed practice as the reference category for the regression analyses.

2.2.3 Control variables

Control variables were derived from the survey conducted prior to the weeks of SMS measurements and concerned:

- *The gender of the GP*, male coded as 0 (reference category), female as 1.
- *The age of the GP,* used as a continuous variable in the regression analyses.

2.3 Data analysis

Self-employed GPs were selected exclusively because patient lists are directly registered under their name. For this reason, salaried GPs and GP locums were excluded from the analyses.

We first conducted descriptive analyses to identify the relationship between the sociodemographic characteristics of the GP (gender and age) and characteristics of the GP's practice (location and type of practice). We then weighted the data by gender and degree of urbanisation or the variable declining/stable population to account for a different distribution of the sample compared with the population. Depending on the type of variable, chi-square tests, one-way ANOVA (*f-tests*), and independent sample *t*-tests were conducted to analyse group differences. Finally, multiple linear regression analyses were conducted to test whether the GP's work location and type of practice are related to his or her workload, controlling for gender and age.

The tolerance/variance inflation factor was calculated to check for multicollinearity between the independent variables on the dependent variables. This proved that there was no need to remove one of the variables from the analyses. The analyses were conducted after excluding outliers of the dependent variables, resulting in a final sample of 596 cases.
Analyses were performed using the statistical package Stata version 14.

3 RESULTS

3.1 Sociodemographic variables of the study sample

The sample of 596 cases used for our analysis represents the composition of the Dutch GP population regarding the degree of urbanisation, the variable stable/declining population, type of practice, and largely to the age of the GPs (appendix, Table A1). For the gender of the GPs, the response group of the SMS

time sampling study clearly differs from the GP population. Table 1 shows the distribution of the sociodemographic variables of the GPs included in the study. It becomes clear that, in our sample, the proportion of male GPs in rural areas is significantly higher compared with the urban areas. Also, GPs in rural areas are younger and more often in single-handed practices.

[TABLE 1]

In total, 68% of the 81 GPs in areas of declining population are working in an area that can be classified both as declining and rural according to the definition of Statistics Netherlands (not in table).

3.2 Differences in workload

Table 2 shows that the average patient list size is greater for GPs in rural areas (2354) compared with their urban peers (2177). This result partly holds when we break down the results by the type of practice. Regarding group practices, an even larger difference (2250 versus 2019) is shown. In areas of declining population, GPs have a higher average patient list size compared with GPs in areas with a stable population (Table 3). However, this difference is only significant for GPs in group practices.

[TABLE 2] [TABLE 3]

The average working hours of rural GPs (51) is significantly higher compared with urban GPs (47.7). This difference is also shown for direct patient-related working hours (27.3 hours versus 25.7 hours). The results are mostly not significant when comparing the types of practices. It is only with regard to group practices that it is shown that rural GPs clearly complete a greater number of working hours, and direct patient-related hours, compared with their urban peers. Furthermore, Table 3 shows that GPs in practices located in areas of declining population work more hours, and patient-related hours, than their counterparts in other areas. These differences are, however, only shown for single-handed and group practices.

3.3 EFFECTS ON WORKLOAD

3.3.1 Patient list size

Table 4 presents the results of a multiple regression analysis, the next step after the bivariate relationships tested in the previous section. There are small significant positive effects of working in a rural area ($\beta = 0.077$, $P < 0.1$), or intermediate area ($\beta = 0.114$, $P < 0.01$), on the size of the patient list. This shows that GPs in rural areas and intermediate areas have a greater patient list than their counterparts in urban practices. Furthermore, there is a negative relationship between working in a group practice ($\beta = -0.233$, $P < 0.01$) and the dependent variable, which means that the patient list size is smaller for GPs in group practices compared with GPs in single-handed practices. Finally, there is a negative relationship with gender showing that female GPs have a smaller patient list size compared with male GPs ($\beta = -0.151$, $P < 0.01$). The fit of the regression model reveals that the variables, degree of urbanisation, type of practice, and gender, explain 8% of the variation in the dependent variable.

[TABLE 4]

3.3.2 Number of working hours

The second column in Table 4 presents significant positive effects of working in a rural ($\beta = 0.075$, $P < 0.1$), or intermediate area ($\beta = 0.113$, $P < 0.01$) on the number of working hours per week. This confirms that GPs in rural and intermediate areas work more hours than urban GPs. Additionally, there is a stronger, and negative, effect of owning a duo practice ($\beta = -0.266$, $P < 0.01$), and a group practice ($\beta = -0.275$, $P < 0.01$), on the number of working hours. In other words, GPs in practices with multiple partners have a shorter working week than GPs in single-handed practices. Furthermore, there is a negative difference of gender ($\beta = -0.124$, $P < 0.01$) confirming the findings of multiple studies that female GPs work, structurally, fewer hours than their male counterparts.25 The number of working hours also increases by age ($\beta = 0.101$, $P < 0.05$). The fit of this regression model shows that all variables, excluding working in an area of declining population or not, explain almost 11% of the variation within working hours.

3.3.3 Direct patient-related working hours

Column three of Table 4 displays a significant difference between GPs in practices located in intermediate ($\beta = -0.130$, $P < 0.01$) and urban areas regarding the number of direct patient-related hours. There is no significant effect of working in an area of declining population. This is in line with the results of the other dependent variables. A significant negative effect upon the number of direct patient-related hours is presented for working in duo ($\beta = -0.289$, $P < 0.01$), and group, practices ($\beta = -0.253$, $P < 0.01$). The negative effect of gender ($\beta = -0.275$, $P < 0.01$) returns in this model. Similar to the previous models, the fit with 17% of the explained variation can be assessed as significant and relevant.

4 DISCUSSION

4.1 Summary of the results

In this paper, we analysed the relationship between GP practice location and their workload, objectively measured by an SMS-based time sampling study. We found that GPs in rural practices had a larger patient list size, worked more hours, and more patient-related hours than their urban peers. These differences were mainly found for GPs in group practices. Based on multiple regression analyses, a significant positive effect of practicing in rural areas (with urban GPs as the reference category) was also shown in the three dependent variables. However, this effect was not very large, and the effect of the type of practice appears to be stronger compared with the degree of urbanisation. GPs working in duo or group practices have a smaller patient list size, worked fewer hours and patient-related hours. This is understandable, as GPs in single-handed practices have to be available for patients during the whole week, while GPs in group practices can alternate their rotas and so are able to shorten their working week.

In areas of declining population, GPs have significantly more working hours and patient-related hours compared with GPs in areas of stable population. These differences appeared only significant for GPs in single-handed and duo practices. The regression analyses showed no significant effect of practising in a depopulated area on the dependent variables.

4.2 Comparisons with other research

There is much debate about the hypothesis that GPs are reluctant to practise in rural practices because of the patient workload. Therefore, in this study, we compared the objective workload of GPs in different areas indicated by time use data. We found evidence for this hypothesis, but mainly with regard to the patient list size and the working hours of GPs as indicators of workload.

Regarding the average number of working hours, we found that GPs in rural areas worked approximately 3 hours more than GPs in urban areas. This is a relatively small difference compared with other countries. For example, in Austria, Hoffmann et al26 found that GPs in rural areas worked 8.7 hours per week more than their urban counterparts. However, it must be noted that, unlike our study, on-call duties and out-of-office hours were not taken into account in the Austrian study. Furthermore, Steinhaeuser et al17 found that GPs working in single-handed practices in rural areas worked 4 hours more than their urban counterparts, while this difference was smaller (2.4 hours) in duo/group practices. Our study revealed the opposite: a larger significant difference for group practices (3.5 hours) and a lower, not significant, difference for single-handed practices (3.2 hours). It must be noted, however, that the definition of rural and urban areas (as well as the definition of the type of practice in the latter case) between our study and the studies mentioned above are different which makes an accurate international comparison difficult in this case.

A key finding is that the differences we found between GPs in rural and urban areas with regard to workload indicators were not very large. These limited differences could be related to a higher workload in urban areas which has narrowed the gap. A high workload for urban GPs was found in earlier studies and resulted from the effect of areas of social deprivation. In these areas, the number of patient contacts was higher,27 the times spent on consultations were longer, and more problems within one consultation were reported by patients.20 As Ono et al28 have indicated in their OECD study, policymakers tend to focus on rural areas when access to services are concerned, while in some countries, poor urban and suburban communities pose a challenge as well. In the Netherlands, urban deprived areas play a pivotal role in the workload of urban GPs too. Moreover, Hingstman et al29 found that many GPs are not willing to work in urban deprived areas.

The *perceived* workload of GPs was not included in our analyses. The results from this topic could be different than the results for the objective workload. This, subjective, workload for rural GPs could be affected by, for example, the presence of more older patients, more home visits, the longer distances for travelling to patients, or to other medical professions. There are also other reasons for avoiding rural areas. These, for example, may concern the lack of available work for partners and the distance from friends and family.10 This is particularly important because a greater proportion of the GP workforce is female. The results of our study reflect the view that female GPs attach more value to a healthy work-life balance and so are more likely to work fewer hours. The older generation of GPs in rural practices who will retire in the upcoming years are mainly men. These GPs work often in single-handed practices, while GPs who have qualified recently prefer group practices in which they can operate a rota, thus keeping the practice open for patients throughout the week without individual partners having to be available every day.

Having sufficient GPs in rural areas is important for controlling the workload of the local practices and for securing the accessibility of primary care. The choice to work

in rural practices seems determined by the fact that GPs stay in the same location as that which they carried out their training and education.30 However, there are also, financial, regulatory, and community factors which come into play when deciding which practice they want to work in.[3] Therefore, it seems important to explore whether it is possible to train more GPs in rural areas and to pay positive attention to rural general practice during training. It could also help to develop financial incentives to increase the attractiveness of rural general practice. It is already possible in the Netherlands for GPs, employed in deprived urban areas, to receive financial incentives to reflect the intensity of the challenge they face. However, there is a discussion about how this might be extended to certain rural, and, specifically, to areas of declining population.31 In Europe, several other suggestions have been made on this topic.7 One option, in particular, is to prepare policies in rural areas geared towards to avoiding or reducing shortages of GPs. Another option is to increase the employment of supporting staff in rural practices. However, this will only help to a certain extent as most of the supporting staff cannot be responsible for certain tasks,11 for instance dedicated medical consultations, referrals to specialised care, and drug prescription.

4.3 Strengths and limitations

An important strength of our study lies in the data we used. We analysed data from a study in which the hours of GPs were measured using an SMS tool with a time sampling design. This is a notably more accurate technique than those used in other time use studies, such as time surveys or diaries, in which recall bias and the tendency to overestimate working hours can play a more pivotal role.32 In this study, we analysed different indicators of workload between GPs in rural and urban areas. We did not find any recent studies from the Netherlands on this topic.

A limitation is that our sample did not correspond to the population with regards to gender in particular. For this, we had to weight the results for the bivariate analysis. On the other hand, the sample corresponded to the population, to a large degree, for the variables, type of practice, the degree of urbanisation, and areas of declining or stable population, in which the GPs' practices were located.

A second limitation is that we had no information about the number of consultations, or about the average time for each consultation. These are widely used indicators for measuring the workload of GPs. 33, 34 For example, an earlier study indicated that the number of consultations per full-time GP was systematically greater in areas of declining population compared with stable areas.24

Furthermore, we included only self-employed GPs to enable the comparison to be made between urban and rural practice on specifically patient list size as a dependent variable. We also conducted a separate analysis in which salaried GPs were included in order to ensure our results were robust. The same, but somewhat smaller, differences between GPs practicing in urban versus rural areas were found, but only with regard to the number of direct patient-related, and total, working hours.

Finally, regarding the variable, area of stable population, we did not make a difference between declining areas and areas where a decline was anticipated, relating to the extent to which a decline in the population is expected. Both areas were considered as declining as we had not enough GPs working in these specific types of areas in our sample. The differences in workload between GPs in declining and other areas might have been higher if we had analysed separately GPs in areas where a decline was anticipated. Further research, including a higher number of GPs

in these specific types of areas, is needed to gain a more detailed insight into differences in workload.

5 CONCLUSIONS

General practitioners practising in rural areas have a higher workload as objectively measured by time use data. However, the differences compared with GPs practising in urban areas are not very large, and they were, in most cases, found in group practices. We also found no significant effect of working in an area of declining population on the dependent variables. The perception, often cited, of a higher workload in practices located in rural areas, does not completely match with the objective workloads of GPs in these areas. These findings contrast with studies conducted in countries which are less densely populated than the Netherlands and are probably related to a lower population density in rural areas. Still, the workload in rural areas can change in the near future and become greater as the Netherlands deals with a depopulation that is concentrated in rural areas. It remains, therefore, important to have policies in place to avoid the danger that certain areas will be confronted by shortages of GPs.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

Data are available from the authors upon reasonable request and with permission of the Advisory Committee on Medical Manpower Planning (Capaciteitsorgaan).

AUTHORS' CONTRIBUTIONS

The major roles in this study were carried out by: DvH, planning the study, collecting, analysing and interpreting the data, writing the paper, and approving the final version; RV, being involved in writing the paper, revising it critically, and approving the final version; RB, planning the study, supervising the implementation of the study, being involved in writing the paper, revising it critically, and approving the final version.

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TABLES AND FIGURES

Table 1. GP's gender, age, and type of practice, divided by degree of urbanisation based on the SMS time sampling data

	Total (*N* = 596)		**Urban (*N* = 287)**		**Intermediate (*N* = 111)**		**Rural (*N* = 198)**		***P*-Value**	
	N	**%**	***N***	**%**	***N***	**%**	***N***	**%**		
Gender									0.043	**
Male	273	45.8%	120	41.8%	48	43.2%	105	53.0%		
Female	323	54.2%	167	58.2%	63	56.8%	93	47.0%		
Age in years									0.012	**
<40	116	19.5%	46	16.0%	24	21.6%	46	23.2%		
40 to 49	208	34.9%	96	33.4%	42	37.8%	70	35.4%		
50 to 59	230	38.6%	116	40.4%	36	32.4%	78	39.4%		
≥60	42	7.0%	29	10.1%	9	8.1%	4	2.0%		
Type of practice									0.002	***
Single-handed practice	110	18.5%	41	14.3%	23	20.7%	46	23.2%		

	Total (*N* = 596)		Urban (*N* = 287)		Intermediate (*N* = 111)		Rural (*N* = 198)		*P*-Value	
	N	%	*N*	%	*N*	%	*N*	%		
Duo practice	159	26.7%	64	22.3%	33	29.7%	62	31.3%		
Group practice/health centre	327	54.9%	182	63.4%	55	49.5%	90	45.5%		

*** < 0.01,
** < 0.05,
* < 0.10.

Table 2. Average size of patient list, working hours, and direct patient-related hours by degree of urbanisation and type of practice.[a]

	Urban (*N* = 287)		Intermediate (*N* = 111)		Rural (*N* = 198)		*P*-Value	
	Mean	(SD)	Mean	(SD)	Mean	(SD)		
Patient list size								
Total	2177	(619)	2468	(683)	2354	(590)	0.000	***
Single-handed practice	2510	(348)	2676	(354)	2461	(436)	0.087	*
Duo practice	2382	(548)	2364	(868)	2421	(728)	0.920	
Group practice/health centre	2019	(645)	2422	(687)	2250	(555)	0.000	***
Working hours								
Total	47.67	(14.27)	52.46	(14.30)	50.96	(16.51)	0.005	***
Single-handed practice	55.87	(14.44)	56.02	(9.89)	59.10	(16.72)	0.537	
Duo practice	46.47	(13.91)	50.48	(14.71)	46.09	(15.28)	0.355	
Group practice/health centre	45.92	(13.67)	51.77	(15.67)	49.45	(15.62)	0.015	**
Direct patient related hours								
Total	25.67	(9.27)	29.37	(9.92)	27.34	(10.89)	0.003	***
Single-handed practice	32.04	(8.99)	34.48	(7.47)	31.11	(11.48)	0.395	
Duo practice	22.77	(8.27)	27.63	(9.80)	23.69	(9.83)	0.050	*
Group practice/health centre	24.99	(8.95)	27.87	(10.30)	27.54	(10.54)	0.044	**

[a] Results are weighted by the degree of urbanisation and gender of the GPs.
*** < 0.01,
** < 0.05,
* < 0.10.

Table 3. Average size of patient list, working hours, and direct patient-related hours by the variable declining/stable area and type of practice.[a]

	Stable Area (*N* = 515)		Depopulation Area (*N* = 81)		*P*-Value	
	Mean	(SD)	Mean	(SD)		
Patient list size						
Total	2281	(643)	2341	(567)	0.389	
Single-handed practice	2539	(375)	2426	(482)	0.242	
Duo practice	2399	(689)	2359	(707)	0.789	
Group practice/health	2131	(660)	2294	(540)	0.093	*

	Stable Area (*N* = 515)		Depopulation Area (*N* = 81)		*P*-Value	
	Mean	**(SD)**	**Mean**	**(SD)**		
centre						
Working hours						
Total	49.07	(14.70)	53.09	(17.59)	0.017	**
Single-handed practice	55.65	(15.14)	65.36	(9.20)	0.006	***
Duo practice	46.67	(13.56)	49.28	(20.41)	0.417	
Group practice/health centre	47.71	(14.38)	49.19	(16.85)	0.507	
Direct patient related hours						
Total	26.54	(9.97)	29.04	(10.33)	0.023	**
Single-handed practice	31.66	(10.34)	34.45	(7.28)	0.247	
Duo practice	23.22	(8.40)	28.77	(12.96)	0.006	***
Group practice/health centre	26.13	(9.77)	26.68	(9.45)	0.706	

[a] Results are weighted by the variable declining/stable area and gender of the GPs.
*** < 0.01,
** < 0.05,
* < 0.10.

Table 4. Standardised linear regression coefficients of factors influencing the patient list size, working hours and direct patient-related hours

	Patient List Size			Working Hours			Direct Patient Hours		
	Beta	***P*-value**		**Beta**	***P*-value**		**Beta**	***P*-value**	
Independent variables									
Degree of urbanisation (ref = urban)									
- intermediate	0.114	0.007	***	0.113	0.007	***	0.130	0.001	***
- rural	0.077	0.085	*	0.075	0.091	*	0.038	0.373	
Declining area (ref = stable)	−0.003	0.942		0.048	0.242		0.049	0.213	
Type of practice (ref = single-handed)									
-duo practice	−0.041	0.444		−0.266	0.000	***	−0.289	0.000	***
-group practice/health centre	−0.233	0.000	***	−0.275	0.000	***	−0.253	0.000	***
Control variables									
Female (ref = male)	−0.151	0.000	***	−0.124	0.003	***	−0.275	0.000	***
Age	0.009	0.830		0.101	0.014	**	0.035	0.378	
Adjusted (pseudo) R-square	8.1%	0.000	***	10.5%	0.000	***	17.4%	0.000	***

*** < 0.01,
** < 0.05,
* < 0.10.

APPENDIX

Table A1. Comparison of sociodemographic variables between the SMS dataset and the population of self-employed GPs employed in the Netherlands according to the NIVEL registration of GPs on the 1st of January 2013

	SMS Data (*N* = 596)		**Population (*N* = 7894)**	
	N	**%**	***N***	**%**
Degree of urbanisation				
Urban	287	48%	3806	48%
Intermediate	111	19%	1540	20%
Rural	198	33%	2548	32%
Are of declining population or not				
No	515	86%	6580	83%
Yes	81	14%	1314	17%
Type of practice				
Single-handed practice	110	18%	1498	19%
Duo practice	159	27%	2144	27%
Group practice/health centre	327	55%	4252	54%
Gender				
Male	273	46%	4875	62%
Female	323	54%	3019	38%
Age in years				
<40	116	19%	1244	16%
40 to 49	208	35%	2451	31%
50 to 59	230	39%	3098	39%
≥60	42	7%	1101	14%