

WORKLOAD AND PROVISION OF CARE IN GENERAL PRACTICE

1-10-2012

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drieharingstraat 6
postbus 1568
3500 bn utrecht
T 030 2 729 614/615
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onderzoek

(71)



ISBN 90-6905-363-2

WORKLOAD AND PROVISION OF CARE IN GENERAL PRACTICE

An empirical study of the relation between the workload of Dutch general practitioners
and the content and quality of their care

Werkbelasting en verleende zorg in de huisartspraktijk

Een empirisch onderzoek naar de relatie tussen werkbelasting van Nederlandse huisartsen
en de inhoud en kwaliteit van hun zorg

(met een samenvatting in het Nederlands)

Proefschrift

ter verkrijging van de graad van doctor

aan de Universiteit Utrecht

op gezag van de Rector Magnificus Prof. dr. H.O. Voorma

ingevolge het besluit van het College van Decanen

in het openbaar te verdedigen

op vrijdag 13 februari 1998 des namiddags te 2.30 uur

door

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geboren op 26 juli 1961 te Tilburg

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Prof.dr. T.A.B. Snijders

This project used personal computers made available by IBM in the framework of a research contract with ICS. The publication of this study was partly made possible by the Institute for Interdisciplinary Socio-Scientific Research of the University of Utrecht (ISOR).

ACKNOWLEDGEMENTS

The writing of this thesis covers a period of more than 8 years. This certainly does not mean that it took that much time to finish this book. Available time needed to be allocated between a large number of activities: professional (giving lectures, writing articles, books and research reports, business trips, networking) as well as private ones (raising three boys, rebuilding houses, holidays and a range of common daily activities). I was lucky to have two supervisors, Peter Groenewegen and Tom Snijders, who recognize the importance of all these activities and I admire their patience and their confidence that one day this book would be finished.

Many people can be thanked for their support, sympathy and compassion: all (ex)-colleagues of ICS and NIVEL, family and friends. Only a few I would like to mention in particular because they had an important impact in this thesis.

Firstly, Koos van der Velden and Marleen Foets organized the data collection of the National survey of general practice. I gratefully used their enormous efforts.

Secondly, the physicians who accompanied me in the difficult and time-consuming process translating the NHG-standards of care into meaningful indicators that could be measured in the data set of the national survey.

Furthermore, Han van Snellenberg helped me in getting the right information out of the huge amount of data, and Peter Spreeuwenberg performed all the multilevel analyses I could think of (almost ten times the number of analyses presented in this book).

Ria Karamat Ali and Mieke Cornelius transformed my manuscript into this 'good-looking' book.

Finally, Rianne, Sjoerd, Sam en Teun, this task in life is fulfilled and in contrast to James Bond I say NEVER again.

CONTENTS

1	Introduction and research questions	1
1.1	Introduction	1
1.2	Importance of time in general practice	4
1.3	Determinants of the allocation of GPs' time	7
1.4	Content of care	11
1.5	Quality of care	13
1.6	Problems and shortcomings of earlier research	14
1.7	Research questions	17
1.8	Overview of the book	18
2	A theoretical model explaining allocation of time in general practice	19
2.1	Introduction	19
2.2	Reactions to workload in general practice	19
2.3	A behavioural model of GPs	23
2.4	Workload and hours in direct patient care	26
2.5	Workload and the length of consultations	34
2.6	Workload and the content of care: allocation of time within a consultation	37
2.7	Workload and the quality of care	42
2.8	Summary and discussion	43
3	Research design: data and methods	45
3.1	Introduction	45
3.2	Dutch national survey of general practice	45
3.3	Assessment of personal list size and practice composition	48
3.4	Measurement of workload	49
3.5	Measurement of content of care	50

3.6	Measurement of quality of care	50
3.7	Selection of the data	51
3.8	Statistical analyses	54
3.9	Summary and discussion	56
4	The relation between workload and working hours in general practice	59
4.1	Introduction	59
4.2	Methods	62
4.3	The workload score	62
4.4	Working hours in different activities	63
4.5	Differences in working hours and workload between GPs	64
4.6	Workload and working hours in direct patient care	67
4.7	Workload and hours in other practice activities	69
4.8	Summary and discussion	75
5	Day to day differences in general practitioners' workload	81
5.1	Introduction	81
5.2	Methods	82
5.3	The daily workload of GPs	83
5.4	Fluctuation in GPs' daily workload	85
5.5	Explaining differences in fluctuations in GPs' daily workload	88
5.6	Summary and discussion	95
6	General practitioner's workload and the content of care: the difference between a 'busy practice' and a 'busy day'	97
6.1	Introduction	97
6.2	Methods	106
6.3	Length and content of consultations by GPs	108
6.4	Workload and length of consultations	110
6.5	Workload and the content of care	114

6.6	Summary and discussion	131
7	The relation between workload and quality of care in general practice	139
7.1	Introduction	139
7.2	Methods	142
7.3	Deviations from indicators for appropriate care: differences between GPs	147
7.4	Workload, allocation of time and deviations from indicators for appropriate care	148
7.5	Summary and discussion	155
8	Summary and conclusions	161
8.1	Summary of the results	161
8.2	Conclusion	172
8.3	Implications for further research	172
8.4	Policy implications	175
	Samenvatting en conclusies	179
	Appendix	
Appendix 1.	Complete results of multilevel analyses of Chapter 6	197
Appendix 2.	Indicators for appropriateness of care provided by GPs, derived from 12 professional standards of care formulated by the Dutch College of General Practitioners (NHG)	211
	References	227

INTRODUCTION AND RESEARCH QUESTIONS

1.1 Introduction

In the Netherlands, as in the United Kingdom and Denmark, general practitioners (GPs) have a strong, central position in the health care system (van der Zee & Hutten, 1996). All inhabitants are registered with a general practice: the personal list system. The GP is usually the first professional confronted with the patient's problems and decides which kind of care is required. In general, most drugs are provided only on prescription and most of the other care providers, such as physiotherapists and specialists, are accessible only after referral by a GP. GPs are the gatekeepers in the health care system. This means that, when possible, GPs have to treat their patients themselves as long as possible and refer their patients to specialist care only when it is really needed. Furthermore, they act as patients' guides to ensure that they will receive the kind of care that they need. The GPs are also the coordinators of the whole package of care that is received by a patient, which improves the continuity of care.

To realize or maintain this important position, a high level of quality of care is required in general practice: both in terms of practice organization (e.g. accessibility) and in terms of professional skills and medical knowledge. However, quality might be at risk when GPs are overloaded.

In general, it is assumed that general practitioners' workload will affect the treatment of their patients. Quantitative and qualitative aspects of GPs' work might be related to it. It is likely that a higher workload leads to less appropriate treatments according to professional medical standards, less room for the patient in consultations, and less attention to psychosocial aspects and preventive tasks. Most people, physicians as well as patients and policy makers, will probably agree with these general statements. In a study by Ely et al. (1995) workload, defined as a sense of being hurried or being distracted, was often mentioned by physicians as a main cause of medical errors. One physician reported as the main reason for a fatal mistake: *'I was in a hurry, you know, in a hurry to get to the next [patient]'*. In addition to

the pressure from other patients, more personal time constraints were mentioned: *'Looking back, I can see all other pressures where everybody wants to shut down the clinic. It's been a long day, get home, get out'*. In a Dutch study, workload was considered as the most important barrier for applying professional protocols in daily practice: *'As soon as you see a crowded waiting room, you will revert to your old routine, namely to empty the waiting room'* (Heerdink et al., 1989). A number of British GPs indicated that their high prescription of benzodiazepines (a psychotropic drug) was linked with their workload (Cormack & Howells, 1992). They believed that a prescription saved consultation time.

In this context, the discussion about optimal list size of general practices may also be mentioned. The optimal number of patients on the lists is an important policy issue in countries where GPs have fixed patient lists (i.e. patients are enlisted with one particular GP), such as the Netherlands and the United Kingdom. It is argued that too many patients on GPs' lists will lead to a higher workload, affecting the quality of the care provided. However, list sizes should not be too small because GPs need to see a sufficient number of patients to maintain routine in recognizing and treating less common diseases. Especially in the mid 1980s, it was assumed that a reduction of list sizes could improve quality of care provided by GPs. In the UK, Morrell and Roland (1987) stated: *'If good quality of care is to be provided [...] average list sizes should probably be not more than 1750'*. At the beginning of the 1990s, the average British list consisted of about 2000 patients (Fleming, 1993). During the 1980s, in the Netherlands the real list sizes dropped from almost 2700 to 2350 (Hingstman & Harmsen, 1994). In a discussion paper of the Dutch Association of General Practitioners (LHV) list reduction was also mentioned as an important tool for strengthening the central role of GPs as gatekeepers in the Dutch health care system (LHV, 1995). The common-sense idea behind list reduction is that smaller lists will increase the amount of time spent per patient. This will lead to a better quality of care.

In a number of reviews on these subjects it is concluded, however, that there is no adequate empirical evidence for this common sense idea (Post, 1984; Butler & Calnan, 1987; de Melker, 1987; Knight, 1987; van der Meulen & Spreeuwenberg, 1987; Groenewegen & Hutten, 1991; Camasso & Camasso, 1994). Conflicting results are reported and often only weak correlations are found. It is not clear to what extent list size and workload are related, and also the relationship between workload on the one hand and the content and quality of care on the other is questionable. An important reason is that allocation of time is often

ignored in research. Time is, however, the main asset in general practice. As will be shown in the next sections, it may be regarded as an important condition for providing appropriate care. The way in which available time is used by GPs must therefore be taken into account as a mechanism linking workload and the treatment of patients (Butler & Calnan, 1987; Knight, 1987; Howie et al., 1989; Risdale, 1990; Groenewegen & Hutten, 1991; Camasso & Camasso, 1994).

This discussion indicates the three topics of our study in general practice:

- the relation between workload and allocation of time;
- the relation between workload and the content of care;
- the relation between workload and the quality of care.

The relations between list size on the one hand and workload and allocation of time on the other are excluded because they have already been discussed in three of our earlier articles (Groenewegen et al., 1992; Calnan et al., 1992; Groenewegen & Hutten, 1995). This means that the determinants of the level of workload of GPs are outside the scope of this study. This study takes one step further and looks into the relation between workload and content and quality of care.

The main elements in this study are workload, allocation of time, and content and quality of care. Usually, two aspects of *workload* are distinguished: objective and subjective elements. In this research, workload is defined in terms of the number of consultations handled by GPs themselves. Subjective elements, such as the GP's own perception of workload and feelings of burn-out (compare e.g. Norman et al., 1991; van Dierendonck et al., 1992; Kirwan & Armstrong, 1995), are not included. Research showed that these subjective aspects of workload are not (strongly) related to objective measures such as list size, number of consultations, and working hours (van Dierendonck et al., 1992; Camasso et al., 1994; van den Hombergh et al., 1997). *Allocation of time* refers to the way in which GPs invest their time in their work in the practice. Butler and Calnan (1987) distinguished three levels of time allocation in general practice. At the highest level time has to be divided between leisure and practice activities (working hours). The working hours consist of direct patient care (e.g. surgeries and home visits) and other practice or professional activities (e.g. continuous medical education and practice administration). The time spent on direct patient care has to be allocated to visiting patients. *Content of care* refers to the kind of services or interventions performed by the GP in the care-providing process. It includes both instrumental or technical

medical behaviour and affective behaviour (Bensing, 1991). Donabedian (1980) distinguished three aspects of *quality of care*: structure, process and outcome of care. Our study focuses on the process of care. The quality of the process is defined as the evaluation of the content of care according to standards that are widely accepted by the medical profession.

Next we discuss the existing literature and indicate the most important problems. Firstly, the literature on the importance of time in general practice is considered. Secondly, circumstances are described that influence the way time is allocated. Thirdly, articles on the relation between workload and allocation of time on the one hand, and content and quality of care on the other, are reviewed. Finally, we shall describe the shortcomings of earlier research and formulate the concrete research questions of this study.

1.2 Importance of time in general practice

The provision of care in daily practice differs greatly between GPs (see e.g. Marinus, 1993). Large variations have been reported in e.g. the number and kind of prescriptions of drugs (Haaijer-Ruskamp, 1984; Bradley, 1992; Denig, 1994), performing or ordering diagnostic tests (Zaat & van Eijk, 1992; Leurquin et al., 1995), the number of referrals to specialist care (Wilkin & Smith, 1987; Gloerich & van der Zee, 1992) or other primary care disciplines (Uunk et al., 1992; Kerssens & Curfs, 1993), their communication styles (Bensing, 1991; van den Brink-Muinen, 1996), and recall rates or follow-up appointments (Carney, 1987; Armstrong et al., 1990). An extensive number of articles deals with the explanation of these differences. Causes have been sought in GP- and practice-characteristics on the one hand and patients and presented health problems on the other, but altogether the studies are unable to explain a significant part of the variations. Although some weak relations have been found, they are far from sufficient to account for the amount of variation. Moreover, conflicting results have been reported and main differences between GPs remain unexplained. Gruppen et al. (1990) concluded that physician decision-making is influenced not only by physician knowledge and the content and nature of the patients' problems, but also by the context in which physicians work. Therefore, research is more and more focused on the condition or circumstances in which the tasks are performed (Clark & Potter, 1991).

The reported variations indicate that GPs can choose, within fairly wide limits, the kind and amount of tasks they will perform. These decisions are related to the constraints met by the GP in a particular situation. An important constraint is the amount of available time. The main argument for linking workload and aspects of care provided by GPs is time (Butler & Calnan, 1987). Because general practice does not require expensive equipment as some medical specialties do, time is an important asset of GPs. Their daily work at least in the Netherlands contains technical medical interventions, a large amount of listening and talking, exploring the presented problems, giving (health) advice, etc. (Groenewegen et al., 1992). It is argued that appropriate time is an important condition for providing appropriate care. Howie et al. (1989) directly related time and quality of care: *'it seems reasonable to argue that quality is a function of how competing demands on time are met rather than a function of inherently different clinical insights and behaviours'*. They argued that time is so important in general practice that the ratio between long and short consultations can be used as a proxy measure for the quality of care (Howie et al., 1991). Wilson (1985) stated that *'any assessment of quality of care should consider time availability in its broadest sense within the practice'*. Mechanic already concluded in 1975 that working style was affected by workload through the restrictions of time and, according to Knight (1987), a high workload might lead to stress and time pressure on the GPs and this in turn might result in shorter consultations, a lower quality of communication between GP and patient, detecting fewer of the patients' problems and generally a lower quality of care. But, according to Andersson et al. (1993), although time is an important aspect in general practice, not time itself but what takes place in a period of time defines the quality.

In conclusion, the way in which the GP allocates available time must be an important intermediate between the workload and the content and quality of care.

As mentioned this book focuses on the direct relation between workload and provided care as well as the intermediate role of the allocation of time in this relation. Thus, the consequences of workload for the use of time and the care provided are the main topics. Causes of workload are not within the main scope of the study. However, for a better understanding of the problem it is relevant to discuss briefly the main factors influencing the level of workload in general practice.

In most studies no direct relation has been found between list size and the content of care

provided by GPs (Raupp, 1971; Haaijer-Ruskamp, 1984; Butler & Calnan, 1987; Knight, 1987; Kuyvenhoven, 1988; Wilkin & Smith, 1987; Groenewegen & Hutten, 1991; Zaat & van Eijk, 1991; Cormack & Howells, 1992; McCarthy et al., 1992; Engelsman & Geertsma, 1994). However, if a GP has more patients on his list, the workload in terms of the absolute number of consultations will be larger (Wilkin et al., 1986; Calnan & Butler, 1988; Groenewegen et al., 1992). But list size is not a perfect predictor of GPs' workload. Some patient categories tend to consult their GP more often than others; differences in the composition of the patient population might result in different levels of workload with the same list size (Muller, 1989). Women, young children, low-educated patients and unemployed men have more surgery consultations, while elderly people tend to call the GPs more often for a home visit (Armstrong & Griffin, 1987; Yuen & Balarajan, 1989; Groenewegen & Hutten, 1991; Groenewegen et al., 1992). Consequently, next to list size, the composition of the practice population has an important effect on the level of workload in general practice.

GPs' workload is not purely 'demand led'. Three types of supply-related factors influencing GPs' workload can be distinguished. Firstly, GPs' personal characteristics; especially gender and age, are discussed in the literature. Female GPs have been found to have fewer consultations than male GPs, but this can be a result of the fact that they also have significantly smaller personal list sizes owing to part-time work (Wilkin et al., 1986). When full-time working GPs are compared no gender difference is found in workload (Hooper, 1989). However, in the Netherlands, female GPs do significantly less home visits compared to male GPs (Groenewegen & Hutten, 1995). The GP's age is not related to workload although younger GPs have smaller list sizes (Wilkin, 1986; Armstrong & Griffin, 1987; Groenewegen & Hutten, 1995). The second type of supply-related factors is the organizational aspects of the practice that increase or decrease the possibilities of managing a certain amount of demand for care by the patients. In the United Kingdom single-handed practices have been found to have higher consultation rates (Wilkin, 1986), but in the Netherlands they only have lower home visit rates (Groenewegen & Hutten, 1995). Larger partnerships provide the opportunity to structure the workload (Branthwaite & Ross, 1988; Freeman, 1989) through the appointment system and a good deputizing service in evening hours and weekends (Bridgstock, 1976). Also our earlier study showed that GPs without a free-flow consultation hour and those working in health centres tend to have a lower office

contact rate than the others (Groenewegen & Hutten, 1995).

Finally, we want to stress that the work style of GPs in terms of the content and quality of care, might also influence their workload. In this respect we need to discuss follow-up or repeat consultations. GPs can alter their workload by the number of patients they ask to return (Carney, 1987). Richardson et al. (1973) found a positive relation between consultation rate and the rate of repeat consultations. Therefore, they concluded that GPs can influence their workload, because repeat consultations are substantially under the doctors' own control. However, the research by Armstrong et al. (1990) showed only poor agreement between the patient's and the doctor's perception of whether or not a return visit had been recommended in a consultation. They concluded that the potential control of GPs on their workload, through follow-up appointments, is limited by *'both clinical considerations and the apparent difficulty of accurately communicating the doctor's advice on reattendance to the patient.'*

1.3 Determinants of the allocation of GPs' time

The starting point of our research is the relation between workload and the way time is allocated by GPs. Two aspects need to be distinguished: number of working hours in the practice and length of the consultations (the distribution of time among individual patients). In this section the literature on the determinants of allocation of time in general practice is briefly discussed.

With regard to the total hours spent in practice, only a few empirical studies were found. List size is the main indicator of the total working hours, especially hours spent on direct patient care (Wilkin et al., 1986; Butler & Calnan, 1987; Groenewegen et al., 1992; Groenewegen & Hutten, 1995). In a recent Dutch study by van den Hombergh et al. (1997), the number of working hours of GPs was estimated as a part of a visitation method to assess management in general practice (VIP). The appointment schemes of 76 full-time working GPs were used to assess the number of hours spent on direct patient care per week. Information about time spent on other activities was based on the personal assessment of the GP. They found a weak relation between list size and working hours of GPs, but list size was divided into two categories (more or less than 2500 patients), while in the other studies, it has mostly been

regarded as a continuous variable.

Also some aspects of the composition of the practice population influence the number of working hours of GPs. The percentage of elderly is positively related to the hours spent on direct patient care owing to the large home visit ratio for elderly patients (Groenewegen et al., 1992). In the same study, a negative relation was found between the percentage of publicly insured patients and total working hours, while van den Hombergh et al. (1997), reported the opposite finding, especially with regard to the time spent on direct patient care. More experienced GPs work fewer hours per week, while those operating a free-flow consultation hour spend more time on direct patient care (Groenewegen & Hutten, 1995). An English study showed that doctors supervising a trainee spend a mean of one hour less per week in contacts with their patients (Martin-Bates, 1993). In the Netherlands, it was also found that GPs with a trainee work more hours than those without a trainee: this extra time is spent on other practice activities and not on direct patient care (Groenewegen & Hutten, 1995). This finding was confirmed by van den Hombergh et al. (1997). Although de Haan (1986) called task delegation to a practice secretary a potential time saver, no evidence was found that the type of practice (single-handed or partnership) or the amount of practice assistance determine the number of working hours of a GP (Groenewegen & Hutten, 1995; van den Hombergh et al., 1997).

When whole-time equivalents are taken into account, no differences in working hours between female and male GPs are reported (Hooper, 1989; Groenewegen & Hutten, 1995). With regard to the professional orientation of the GP, Calnan (1988) showed that more medically oriented GPs work more hours than more socially oriented GPs. In a large observational study in Dutch general practice it was concluded that GPs with broad task perception are more likely to work more hours in practice when confronted with a high workload, compared to GPs with a smaller task perception (Boots, 1983). Apparently, the latter are less affected by workload. Working hours of GPs are also related to the type of remuneration system (Mechanic, 1975; Calnan et al., 1992; Kristiansen & Mooney, 1993; Bjørndal et al., 1994). Controlling for workload, GPs with a fixed salary have shorter working days than GPs in a fee-for-service payment system.

Over the years, a large variation in the duration of consultations in general practice has been demonstrated (Buchan & Richardson, 1973; Wilson, 1991; Heaney et al., 1991). Again GP-

and practice-characteristics on the one hand, and characteristics of patients and their health problems on the other, are used to explain this variation.

With regard to the association between list size and consultation time per patient, conflicting results have been reported. In a review of 19 studies it was concluded that the relation between list size and length of consultations is ambiguous (Hofman-Okkes, 1991). A number of studies presented a (although often small) negative correlation between the number of patients on the list and the average length of the consultations of a GP (Wilkin & Metcalfe, 1984; Wilkin et al., 1986; Butler & Calnan, 1987; Knight, 1987; Howie et al., 1989; Groenewegen et al., 1992). Others did not find substantial evidence for such a relationship (Buchan & Richardson, 1973; Boots, 1983; Mokkink et al., 1993). According to Wilson (1985) consultation length and list size are only negatively associated at the extremes of list size, indicating that list size has an effect when the practice contains more than 3000 patients. Butler and Calnan (1987) also concluded that size is usually not an important determinant of the length of consultation, although an extremely large or small list might have an effect. Generally, older patients, women and higher social class patients (with a higher education) have longer consultations (Westcott, 1977; Morrell et al., 1986; Verhaak, 1986; Andersson & Mattsson, 1989; Groenewegen & Hutten, 1991; Wilson, 1991; Mokkink et al., 1993). Further, it is often mentioned that particular features of the presented problem or complaint affect the consultation time. New problems require more time than problems already known by the GP (Buchan & Richardson, 1973; Armstrong & Griffin, 1987; Wilson, 1991). Moreover, research pointed out that problems with a psychological dimension, psychosocial, psychosomatic or behavioural complaints, need longer consultations than purely somatic or physical complaints (Westcott, 1977; Verhaak, 1986; Wilson, 1991; Andersson et al., 1993). A number of studies concluded that, although some patient characteristics and their complaints may influence the consultation time, most of the variation is explained by characteristics of the GP and his practice organization (Wilson, 1991; Andersson et al., 1993; Mokkink et al., 1993). Regarding practice organization, attention is mainly devoted to the influence of the booking intervals and the use of an appointment system. Operating an appointment system and larger booking intervals coincide with longer consultations (Bridgstock, 1976; Wilson, 1985; de Haan, 1986; Howie et al., 1991), but not as much as expected (Risdale et al., 1989). Increased delegation of clinical or administrative duties is also an important tool for regulating the consultation time (Breslau et al., 1978; Campbell

& Howie, 1992). Mokkink et al. (1993) found that the working style of GPs is related to the length of consultations. On average, consultations of the 'doer' (GPs oriented towards doing things) last longer and GPs with a 'minimum working style' have the shortest consultations. The doctor's personal speed is also considered an important determinant of the consultation length (Heaney et al., 1991; Andersson et al., 1993). This variable is problematic because it is the aggregated result of consultation lengths. This means that both factors overlap. In a review article, Wilson (1991) found evidence that older and female GPs have longer consultations. A study by Bensing et al. (1993) also showed that female GPs have relatively more longer consultations than male GPs, especially with female patients. In an earlier article, we found that the bivariate differences between male and female GPs and young and old GPs disappear in a multivariate analysis controlling for supply- and demand-related factors (Groenewegen & Hutten, 1995). This result indicates that differences between male and female GPs are a consequence of different practice composition and working conditions, rather than gender differences. Risdale (1990) also stated in his editorial in BMJ that differences in lengths of consultations between male and female GPs and young and older GPs must be explained by differences in patient mix. Women and people with psychological problems consult female GPs more often and in particular these kind of patients demand longer and more frequent consultations. The same kind of selection effect is shown in older GPs, who normally have more elderly patients on their lists.

Finally, we discuss the direct relation between workload in terms of the number of consultations and the consultation time. Again ambiguous results have been reported.

Buchan & Richardson (1973) found no relation: *'even when the patient demand was lighter, doctors still tend to see patients for 5-6 minutes'*. The evaluation of the new contract in the UK showed *'a significant increase in general medical services work, mainly due to more patients being seen in clinics, with no reduction of the time spent per patient'* (Hannay et al., 1992). On the contrary, Howie et al. (1991) stated that a crowded waiting room negatively influences the actual length of a single consultation. In the same research a negative correlation between number of consultations and average consultation time was found (Heaney et al., 1991). However, they also concluded that slower doctors change more in response to an increase in surgery than faster ones.

1.4 Content of care

In this section the literature on the relationship between workload and allocation of time on the one hand and the care provided by GPs on the other is briefly discussed. We shall not discuss other factors that influence the GPs' activities in their consultations. First of all, they would be only indirectly relevant to our research problem, and, moreover, the available literature on all influences on what GPs do in their consultations is too large.

In a study by Wilson (1985), 190 GPs mention as expected consequences of longer consultations: a decrease in patients' consulting rates, fewer prescriptions, and an increase in both quality of care and job satisfaction; diagnostics and referral rates are expected to remain the same. Empirical research reported conflicting findings in this respect. An experiment with three different booking intervals (5, 7.5 and 10 minutes) showed, contrary to the author's expectations, no differences with respect to prescribing, (physical) examinations, referrals and repeat consultations; only blood pressure was recorded twice as much in the 10-minute booking intervals compared to 5-minute intervals (Morrell et al., 1986; Risdale et al., 1989). Observational studies reported some effects.

Diagnostic tests In an international comparison there was some evidence that GPs with a high workload make less use of blood test (Leurquin, 1995). Possible causes mentioned are time pressure, more clinical experience, more symptomatic treatment orientation and more frequent contacts with the same patients. On the contrary, other studies found a positive relationship between workload and performing or requesting diagnostic tests (Hulka et al., 1979; Boots, 1983; Donabedian, 1985).

Drug prescription Back in 1978, Murray et al. found that the slower doctors prescribed less in general and significantly fewer antibiotic and psychotropic drugs. Hughes (1983) compared two practices and came to the conclusion that the practice offering longer consultations had a lower proportion of consultations ending with a prescription. In an American study among eighty family practitioners, the number of patients processed per clinic hour in a primary care HMO setting was one of the major non-medical factors associated with the prescribing volume (Hartzema & Christensen, 1983). A multivariate analysis showed that a larger average patient load per clinic hour increases the prescribing rate. Campbell (1992) found a small negative correlation between prescribing rates and the ratio of long to short consultations for individual GPs. Also, more recent studies reported positive relationships

between workload and the number and cost of prescriptions (McGavock et al., 1993; Davidson et al., 1994). This is true of specific prescribing (for proven pathology), for symptomatic prescribing and for prescribing drugs that are often used less precisely than they should be (for presumptive diagnoses). According to Bradley (1992) there is a good deal of evidence from several studies that an increase of consultation time may lead to more rather than fewer prescriptions. In a study in the USA no relation between workload and prescriptions of drugs was found (Camasso et al., 1994). The primary care physicians in this study were more likely to rely on the care of ancillary staff when they were confronted with a high workload. We have already mentioned the study by Cormack & Howells (1992), who asked 55 respondents (31 principals and 24 trainees) whether they thought that their prescribing of benzodiazepines was linked to their workload. The high prescribers believed that a prescription saved consultation time. In actual practice, for principals more consultations coincided with fewer prescriptions, while amongst trainees the relation was the other way round. GPs mentioned that, when busy, instead of prescribing drugs, the patient was asked to return for follow-up consultation. Apart from that, spending less time on each patient might lead to a smaller chance of discovering any psychological distress, and therefore the prescription of benzodiazepines might be less often indicated. This explanation corresponds to the main results of the experiment with different booking intervals (Morrell et al., 1986; Roland et al., 1986). In the longer booking interval condition more problems were identified in general and psychosocial problems in particular. However, a replication of this study did not confirm this result (Risdale et al., 1989).

Follow-up As mentioned, return or repeat consultations influence the GPs' workload. But workload might also affect the number of follow-up appointments. Different directions of this relationship are established: a positive (Norman et al., 1991; Cormack & Howells, 1992; Camasso et al., 1994) and a negative relationship (Hughes, 1983).

Referrals In their review of referral studies, Wilkin and Smith (1987) found little evidence for the view that high referral rates might result from pressure of work. Although some studies demonstrate the opposite (Camasso et al., 1994), it seems more likely that an inverse relationship exists between workload and referrals. Boots (1983) found that a smaller number of patients per unit of time coincides with more referrals. He proposed two explanations. Firstly, he did not control for the health problems presented by the patients. There might be a relation between the severity of the complaints and workload that can disturb the relation

between workload and referrals. The second explanation is the possibility we already mentioned that in longer consultations more problems can be detected. In a recent international comparison of GPs' consulting and referral patterns, Fleming (1993) also found a negative relation between workload and referral rates. A cause and effect relationship could not be determined; it could be argued that choice of work style (being low on referrals) increases the amount of work to be done.

Affective behaviour, counselling and prevention There are a number of studies about the relation between consultation time and social or affective aspects of care. Roland et al. (1986) reported that 10-minute intervals increases time for GPs to explain the problem, propose management to the patient and discuss prevention and health education. In the replication it was also mentioned that patients ask significantly more questions and make more statements of their own ideas about the problem when longer booking intervals are used (Risdale et al., 1989). Also, in most observational studies a higher workload or shorter consultations coincide with less health education/promotion or fewer preventive activities (Waitzkin, 1985; Calnan & Butler, 1988; Wilson, 1991; Wilson et al., 1992; Camasso et al., 1994). Howie et al. (1989) showed that where a relevant psychosocial problem is recognized faster doctors are less likely than slower doctors to deal with it in depth.

1.5 Quality of care

In the preceding section it became clear that the exact relation between workload and content of care in general practice is not yet established. With regard to quality of care results are even more equivocal. A review of 19 articles revealed no clear conclusion about the relation between consultation time and the quality of the consultation (Hofman-Okkes, 1991). Regarding patient satisfaction, conflicting results have been reported. Studies of the same doctors consulting at different rates suggested that, while many aspects of a doctor's behaviour do not change, longer consultations are associated with greater patient satisfaction (Wilson, 1991). There is also evidence that the relation between length of consultation and patient satisfaction is not linear. Especially in very short consultations people complain that they had little or far too little time available (Risdale et al., 1989), but this depends on the reasons for encounter (Hull & Hull, 1984). On the contrary, Swedish patients were equally

satisfied with the duration of both long and short consultations (Andersson et al., 1993; Andersson & Mattson, 1994). One has to bear in mind that in the Swedish consultations lasting 10 minutes or less were defined as short consultations and those lasting longer than 31 minutes were considered long. In most studies in the UK and the Netherlands, short consultations last 5 minutes or less and longer ones 10 minutes or more. However, the Dutch study of Mokkink et al. (1993) also showed no influence of the length of consultations on patients' satisfaction.

The Swedish authors concluded that *'the doctor as a person and his working style is most important in achieving good consultations in general practice'* (Andersson & Mattson, 1994). Length of consultation is less influential. The research of Howie et al. showed the opposite: *'mean consultation time is positively related to indicators of care and 'pressured' behaviour from GPs in short consultations, owing to heavy workload, is less satisfactory to the patient, less effective clinically and more costly in terms of referrals and prescriptions'* (Howie et al., 1989; Campbell & Howie, 1992; Howie et al., 1992). In a recent occasional paper by The Royal College of General Practitioners, a first attempt is made to relate patients' needs and outcome to the length of consultations (Howie et al., 1997). Although only six practices were studied, the authors are convinced that: *'time spent at consultations appears directly associated with quality of care, more time producing greater benefit'*. Quality was defined in terms of the ability of the GP to enable patients (patients' ability to understand and cope with their health problem).

1.6 Problems and shortcomings of earlier research

The preceding sections showed that the existing literature provides contradictory results and interpretations of the relation between workload and the content or quality of care in general practice. With regard to the affective aspects of the GPs' work, the results are clearer than with regard to the medical instrumental part of the work. Furthermore, there is a striking difference between the outcome of experimental studies and of observational studies. We think that some differences can be traced back to differences in definitions and research design.

Different results might be related to the aspect of workload being analysed. In most research, workload was conceptualized in terms of list size, consultation rates, and booking intervals. These conceptualizations refer to a stable, overall situation. There is also the reality of working days with sometimes crowded waiting rooms or overloaded appointment schedules. GPs' reactions to workload might differ depending on whether workload refers to a busy practice (overall workload) or a busy day (situational workload). Some reactions structurally affect workload, while others are only helpful in managing to survive the day and shift work to the future.

Another problem is that workload and allocation of time were often not analytically separated. As we shall argue in the second chapter, it is important to do so because GPs also have coping mechanisms for workload that are not related to allocation of time.

Furthermore, most research was limited to a rather small part of the GPs' daily work, e.g. a particular intervention or the treatment of a particular disease. This does not seem sufficient to derive conclusions about the consequences of workload on a more general level.

Another problem is the causality in the relation between the interventions and the length of consultation: does the time spent on each individual patient determine the kind of interventions or is it the other way round? We stress that both aspects of care have to be regarded as two sides of the same coin and that there is no causal relationship.

The most important reasons for the divergent findings are probably methodological. Firstly, inadequate measurements of quality were used. Indirect indicators such as the number and types of prescriptions or referrals were used, assuming that higher prescribing or referral rates indicate a lower quality of care. However, indirect measures do not take into account whether the intervention is appropriate in relation to the presented health problem. Knottnerus et al. (1990) concluded that using referral rates to judge referral quality is misleading. When the referrals of GPs with a high average referral rate and those with a small average referral rate were judged by an expert panel, no differences in quality were found. Therefore, a judgement of the quality ('did the GP do the right thing in a particular case?') makes it necessary to relate the interventions to specific standards of care.

Moreover, it is clear that the real relation between workload and content or quality of care can be established only when other relevant determinants are taken into account. Besides GP- and practice-characteristics, the characteristics of the particular situation or circumstances in

which the care is provided play an important role; one of the main factors in this respect is of course the presented health problem (Wilson, 1991; Flierman, 1991; Uunk et al., 1992; Engelsman & Geertsma, 1994). Often this kind of information was not fully available. Furthermore, results of studies with completely different designs were compared. Roughly two types of studies can be distinguished. On the one hand studies involving a limited number of GPs but with a large number of observations per GP and on the other studies involving a large number of GPs but with only a few observations per GP. Referring to the two workload aspects mentioned above, this might indicate that these studies were concerned with different workload aspects. In other words, within subjects or time series research designs were compared with cross-sectional designs and this might result in different conceptualizations of the dependent variable.

In our research we hope to overcome these problems. Patient-, health problem-, GP- and practice-characteristics are all integrated into the analyses. The central concepts are clearly distinguished. Content and quality of care are considered as two different aspects. Quality of care will be assessed on the basis of some indicators derived from professional standards of care formulated by the Dutch College of General Practitioners (NHG).

Beforehand, a theoretical model will be developed from which specific hypotheses about the relation between workload and content and quality of care are derived. Most of the research reviewed is not based on explicitly formulated theoretical considerations. Results can then be explained only on an *ad hoc* basis and no attempt is then made to specify the conditions that lead to a weaker or stronger relation between workload and content or quality of care. In our theoretical model, these conditioning hypotheses play an important part. To test these hypotheses we shall use a large data set, containing information on 159 GPs in more than 300,000 consultations during a period of three months (Foets et al., 1992). This data set partly allows us to investigate workload as a fixed GP characteristic and as a situational characteristic which can differ for each GP from day to day. Overall and daily workload will be analysed simultaneously by using multilevel analysis. Between- and within-practice variations can be considered in one analysis (Jones & Moon, 1991; Goldstein, 1995; Rasbash & Woodhouse, 1995).

1.7 Research questions

The problem that is addressed in this book is whether there is a relation between workload of general practitioners and the content and quality of care and how this relation can be explained. As mentioned at the beginning of this chapter, there are three topics in this book:

- the relation between workload and allocation of time;
- the relation between workload and the content of care;
- the relation between workload and the quality of care.

After this review, we formulate more explicit research questions regarding these relations:

- I
 - a. *Is the workload of general practitioners related to their allocation of time (working hours in patient care and other practice activities, length of consultations)?*
 - b. *Do GPs differ in the way they cope with their workload with respect to the allocation of time?*
 - c. *How can these differences be explained?*

- II
 - a. *Is the workload of general practitioners related to their choices of interventions within consultations (the content of their care)?*
 - b. *Is there a differential relation of overall workload and daily workload of GPs with the content of their care?*
 - c. *Do GPs differ in the way they cope with their workload with respect to content of care and do characteristics of the patients and their health problems affect the way in which GPs cope with their workload?*
 - d. *How can these differences be explained?*

- III
 - a. *Is quality of care negatively related to GPs' workload?*
 - b. *Can this relation be explained by aspects of the allocation of time?*

1.8 Overview of the book

In the next chapter a theoretical model is constructed to explain how GPs will react to their workload and to specify which circumstances might influence these decisions. The hypotheses derived from this model are tested using a data set collected by NIVEL (Netherlands Institute of Primary Health Care) in 1987 and 1988. Data collection, the measurement of the main concepts and the statistical techniques used are discussed in Chapter 3. In Chapters 4 to 7 the results are presented. The topic of Chapter 4 is the relation between workload and the allocation of time at GP-level. In Chapter 5 we discuss the amount of day-to-day variation in GPs' workload. Chapter 6 is devoted to the relation between workload and the length of consultations and content of care. Both aspects of workload are involved, a stable GP-characteristic and a fluctuating working day-characteristic. In Chapter 7 workload and quality of care are related. The main conclusions and implications for further research and for health care policy are summarized in Chapter 8.

CHAPTER 2

A THEORETICAL MODEL EXPLAINING THE ALLOCATION OF TIME IN GENERAL PRACTICE

2.1 Introduction

The main element linking workload and content or quality of care in general practice is time. In general, high workload is thought to coincide with shorter consultations that in turn will affect what GPs do in their consultations. Empirical evidence for these relations is lacking, however, because of methodological and theoretical shortcomings. Often studies reported weak correlations, but no attempts were made to explain why relations that seem to be obvious from a 'common sense' point of view could not be established.

In this chapter it will be argued that having shorter consultations is only one way to cope with workload. Other mechanisms can also be used, and this might influence the strength of the relations. It is also possible that the expected relations occur only under specific circumstances or that the circumstances determine the strength of the relations. To explore these ideas a theoretical model is built, explaining the allocation of time in general practice. Allocation of time is a result of choices made by GPs and their patients. For reasons of simplicity, it is assumed that GPs have the greatest influence. As a consequence our theoretical model is mainly based on the GPs' choices. Patients' behaviour will not be modelled explicitly. When necessary, it will be integrated into the model as a restriction, affecting the decision room of GPs.

2.2 Reactions to workload in general practice

The total workload of GPs is generated from two sources: the demand for care by patients on the one hand and other practice activities by GPs on the other. The latter refer to practice organization (practice administration, deliberation with practice secretaries or colleagues) and medical professional activities such as participation in continuing medical

education, peer review, and reading medical literature. In our study, workload is defined in terms of the number of consultations. This refers to the first, demand-related source. However, the number is not fully demand-led. GPs themselves have some opportunities to determine at least a part of the number of consultations by making follow-up appointments or performing home visits on their own initiative.

As is summarized in Figure 2.1, GPs have certain opportunities to cope with their workload. These opportunities are not mutually exclusive. Two general mechanisms can be distinguished: reduction of workload and (re)allocation of available time. The first aims at reducing demand; the second at processing a given level of demand. Because the first mechanism is beyond the scope of our study, it will be discussed very briefly. In health care systems where GPs have fixed patient lists, one way of reducing workload is limiting the number of patients on the list. List reduction is possible for instance by ceasing to register new patients or starting a partnership. In health care systems without fixed lists, GPs can decide to limit the number of patients they treat. A second way to reduce workload is delegation of consultations or tasks to other workers in the practice (practice nurse/secretary or (assistant) GP). Finally, regulation of consultations, for instance through appointment schedules or waiting lists, can be mentioned as ways to reduce workload. They also might reduce workload in the long run because patients might be discouraged from making an appointment or complaints might disappear spontaneously during the waiting period.

Figure 2.1 Coping mechanisms for workload in general practice

- 1. Reduction of workload:
 - Reduction of list size
 - Delegation of tasks
 - Regulation of consultations

 - 2. Allocation of time:
 - Increasing working hours in direct patient care:
 - working more hours in practice
 - cutting back on other practice activities

 - Reduction of length of consultation:
 - Avoiding time-consuming interventions and doing less time-consuming interventions
 - Spending less time on each intervention
 - Postponing work to the future
-

Our research is focused on the second mechanism of coping with workload in general

practice. Allocation of time may be considered a series of choices made by GPs to cope with a given amount of work. For a better understanding of this process, three levels of decision can be distinguished (Butler & Calnan, 1987). The first level concerns the distinction between working time and leisure time. At this general level GPs decide how much time they are willing or able to spend on their work. This is of course reflected in the whole-time equivalents (WTEs) of involvement in the practice. However, the actual number of working hours per week can deviate for GPs working the same number of WTEs, owing to e.g. differences in workload. At the second level, total working time is allocated to different kinds of activities. An important distinction is between direct patient care and other practice or professional activities. Thirdly, time for direct patient care needs to be divided among individual patients.

These levels are interrelated. This means that a decision on one level affects the allocation of time on another level. A problem in this respect is the time order in the decision process. Theoretically, it is possible that GPs first decide about the number of hours they want to spend for instance in direct patient care and that this decision determines in turn the length of consultations. However, the point of departure can also be the time spent on each consultation. Consultation time aggregates into the total hours spent in direct patient care. As will be argued in the following sections, the focus or assumed direction of the process depends on the topic under study: the general allocation of time or the allocation of time in a particular consultation.

The three levels correspond to the reactions to workload mentioned in Figure 2.1. Because workload is defined in terms of the number of consultations, spending more time in direct patient care is the first coping mechanism. There are two options in this respect. Firstly, by increasing the total number of working hours. This means that the time spent on other practice activities remains the same. Secondly, within a given total number of working hours a shift can be made from time spent on other practice activities towards direct patient care. When at least one of these mechanisms occurs, workload does not necessarily have direct implications for the length of consultations. Therefore, reduction of the length of consultations is regarded as a separate way to cope with workload. This can be done in three ways: performing less time-consuming interventions or avoiding more time-consuming interventions, performing the same kind of interventions in less time, and consultations may also be shortened by postponing work to the future and

making follow-up appointments. A GP may skip health advice or spend less time on it because he¹ is too busy.

A simple example can clarify these considerations. Let us assume that a GP with a workload of twenty consultations per day normally works three hours a day. This means that on average the consultations will last about nine minutes. On a specific day his workload happens to be ten consultations higher. What can he do? Firstly, he can decide to work 90 minutes longer: the average length of consultations will not change. Secondly, he can decide to consult all 30 patients in his three working hours, which leaves an average of six minutes consultation time. Thirdly, of course both coping mechanisms might occur at the same time: for instance working one hour extra means a drop in the average length of consultation to only eight minutes. So, although there is a relation between working hours and length of consultations, they need to be regarded as separate choices.

The actual choice of coping strategies can differ between GPs. Some GPs are probably more likely to opt for a reduction in the length of consultations, while others are more likely to increase the number of hours spent in direct patient care. Moreover, the decision to reduce the length of a particular consultation might also depend on the type of patient and the health problem that is presented. In this chapter these decisions are theoretically elaborated. We start with the introduction of a general behavioural theory that will be applied to GPs. In the sections to follow, this theoretical model is used to formulate hypotheses on each of the two aspects of the allocation of time: the decision to spend more time in direct patient care and the reduction of the length of consultations as reactions to high workload. The alternative of reducing the length of consultations is further elaborated by looking at more or less time-consuming activities within consultations. Finally, the implications of these decisions for quality of care will be discussed.

All hypotheses presented in this chapter concern relations between GPs' workload and their decisions in daily practice. These decisions do of course also depend on other aspects, which will be taken into account in the empirical analyses. Therefore, each hypothesis only holds true controlling for other relevant factors such as GP- and practice-

¹ For reasons of style the use of 'he/she' and 'his/her' is avoided: 'he' and 'his' are used to indicate both sexes.

characteristics and case-mix (patient- characteristics and the kind of presented health problem).

2.3 A behavioural model of GPs

Our starting point is a simple theory of goal-oriented behaviour. People's goals on the one hand and their resources and the opportunities they encounter on the other determine their behaviour. In this section the goals that GPs are assumed to strive after will first be specified. Then resources and opportunities will be discussed.

To specify GPs' goals, the approach known as social production function theory is used. It is assumed that all GPs are driven by a number of goals in their work: a mixture of personal goals and benefits for their patients. Goals are situated on different levels. On the highest level, Lindenberg (1984) distinguished two general goals of people: physical well-being and social approval. These are ultimate goals. All goals on a lower level are considered instrumental goals: instruments to 'produce' these ultimate goals. Income and leisure time are important instruments to produce physical well-being. Social approval reflects aspects like social status or prestige, behavioural confirmation, and positive affect. One of the main instrumental goals for the social approval of GPs is the care they give their patients. 'Good' or 'appropriate' care will increase the amount of social approval from the patients and other professionals, such as direct colleagues, and will enhance job satisfaction and self-esteem of GPs. Provision of appropriate care to patients is related to the health problem that is presented by a specific patient. This makes the provision of appropriate care dependent on the specific situation (Westert, 1991; Uunk et al., 1992; Delnoij, 1994). The patient's health problems are a situational restriction on the GP and improving the patients' health may be regarded as an instrument to reach social approval (Groenewegen, 1996). With respect to the allocation of time, appropriate care can be defined in terms of an appropriate amount of time available for a given patient (Howie et al., 1989). In other words, the time allocated to a patient is a resource to produce appropriate care which, in its turn, is instrumental in producing social approval. It is important to differentiate between a patient in an actual consultation (the 'index patient') and other patients. Gillon (1988) argued that: *'in practice most doctors recognize*

moral obligations to all their patients, and do not accept that the index patient's interests must always come first'. Pauly also (1980) criticized the idea that a physician could be considered a 'perfect agent' for every patient. The scarcity of physicians' resources (such as time) indicates that they cannot be perfect agents for all patients at the same time: choices have to be made.

In making a decision with respect to one patient, accessibility of care and waiting times for other patients, both important determinants of patient satisfaction (Roland, 1989; Heaney et al., 1991), are affected. Therefore, a second instrumental goal for the production of social approval is introduced: optimal availability for other patients.

Social approval is derived not only from patients. Colleagues and, more generally, the medical profession as a whole are also important sources of social approval. Of course, being a 'good' doctor for the patients has a positive influence on the professional status of a GP (or perhaps it is better to say that being a 'bad' doctor for the patients, for both the index patients and the total practice population, will reduce the professional status of a GP). However, involvement in direct patient care is only one part of the work of GPs. Other practice activities are related to smooth running of the practice and professional activities (continuing medical education or keeping up with the medical literature). Spending time on these activities can also be seen as an instrument to enhance professional status or prestige that can be translated into higher social approval by colleagues and/or patients. The following figure summarizes the specification of the GPs' ultimate goals into instrumental goals.

Figure 2.2 The goals of general practitioners, specified in relation to allocation of time

Ultimate goals:	Physical well-being	Social approval
Instrumental goals:	Income Leisure time	Appropriate care for patients Shorter waiting time for patients Time for other professional activities

It is assumed that providing appropriate care is the most important goal for GPs. For reasons of simplicity, we define appropriate care in terms of an appropriate amount of time spent on each individual patient. This means that it is expected that GPs initially prefer to increase total working time or to decrease the time for other professional

activities instead of shortening the consultations, in the case of higher workload.

The opportunities to realize the goals are determined by the available resources and the constraints related to the choice situation. They are situated at three levels: the health care system, the GP and his practice, and the consultation (Groenewegen, 1996).

At the most general level (structural conditions), rules and regulations of the health care system and the medical profession can influence the medical decision room of GPs. Realization of the optimal combination between leisure time and income is related to the type of remuneration system: salaried, fee-for-service or capitation-based (Flierman, 1991). The availability of other care providers is another restriction at this general level: e.g. when a GP wants to refer a patient, there has to be specialists or hospitals to refer to. With respect to the content and quality of care, it is important to stress that clearly defined professional rules or standards of care determine the GPs' choices to a large extent.

The second level of restrictions refers to the GP and the practice. GPs in single-handed practice are more dependent on their patients for receiving social approval, whereas GPs in partnerships or group practice receive social approval from their colleagues more easily (Freidson, 1973). Realization of the GPs' goals is of course also related to their personal resources, such as knowledge and skills (that may be related to age) and their personal circumstances (that may be related to gender).

A third level contains the restrictions related to an actual consultation between GP and patient. The health problems presented by patients in the consultation differ and for some health problems the course of action of the GP is quite determined, while for other health problems there is a wide range of possible actions (Flierman, 1991). Patient characteristics, such as education or type of insurance, can also affect opportunities of GPs to reach their goals in a particular consultation.

Workload is one of the restrictions, and an important one, that influences GPs' behaviour. As mentioned in Chapter 1, it is important to distinguish two aspects of workload. A stable, overall situation and the reality of daily practice with sometimes crowded waiting rooms or overloaded appointment schedules. Therefore, workload is situated at two of the levels discussed above. At the second level, as a fixed characteristic of the practice and at the third level, as a characteristic of the particular consultation: workload at the moment

of consultation (situational aspect).

After this general outline of the behavioural model, it will be applied to the effects of workload on GPs' behaviour in the daily practice. We want to explain these effects by indicating the circumstances that influence the GPs' choices in coping with workload. Firstly, the number of hours worked in direct patient care is considered. Thereafter, the length of consultations is discussed and the next section is devoted to the activities within the consultation or, in other words, the content of care. Quality of care itself is not regarded as a direct choice of GPs, but as a result of the reactions to higher workload. In the final section the effects of the coping mechanisms on quality of care.

2.4 Workload and hours in direct patient care

One of the ways to cope with a higher workload is working more hours in direct patient care. Taking into account that the main goal of GPs is the provision of appropriate care, a positive relation between workload and the number of hours spent in direct patient care is generally expected.

HYP1 In general, the workload of general practitioners is positively related to the hours spent in direct patient care.

As mentioned in Figure 2.1, GPs have two opportunities to do this. Firstly, by increasing the total working hours in the practice, which indicates a decrease in leisure time. Secondly, by keeping the total working hours constant but cutting back on time for other activities in favour of direct patient care. Which of the two is chosen depends on the way the achievement of the other instrumental goals is affected. The consideration of the other instrumental goals leads to hypotheses about the conditions under which the relation between workload and the number of hours in direct patient care is expected to be relatively stronger or weaker.

The opportunity to gain income is directly related to structural conditions such as the

remuneration system and the amount of competition (e.g. number of GPs in an area). GPs' income in the Netherlands is mainly based on the services directly provided to the patients; most of the other activities are not separately paid for or they are included in capitation fees. One exception is the supervision of a trainee in the practice: there are separate payments for supervisors.

Two groups of GPs are distinguished: independent GPs working in their own practice and GPs working on a salary basis (mostly in health care centres or as assistant GPs or locums employed by an independent GP). The personal income of these salaried GPs is fixed and does not directly depend on the number of patients or consultations. The remuneration of independent GPs is a mixture of fee for service and capitation fee, depending on the patient's type of insurance. In the Netherlands, most patients (about 60%) are publicly insured (Delnoij, 1994). They are formally on the list of a GP who receives a flat capitation fee. The remaining patients are privately insured. Although they are not formally on the list of a GP, they usually consult the same GP, who is paid for each consultation. Medical interventions are not separately reimbursed. All GPs in the Netherlands have a mixture of privately and publicly insured patients on their list. Hence, the income of independent GPs is based on the number of publicly insured patients on the list and the number of consultations with privately insured patients. In sum, the income of most Dutch GPs is related to direct patient care: a total package of services for publicly insured patients and a consultation for privately insured patients. Most of the other activities, such as practice administration and meetings with colleagues, are not separately reimbursed.

In general, different payment systems can lead to differences in the allocation of time in general practice. Mechanic (1975) showed that prepaid physicians (comparable to the capitation payment of Dutch GPs) react to a greater number of patients by treating more patients in the same time, while fee-for-service physicians tend to increase their number of practice hours. In an earlier article we provided a theoretical framework to explain these different reactions. According to this framework, the division of time between work and leisure is restricted by the GPs' anticipation of the patients' reactions and by institutional arrangements in contracts (Calnan et al., 1992). Institutional arrangements for the allocation of time are clearest in salaried systems, where GPs' working hours are more or less fixed. Capitation payment implies fixed patient lists and therefore more

administrative barriers in the way of patients changing GPs than fee-for-service systems. Also, local groups of GPs tend to adhere to informal rules of conduct that restrict overt competition for each other's patients. But still, in capitation systems patients are free to join the list of another GP. However, in a fee-for-service system the patients have a greater freedom to consult the GP they prefer at a particular time. Given these conditions, the following hypothetical responses of GPs to a high workload under different payment systems are predicted.

In capitation systems the total number of hours spent on direct patient care is relatively unaffected by a higher workload. A higher workload is typically managed by seeing more patients in the same period of time. At a given list size (and keeping the capitation fee constant) the only way to increase physical well-being is by working fewer hours, thereby increasing the monetary gain per unit of time and at the same time increasing the number of leisure hours. An increase in list size means more income, irrespective of the number of services rendered and thus of time invested; GPs will not increase their number of hours worked proportionally to the increase in list size.

In fee-for-service systems a higher workload leads to a larger number of hours worked in direct patient care. Fee-for-services often means a separate payment for each consultation and not necessarily a fee for each service delivered. The only way to increase income in this kind of system is to perform more consultations, of course limited by the amount of time available. Furthermore it is important to realize that when patients pay separate fees for each consultation, it is easier to switch GPs and/or go directly to a specialist, without first consulting a GP (Groenewegen & Delnoij, 1997). Consequently the GPs must also beware of possible loss of income in the future. They must take the patient's wishes into account. Therefore, GPs will be less likely to cut back the time spent on each individual patient. As a consequence, the relation between workload and the number of hours worked is stronger in a fee-for-service system than in a capitation system.

In salaried systems the total number of hours worked and income are fixed. A higher workload does not affect the number of hours worked, nor the time spent per patient. The effect of a higher workload is increasing waiting lists.

These arguments are used to identify which kind of GPs are more likely to react to their workload by spending more time on direct patient care because their loss of leisure or time spent in other professional activities is compensated by a gain of income. The

following hypothesis is formulated:

HYP2 The positive relation between workload and the number of hours spent in direct patient care is stronger when there is a direct relation between income and working hours in direct patient care.

When only differences in payment systems are taken into account, it can be assumed that salaried GPs react differently to their workload than independent GPs. The fixed payment, directly related to the formal number of working hours (whole-time equivalents or WTEs), provides no financial incentive to work overtime, while the fee-for-service part of the income of independent GPs leads to a higher income when more consultations are provided. The strength of the relation between workload and hours in direct patient care is, therefore, expected to be greater for independent GPs working in their own practice than for GPs with a fixed salary.

The model also predicts that independent GPs working in their own practice react in another way to workload generated by publicly insured patients than by privately insured patients. Only for the latter are patient care and income directly related, since they pay a fee for every consultation. Because all Dutch GPs have both kinds of patients, only the influence of the proportion of these kinds of patients on the GPs' lists can be studied. We predict that independently working GPs with a larger proportion of privately insured patients are more likely to react to workload by working more hours in direct patient care, as in the fee-for-service system. Hence, a higher percentage of privately insured patients on the lists coincides with a greater chance that GPs work more hours in direct patient care to cope with high workload.

Until now it has been assumed that the loss of leisure or time for other professional activities can be compensated by the fact that extra time in direct patient care means extra income. We did not take into account that the importance of these two instrumental goals might differ between GPs. However, this might be the case for different groups of GPs, related to constraints and resources at the second level, that of GP- and practice-characteristics.

The hypothesis is:

HYP3 The positive relation between workload and the hours spent in direct patient care is stronger when income is more important and leisure time is less important.

It seems reasonable to assume that income is more important for younger GPs than for older GPs. Young GPs recently invested money to start a practice, while the financial investment of older GPs is already largely compensated by their past earnings (Leese & Bosanquet, 1986). So we predict that older GPs are less likely to work more hours to cope with high workload because the gain of income is less important for them than for young GPs. Moreover, because of decreasing physical strength with increasing age, we expect more leisure time to be more important to older GPs.

Gender is an important determinant for labour market participation. Because of social cultural differences between the sexes, it is assumed that female GPs differ from male GPs with regard to their allocation of time. Kortenhoeven (1990) pointed out that the relevance of the two instrumental goals income and leisure time differs between male and female GPs. In western society more men than women participate in the labour market. Therefore, she assumes that most of the female GPs will have a partner with an income of his own; in the case of male GPs this will less often be the case. Hence, the family income of female GPs will be higher than the family income of male GPs. This indicates that, in general, income is a more important goal for male GPs than for female GPs. Furthermore, Kortenhoeven refers to the fact that female GPs may have to spend more time on household activities. Thus, female GPs working the same amount of WTEs in practice will have less leisure time available than their male colleagues. As a consequence, females may find the goal 'leisure time' more important than males. When leisure time is more important and income is less important for a GP, the chance that a GP reacts to a higher workload by increasing the working hours is smaller than when leisure time is less relevant and income is more relevant. Therefore, we predict that the positive relation between workload and the hours spent in direct patient care will be stronger for male GPs than for female GPs.

It has already been explained that GPs have different sources for their social approval: their selves, their patients and their colleagues. Here, it is assumed that the kind of source

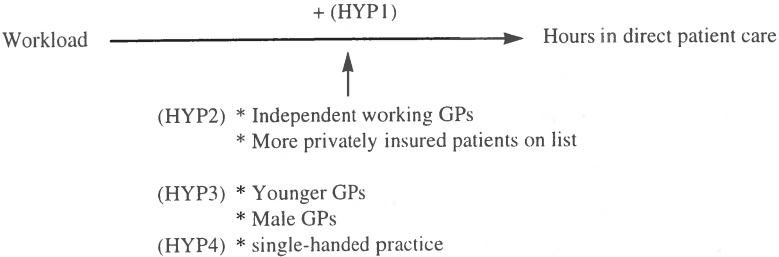
is related to different aspects of the GPs' work. Working hours in direct patient care will mainly affect the social approval given by the patients. It influences the length of the consultations of the index patient but also the waiting time of the other patients in the waiting room, and, on a more general level, the accessibility of the practice. In relation to workload, the following hypothesis is formulated:

HYP4 The positive relation between workload and the hours spent in direct patient care is stronger when GPs are more dependent on their patients as a source of social approval.

GPs in single-handed practice are more dependent on their patients as a source of social approval, while GPs in partnerships depend more on their colleagues as a source of social approval. Social approval of patients might be influenced by the allocation of time to direct patient care.

The next figure summarizes the expectations on the relation between GPs' workload and the number of working hours in direct patient care.

Figure 2.3 Empirical expectations about GP- and practice-characteristics that influence the strength of the relation between workload and the hours spent in direct patient care



Up to this point, we mainly focused on the trade-off between leisure and income. The time spent on other practice activities was regarded as a constant. The conditions will now be discussed under which we expect GPs to be willing to cut back the time spent on other activities in favour of the time for direct patient care. Cutting back time in this respect seems to be an important solution for GPs confronted with high workload. This

choice is positively related to all other goals: appropriate time for the patients, income (at least when other activities are not separately paid for), leisure time (in this way the increase of direct patient care does not affect the amount of leisure time). Therefore, it is assumed that the following general relationship is most likely to occur:

HYP5 In general, GPs' workload is negatively related to the hours spent on other practice or professional activities.

However, the other professional activities are instrumental to GPs in producing social approval from their colleagues. As before, we assume that the relevance of this aspect can differ between GPs. Therefore, our hypothesis is:

HYP6 The negative relation between workload and hours spent in other activities is stronger when GPs are less dependent on their colleagues as a source of social approval.

Earlier it has been mentioned that involvement in continuing medical education will have a positive effect on social approval from colleagues. GPs who have just started a practice still have to gain this social approval, while older GPs have already established a certain amount of professional status. Therefore, the utility derived from this kind of activity will be greater for younger GPs. As a consequence, younger GPs are more likely to work more hours in the practice instead of cutting back the time spent in other professional activities as a reaction to high workload compared to other GPs.

An important restriction at the second level is the practice setting. As mentioned, GPs have two sources of social approval: their peers and their patients. Since GPs in single-handed practice have relatively few contacts with colleagues, their patients will be their most important source for social approval. GPs in partnerships or group practices are more directly observed by their colleagues. As a consequence, GPs working in partnerships derive more social approval from their colleagues by engaging in other professional activities such as peer review, refresher courses, and reading medical literature. This implies that GPs in partnerships are less likely to reduce time for other practice activities in favour of direct patient care as a reaction to their workload compared to GPs in

partnerships.

The supervision of a trainee is the only activity, besides direct patient care, that increases the number of hours spent in other practice activities and is directly related to income. We assume that the other goals are not related to whether or not a GP has a trainee in his practice. But, because of the direct relation between income and the activity, the utility derived from time spent in other practice activities is higher for GPs with a trainee than for GPs without a trainee. As a consequence, GPs without a trainee will be more likely to cut down on the hours spent in other activities.

It is expected that when income is more important or when there is a direct relation between patient care and income, GPs are more likely to cut back on time spent on other practice activities because most of these activities are not separately remunerated.

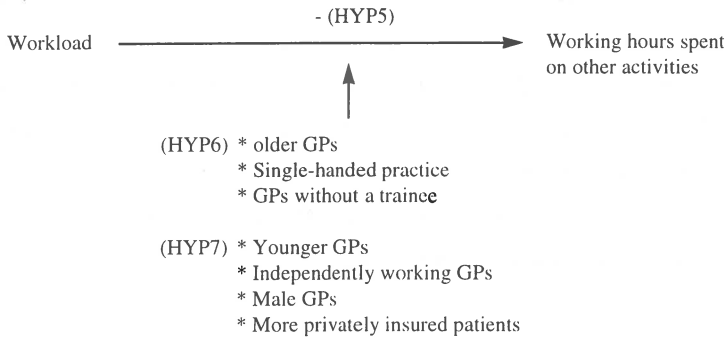
HYP7 The negative relation between workload and hours spent in other practice activities is stronger when income is more important for a GP.

Based on this hypothesis and the earlier arguments connected to income, it is expected that the negative relation will be stronger for male GPs, GPs working independently, GPs with a higher percentage of privately insured patients and younger GPs. It is important to notice that the GPs' age leads to conflicting predictions. On the one hand it is assumed that the importance of other practice or professional activities is decreasing with age. Older GPs are less dependent on the social approval of their colleagues because their professional status is, to a large extent, established. As a consequence they are more likely to cut back on time in these activities in favour of time in patient contact. On the other hand, however, it is assumed that younger GPs are more aware of differences in remuneration than older GPs because they still have to recover their investment costs. Because, in general, GPs are not separately paid for the other practice activities, younger GPs are more likely to cut back on time for these activities in favour of direct patient care.

In the next figure all expected empirical relations regarding workload and the number of working hours in other practice activities are summarized.

Figure 2.4

Empirical expectations about GP and practice characteristics that influence the strength of the relation between workload and hours spent in other practice activities



2.5 Workload and the length of consultations

In the previous section workload was related to working time. The next step concerns reduction of the length of consultations as a reaction to high workload. This changes our perspective towards specific consultations. In the former section 'appropriate care' is defined in terms of sufficient amount of time available for all patients. With regard to a specific consultation it is more difficult to define this term because the 'appropriateness' is related to the health problem of the specific patient. The time spent on the index patient might be determined by the health problem of this patient, but at the same time directly influences the waiting time of the other patients. Hence, in the face of a large number of consultations and restricted available time in direct patient care, GPs will have a tendency to reduce the length of consultations on average. Thus, the following general hypothesis can be formulated:

HYP8 In general, the workload of general practitioners is negatively related to the length of their consultations.

There is no direct relation between the length of a consultation and GPs' income. This means that differences in direct financial gains between remuneration systems and the importance of income for GPs are not taken into account. However, the amount of time spent on each patient is expected to be related to the social approval received from the patient. When patients feel comfortable and feel that the GP takes time and interest in

them, they will more appreciate the consultation.

It is already stated that GPs who work in single-handed practices rely to a higher extent on their patients as a source of their social approval. Therefore, they will be less likely to reduce the length of a consultation in reaction to high workload.

Furthermore, patients' satisfaction may, under certain circumstances, affect the GPs' income in the future: e.g. when dissatisfied patients leave the practice. As mentioned in Section 2.4., for privately insured patients it is easier to switch GPs or to go directly to a medical specialist. As a consequence, GPs must be aware of possible loss of income in the future. They must take the patient's wishes more seriously into account and they are therefore less likely to cut back on the time spent on each privately insured patient. The following general hypothesis can be formulated:

HYP9 The negative relation between GPs' workload and the length of consultations is stronger when:

- *patients have less freedom to change GPs or to go directly to a medical specialist.*
- *GPs are less dependent on their patients as a source of social approval.*

Characteristics of the patient and his health problem are, in the context of a particular consultation, important restrictions that define the allocation of time to particular consultations. We have already discussed the fact that the opportunities to provide appropriate care are determined by the patient's health problem. According to Flierman (1991), the medical decision room of GPs differs largely according to the health problem. The choice in treatment of a broken leg is for example more restricted than the choice in treatment of a sleeping disorder.

When the medical decision room is smaller, the GP is more aware of what is best for the patient and, as a consequence, the consideration of other instrumental goals does have less influence on the decisions made. When this is the case, the length of the consultation is mainly determined by the presented health problem and not (or to a lesser extent) by workload. Therefore, the relation between workload and the length of consultations will be less strong. We therefore predict that:

HYP10 The negative relation between GPs' workload and the length of the consultation is stronger when the decision room of the GP in a consultation is less restricted by the patient and his health problem.

To formulate more concrete hypotheses, we must define which characteristics of the health problem will influence the medical decision room. The following aspects will be distinguished: certainty about the diagnosis of the patient's problem, the existence of more or less well-defined standards of what to do or not to do, given the patient's problem and/or diagnosis, and the possible consequences of suboptimal care for the patient. Firstly, the degree of uncertainty about the diagnosis is relevant. The diagnosis defines the type of treatment required. When the GP is certain about a diagnosis, his medical decision room will be more limited: a higher level of uncertainty of the diagnosis means a greater chance that workload affects the length of the consultation.

Secondly, medical knowledge and professional standards of treatment of given conditions define the medical decision room. There are large differences between health conditions in this respect and it is impossible to consider these in great detail. We therefore differentiate only between physical and psychosocial problems. When the GP is confronted with physical conditions his decision room is, it is assumed, usually more limited than when he is confronted with psychosocial problems. We assume that professional standards are less well defined regarding psychosocial problems and that the variety of treatments is wider with respect to these kinds of problems. Consequently, the negative relation between GP's workload and the length of the consultation will be stronger when psychosocial problems are presented.

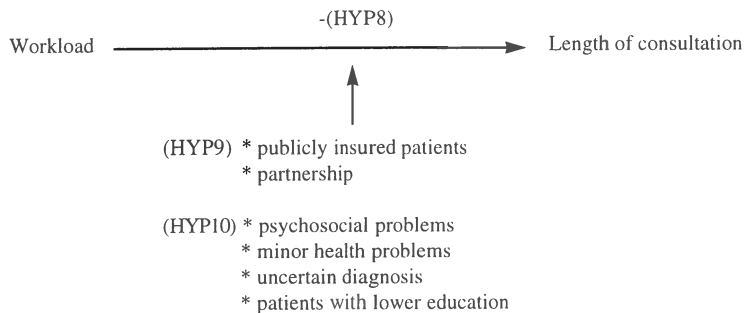
Finally, it is important to take into account to what extent less appropriate care has negative consequences for the patient. Medical work is characterized by a large amount of professional uncertainty (McPherson et al., 1981). This means that the GP has to weigh chances of less appropriate care and the consequences for the patient. When a GP is confronted with a severe problem, his behaviour will be less influenced by situational aspects, such as a high workload, because less appropriate care has more severe consequences for the patient's health status. The idea that the medical decision room of GPs is smaller in severe health problems is confirmed in an empirical study which showed that the interdoctor variation was significantly smaller when the doctors were confronted with

serious illnesses (Mokkink, 1986).

The decision room of GPs in a consultation can also differ between patients. It is known that patients with a higher education are better able to 'negotiate' with physicians. According to Boulton et al. (1986) this can be explained by two factors. Firstly, the social distance between physicians and patients with higher education is smaller. This leads to more similar communication styles. Secondly, health knowledge and beliefs of patients with a higher education better match those of the physician. Therefore, they have a greater influence in a consultation than patients with a lower education. Higher impact of the patient means less decision room for the physician to determine the length of the consultation. Thus, from our general hypothesis stated above, it can be derived that the negative relation between a GP's workload and the length of the consultation will be stronger when the GP is confronted with a patient with lower education.

In the next figure, all expectations regarding workload and length of consultations are summarized.

Figure 2.5 Empirical expectations about GP, practice, patient and health problem characteristics that influence the strength of the relation between workload and length of a consultation



2.6 Workload and the content of care: allocation of time within a consultation

This section focuses on the GPs' choices in a specific consultation. As a whole, these choices result in a specific content of care. Patient's behaviour will be considered only as a restriction affecting the GP's medical decision room.

We shall start this section by describing the alternative ways of action within consultations. Then the idea is developed that in situations of high workload, one way to cope is to shift towards less time-consuming interventions or to do interventions more quickly. These ways of coping may result in postponing work to the future. Here the distinction between overall workload and busy working days comes in. Postponing work to the future might be an adequate way of coping with an incidental busy day, but not with an overall high workload. Based on these distinctions, a number of hypotheses will be formulated.

Ideally, a consultation is composed of a number of decision steps that are summarized in the next figure. It is important to stress that the alternatives do not exclude each other: different aspects of care can be used next to each other in one consultation or in succeeding consultations. However, for reasons of simplicity they are considered more or less independent choices.

Figure 2.7 Main elements of a consultation in general practice

Diagnostics	Physical examination Diagnostic tests in the practice (internal diagnostics) Diagnostic tests in external laboratories (out-of-office)
Wait and see	
Treatment	Counselling and advice Technical medical interventions Prescription of drugs
Referral	Specialist care Primary care disciplines
Follow-up appointment	

In general, GPs will start a consultation by translating the patient's complaint or reason for encounter into a professional (preliminary) diagnosis and estimate the severity of the problem. It might be relevant to carry out an anamnesis, physical examination or diagnostic tests such as blood or urine tests and X-ray. Some tests can be performed in the practice, others in external laboratories (out-of-office). The diagnosis is used as working hypothesis in the consultation. In our research, the correctness of the diagnosis is not relevant because it is assumed that the GP will act according to his own opinion of

the patient's health problem. If for instance according to a GP a patient has a high blood pressure, he will treat the patient as an hypertensive, irrespective of formal diagnostic criteria. Thus, the GP's working hypothesis, in this book referred to as the diagnosis, strongly influences further decisions or actions in the consultation.

Because a number of diseases are innocuous and self-limiting, 'wait and see' (waiting for a while and seeing how the complaints develop) can be an appropriate strategy in general practice. Next the GP can decide to start treatment himself or to refer the patient to another care provider.

A distinction can be made between referrals to specialist or hospital care and referrals within primary health care: e.g. to physiotherapy, community nursing, social work or dietician. The most important difference is the role of the GP. When he refers the patient to primary health care providers, the GP will remain the treating physician and therefore medically responsible for the patient. After a referral to specialist care the GP will have less influence on the care provided to the patient: the specialist takes over treatment for a considerable part (Kersten, 1991).

Treatment in general practice can be divided into three main categories: counselling and advice, technical medical interventions, and pharmaceutical prescriptions. For affective or psychosocial treatment the term 'counselling' is used. In this book it includes listening, talking, reassuring and giving information and advice. Two general types of instrumental treatment are distinguished: technical medical interventions, such as injections, wound care, placing an I.U.D. and minor surgery, and pharmaceutical treatment (prescription of drugs).

Making follow-up appointments is an important aspect of GPs' care in relation to the continuity of care. It may be necessary to see the patient again, to evaluate the choices made in earlier consultations (e.g. the effect of drug treatment), to see how the complaints develop or to discuss the results of diagnostic tests. For these reasons, concrete appointments are made.

As mentioned in Figure 2.1, GPs have three coping mechanisms for high workload in a specific consultation: performing less time-consuming interventions or avoiding more time-consuming interventions, performing the same kind of interventions more quickly, and postponing work to the future. To understand the relation between workload and the

content of care, it is important to note that the interventions require different amounts of time. A division must be made between two aspects of time consumption: time needed in the consultation itself and time consumption in the near future (the chance of a repeat consultation).

GPs' reactions to workload might differ depending on whether we refer to a busy practice (stable or overall workload) or a busy day (situational or daily workload). Some reactions structurally affect workload, while others are only helpful in managing to survive the day and shift work to the future. Therefore, within the bounds of what is medically justifiable, higher overall workload will imply other coping mechanisms than a busy working day. A busy working day can be coped with by shortening the consultation by postponing activities to a later moment. However, when confronted with a busy practice, this does not seem to be an adequate strategy because the practice is always busy. Hence, not only the direct time consumption of interventions will be an important consideration but also the expected time consumption in the near future. Out-of-office diagnostics may save time directly: the patient knows that his complaints are taken seriously and the GP knows that the patient will contact him again for the results. This is why out-of-office diagnostics are expected to be related positively to daily workload and negatively to overall workload. This also applies to follow-up appointments. We expect higher referral rates as a way to cope with high overall workload, while the pressure of a busy day might be relieved by the strategy of wait and see.

On the relation between overall and daily workload on the one hand and the choice of interventions within consultations on the other, the following general hypotheses can be formulated:

*HYP11 In general, daily workload and overall workload of GPs are negatively related to the choice of more **directly** time-consuming interventions and positively related to the choice of less **directly** time-consuming interventions, under the condition that the expected time consumption of the interventions in the near future is neutral.*

HYP12 In general, the daily workload of GPs is positively related to the choice of more time-consuming interventions in the near future, while the overall workload of GPs is negatively related to the choice of more time-consuming interventions in the near future and positively related to the choice of less time-consuming interventions in the near future.

After specifying more and less directly time-consuming interventions and interventions that bring more or less work in the near future, a series of operational hypotheses is formed. Examples of more directly time-consuming interventions are physical examinations, of less directly time-consuming interventions wait and see, of more time-consuming interventions in the near future making follow-up appointments, and of less time-consuming interventions in the near future referrals. In Chapter 6 these operational hypotheses will be formulated (and empirically tested).

Again, just as in the previous sections, we expect that the relations expressed in these general hypotheses will be stronger depending on how much decision room the patient and his condition allow the GP. With less certainty about the diagnosis, with psychosocial problems and less severe problems and with lower-educated patients, it is assumed that GPs have more room to shift to less time-consuming alternatives within their consultations.

HYP13 The relations between overall and daily workload on the one hand and the choice of interventions within consultations on the other will be stronger when the decision room of the GP in a consultation is less restricted by the patient and his health problem.

Similarly, the relations between overall and daily workload and the choice of interventions will differ according to the economic interests of GPs and the risk of losing social approval. Because GPs are paid for each consultation of a privately insured patient separately, they will be more likely to postpone decisions about the treatment and make a follow-up appointment than when a publicly insured patient (with a fixed capitation fee) visits them. For the same reason the GP might refer a publicly insured patient more

quickly to cope with high workload.

In this case the relation between workload and the choice of interventions can be both weaker and stronger, depending on the specific intervention and the characteristic of the GP or the practice. From the point of view of realizing instrumental goals in the field of income, the patient's insurance status is relevant and the employment status of GPs. From the point of view of gaining or losing social approval the practice type is relevant.

HYP14 The relations between overall and daily workload and the choice of interventions within consultations are conditioned by the consequences of the choice of intervention for income and/or social approval of the GP.

2.7 Consequences of workload for the quality of care

Allocation of time and content of care have been defined in terms of choices made by GPs. Quality of care is not considered a choice of a GP, but a consequence of the choices described in the previous sections. Quality of care in our study will be conceptualized in terms of accordance with professional standards. The operationalization will be discussed in Chapter 7.

Overall, a negative relation is expected between the GPs' workload and the quality of care they provide. The mechanisms that bring about this overall relationship are derived from the reactions to high workload. These mechanisms are related to working more hours in direct patient care, spending less time on keeping up to date and reducing the length of consultations.

When GPs decide to work more hours per week, this does not necessarily affect the type of interventions undertaken in consultations. However, the quality of care might be influenced by the fact that longer working hours affect concentration, which can lead to less appropriate care.

A decision to spend less time on other practice activities might disturb the practice organization or influence the GP's competence (skills and knowledge). Especially, spending less time on continuing medical education (CME) and reading the medical literature might be related to lower quality of care.

It is expected that reduction of the consultation length will have the greatest influence on quality of care. The length of consultations has a direct relation to the content of care provided.

The general hypothesis is:

HYP15 In general, the GPs' workload is negatively related to their quality of care.

This general relation is supposed to be caused by choices made in the allocation of time to total hours worked, other practice activities and consultations:

HYP16 The negative relation between GPs' workload and quality of care is caused by a larger number of hours in direct patient care, less time spent on keeping up to date (CME), and by shorter consultations.

2.8 Summary and discussion

In this chapter we have elaborated the relations between GPs' workload and the content and quality of their work. The link between the two is in the choice of strategies to cope with workload, either in general (a busy practice) or on a specific day (a busy day). We have started with the introduction of a general behavioural model, which was applied to GPs. Based on this theoretical model we have formulated hypotheses on each of the two aspects of the allocation of time: the decision to spend more time in direct patient care and the reduction of the length of consultations as reactions to high workload. The alternative of reducing the length of consultations has been further elaborated by looking at more or less time-consuming activities within consultations. Finally, the implications of these decisions for quality of care have been discussed.

A theoretical model is a simplification of reality. This means that often assumptions have to be made that can be issues for debate. Apart from implications from the general behavioural model that we used, three points are important to mention. Firstly, we only have considered workload as a restriction of the behaviour or choices of GPs. However, workload might also be seen as a result of this behaviour or these choices and this is not

further explored in our theoretical model. Secondly, choices in allocation of time and provision of care were considered to be independent. In reality, they might be interrelated. The third remark is related to the kind of data we have to test the hypotheses. Although a number of our expectations have been formulated as if a GP has to react to an increasing workload, we can only perform cross-sectional analyses. This means that we assume that the effects of an increase of workload will be reflected in the behaviour of GPs who had a higher workload at the moment of study.

The hypotheses that have been formulated in this chapter will be tested with data that are collected in the Dutch national survey of general practice. In the next chapter we discuss this study and explain the methods of analyses that will be used.

RESEARCH DESIGN: DATA AND METHODS

3.1 Introduction

In the previous chapter, hypotheses were formulated about the three central relations in this study. These were the relations between on the one hand GPs' workload and on the other their allocation of time, content and quality of care. It was expected that several characteristics of GPs, their practices, patients and the presented health problems will influence the strength of these relations. To test these expectations, information is needed about a large number of consultations (with different kinds of patients) performed by a large number of GPs. Furthermore, a distinction was made between overall and daily workload, which implies that data have to be available at two levels: the GP- and the working day-level. In the Dutch national survey of general practice, most of the required information has been gathered. Therefore, this data set was used in this study.

This chapter starts with a brief outline of this survey. Next, the measurement of the main concepts of our study, workload, content and quality of care, is discussed. The specific selection of GPs and working days for our analyses is addressed in the following sections. Finally, the statistical method is considered in general terms. More detailed information on the research methods is separately provided in each chapter.

3.2 Dutch national survey of general practice

Between April 1987 and March 1988, the Netherlands Institute of Primary Health Care (NIVEL) conducted the Dutch national survey of general practice (Foets et al., 1992). The aim of this large-scale research project was to provide information about the position and function of Dutch general practitioners. Both demand (patient) and supply (GP and practice) aspects were included in the study. A sample of 161 established GPs (principals), working in 103 practices, participated as well as their trainees ($n=13$), locums ($n=10$), assistant GPs

(n=9) and practice secretaries (n=177).

The sampling procedure was performed in three steps. Firstly, a non-proportional stratified sample of 98 established GPs was randomly selected from a data base of all Dutch GPs. Degree of urbanization, region and distance from the hospital were used as stratification criteria¹. Secondly, in partnerships, the colleague GPs (n=58) were also asked to participate. Thirdly, for stratification reasons, it was necessary to include five volunteering GPs in the study. In comparison with Dutch national figures, the study population contained a little more younger doctors, more female GPs and fewer doctors working in single-handed practices (Foets et al., 1992).

Four main research instruments were used. The core of the data collection was a three-month registration of all consultations with patients in the practices. Additionally, for all practices a register was set up containing important background information on all patients on the list (patient census). Data on GP and more specific patient characteristics were gathered by mailed questionnaires and personal interviews respectively.

Registration of contacts

The whole registration of contacts was spread over one year, from April 1987 till March 1988. The participating practices were divided into four groups that registered in four different periods of three months. For each contact a registration form was completed. Information was reported about the contact itself (time, place and length of consultation), presented morbidity and performed interventions. In total 386,000 contacts, including office consultations, home visits and telephone calls, were recorded.

Patients can have several reasons for contacting the GP (reasons for encounter in the terminology of ICPC) in one consultation. When the GP regarded them as one health problem or diagnosis (e.g. fever, cough and headache as symptoms of influenza), he completed one registration form. When, according to the GP, two or more distinguishable health problems were presented, e.g. warts and hypertension, information on morbidity and

¹ Degree of urbanization: 1.rural areas (fewer than 30,000 inhabitants), 2.medium-sized cities (30,000-50,000), 3.large cities excluding Amsterdam, Rotterdam, The Hague (50,000-250,000), 4.Amsterdam, Rotterdam, The Hague (400,000 - 800,000).

Region: 1.north, 2.middle, 3.south.

Distance from the hospital: 1.surgery in the immediate vicinity of a hospital, 2.less than 15 km, 3.over 15 km.

interventions was separately registered for each health problem.

Morbidity (reasons for encounter and diagnosis or working hypothesis) was recorded by the GP on the form and later centrally classified by well-trained coders. The International Classification For Primary Care (ICPC) was used as coding instrument (Lamberts & Woods, 1987; Van der Velden et al., 1992). Furthermore, GPs provided additional information on the health problem such as the nature (new or already existing), perceived degree of somatic or psychosocial nature, severity according to the degree of life threat and to the probability of serious disability. Also, relevant underlying diseases were recorded.

With respect to the interventions, the following information was available. Firstly, the performance of diagnostic services (anamnesis, physical examination, diagnostic tests). A distinction was made between services performed by the GP or practice secretary themselves (internal diagnostics) and requests for diagnostics outside the own practice (out-of-office diagnostics). Secondly, the kind of treatment in the consultation was recorded, e.g. activities concerning health promotion, counselling, vaccinations and minor surgery. Regarding the prescribed medicines, brand name, strength, total quantity and prescribed daily dose were reported. The medication was classified according to ATC classification (Nordic Council on Medicines, 1985). Furthermore, information on referrals to other primary care disciplines (e.g. community nursing, physiotherapy or social work) and specialist or hospital care was collected. Finally, the GP indicated whether a follow-up appointment was made.

The information from the contact registration could be connected with the data of patients and doctors.

Patient information

Patient information used in this book was obtained from the patient census, which provided information on 90% of the patients on the GPs' lists (N=335,000 patients). General background characteristics were recorded such as age, sex, marital status, ethnic background, profession, health insurance, education and housing conditions. Patients visiting the practice during the registration period were asked to complete a small questionnaire. Afterwards, a questionnaire was sent to all people on the list who did not visit the practice during the registration period.

Practice and GP information

General background information on GPs (such as sex, age and type of practice) was partly obtained from the continuous registration of all practising GPs in the Netherlands (Pool & Hingstman, 1990). This kind of information was available for all GPs who participated in the study. Additional data, e.g. practice organization (booking intervals, appointment system, number of practice secretaries), task perceptions and personal attitudes were obtained by means of a questionnaire. Locums and trainees were not asked to complete this questionnaire. Of the remaining 170 GPs, only 161 completed the questionnaire in a sufficient way. Furthermore, 155 GPs kept a detailed diary covering 24 hours a day during one week (including the weekend) within the three-month recording period. They registered, in intervals of 15 minutes, the activities they performed. These activities were later centrally classified into four main categories: private time, time spent on practice activities divided into direct patient care (surgery, home visits, emergency calls and hospital visits), other practice-related activities (continuing medical education, reading literature, practice administration, communication with colleagues and practice secretaries), and time spent in professional activities outside the practice (other jobs (e.g. teaching or research), health checks and well child care clinic). In our study only the time directly related to the practice work was taken into account. This means that private time and time spent in other jobs or activities outside the practice were excluded.

3.3 Assessment of personal list size and practice composition

The total number of patients per practice was established through the patient register that was set up for each practice. Our research questions are focused on individual GPs. Therefore, information on the personal lists is required: the number of patients for whom the individual GP is responsible. In single-handed practices personal list size and practice list size are identical. However, in most partnerships, patients are registered on a practice basis. To assess the GP's personal list in these practices, it was necessary to assign patients to each individual GP. This procedure contained two steps. Firstly, patients were asked which GP they usually visit or they were directly assigned to the particular GP whom they consulted in the registration period. Secondly, the remaining 29% of the patients of partnerships or

group practice were distributed among the GPs according to their share in the total number of full-time equivalents worked in practice. For instance, when two GPs worked full-time in the practice, half of the remaining practice population was assigned to each GP. However, when one GP worked half-time and the other worked full-time, the distribution rate was 20% (5/15) and 80% (10/15) respectively. Assistant GPs were treated in the same way as partners.

With regard to the practice composition, the following features were assessed per GP:

- percentage of women;
- percentage of elderly people (over 75 years of age);
- percentage of young children (under 5 years of age);
- percentage of publicly insured people;
- percentage of low-educated people (people over 25 years of age with primary education only).

A review of the literature showed that these features were important determinants of the number and length of consultations (Groenewegen & Hutten, 1991).

3.4 Measurement of workload

Our study was focused only on the objective aspects of GPs' workload. Therefore, it was expressed as the number of consultations handled by the GPs themselves.

A distinction must be made between office consultations, visits (both home and hospital visits) and telephone calls. They each refer to a specific part of the workload with different weights. In accordance with other research (Commissie moderniseren curatieve zorg, 1994), one total workload score was calculated in which home visits, office consultations and telephone calls were counted by the ratio of 2:1:0.5. All consultations of the GP were included in the workload score; also consultations with patients who were formally on the list of another GP (e.g. during rota duties or vacations).

Overall workload was defined as the weighted number of consultations handled by the GP per week averaged over the registration period of three months. This number was divided by the whole-time equivalents of involvement in the practice because it is important to control for the official or formal number of working hours. A full-time working GP with an average of 50 consultations a week has a lower workload than a part-time working GP with

the same average. Indicator for the daily workload was the number of weighted consultations per day.

It is important to stress that the personal workload of GPs was calculated. This means that this figure already reflects differences in list size and composition and differences in the opportunities to delegate consultations to others such as colleagues or practice secretaries.

3.5 Measurement of content of care

Information on the content of care (the choices made by the GPs in the care-providing process) was gathered through the contact registration. For reasons of comparison, only the office consultations were investigated. Hence home visits, hospital visits and telephone calls were taken into account in the workload measurement, but they were excluded from the measurement of the content of care. Furthermore, GPs were asked to fill in a full contact registration form only when one of their own patients was consulting. This means that no information was available on care provided to patients enlisted in other practices.

Content of care was defined as the percentage of specific interventions in the *office* consultations of the GP. These percentages were calculated both on a daily basis and as averages per GP. The interventions were grouped into ten categories: physical examination, practice-based diagnostics, out-of-office diagnostics, the decision to 'wait and see', counselling (therapeutic communication, health education, advice), technical intervention (vaccinations, minor surgery), drug prescription, referral to specialist care, referral to primary care (dietician, physiotherapist), and follow-up. The length of office consultations was noted by the GPs. Average length was also calculated per GP and per working day.

3.6 Measurement of quality of care

Three dimensions of the quality of care are often distinguished: structure, process and outcome (Donabedian, 1980). In this study only one dimension will be considered: the process defined as the decisions made by the GP during a office consultation was related to professional standards of care.

In Chapter 1 we discussed already some of the difficulties of measuring the quality of the performances of physicians in the daily practice. Frequently indirect indicators have been used such as the length of consultations and the number of specific interventions. These measures assume that for instance prescription or referral rates are negatively related to good quality of care. The main criticism of these methods stresses the fact that these kinds of rates do not take into account whether the intervention was appropriate in relation to the patient's complaints. In this study, a method will be introduced to assess the appropriateness of medical care in general practice, using 33 indicators derived from professional standards of care and the patient-linked information on morbidity and intervention registered by the participating GPs in the Dutch national survey. This choice was based on the limited use of other techniques such as (in)direct observations, questionnaires and standardized patients, with regard to our specific research questions and practical considerations (the availability of the data). The whole process used to translate the professional standards of care into empirical measures applicable in the data set will be discussed in Chapter 7.

The percentage of deviations from these indicators were calculated per GP and for each working day.

3.7 Selection of the data

For our specific research questions, it was necessary to make a certain selection in the available data. Firstly, not all participating GPs could be included and secondly per GP a selection of the working days was made.

The GPs

Firstly, the principals and assistant GPs were selected who were employed on a permanent basis ($n=168$)². Secondly, to make a more homogeneous research group, all GPs were excluded who worked less than 0.5 whole-time equivalents in the practice. In total 159 GPs remained: 149 of them kept the diary. In Table 3.1 some major characteristics of the selected GPs are presented.

² Only assistant GPs who worked permanently in the practice were included. Temporary workers like trainees, and locums because of sickness or vacation of the principal, were excluded.

Table 3.1 Descriptives of participating GPs, in percentages

	GPs and permanent assistant GPs (N=168)	Working at least 0.5 WTEs in practice (N=159)	Diary completed (N=149)
<i>Gender</i>			
male GPs	83	87	88
<i>Age</i>			
< 35	16	13	13
35-39	30	30	30
40-50	38	40	40
50-60	14	15	15
60+	2	2	2
<i>Practice involvement</i>			
Full-time	76	80	82
<i>Status</i>			
Principal	96	98	100
Assistant GP	4	2	0
<i>Type of practice</i>			
single-handed	34	34	32
partnership	55	56	58
health centre	11	10	10
<i>Practice location</i>			
Rural areas	37	37	38
Medium-sized cities	38	39	38
Large cities	18	18	19
The 3 largest cities	7	6	5

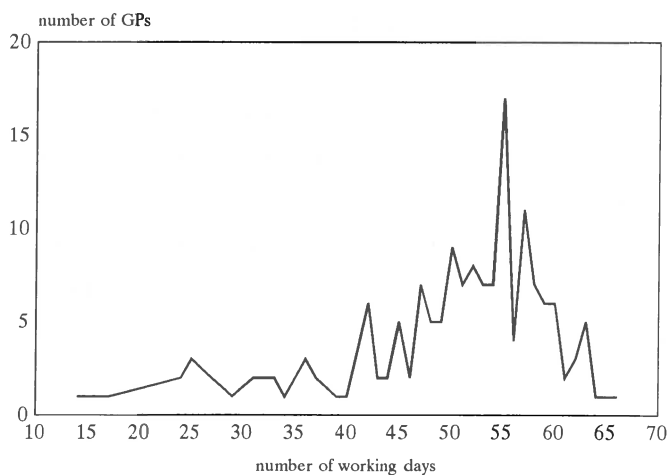
There were, in general, only small differences between the three selections of GPs. Our research populations included a little more male GPs, fewer younger doctors and more full-time workers compared to the whole group of participating doctors in the national survey. As mentioned in Section 3.2, the GPs participating in the national survey deviated, in some respects, from the total GP population in the Netherlands during the time of data collection. This was due to the sampling procedure. The non-proportional stratification procedure and the inclusion of partners of the randomly selected GPs were the main reasons. This means that the data presented in this book are not fully representative. To present data representative of the Netherlands, weighting procedures need to be used. However, this book is mainly focused on the relations between workload on the one hand and allocation of time, content and quality of care on the other. In the multivariate analyses, characteristics of GPs and their

practices were taken into account. Therefore, weighting procedures were not needed. Representative information on the absolute amount of workload and working hours of the participating GPs was published in an earlier article (Groenewegen & Hutten, 1994).

Working days

For reasons of comparison, weekends and holidays were excluded. The workload and especially the opportunities for providing care in general will be more restricted during these days. Therefore including them might influence the relation under study too strongly. Next, working days with fewer than ten office consultations were excluded because these might be very special days, for instance a half day off. Finally, working days with special surgeries such as influenza vaccination and wart removal were excluded because the content of care is too much influenced by these surgeries. In total 7918 days remained. The average number of working days per GP was 50 (range between 16 and 66) (see Figure 3.1).

Figure 3.1 Number of working days per GP included in the study



Although the data in this study were collected almost ten years ago, this does not mean that they are irrelevant to the current situation in general practice. The most important and practical argument is that, at this moment, no more recent data set is available with the same kind of comprehensive information as the national survey. To test the hypotheses, detailed information is needed on the daily work of a sufficient number of GPs, covering a substantial

number of working days. Moreover, information on the care provided can be related to the health problems presented and important characteristics of the patients. Furthermore, possible changes in GPs' workload over the years will not affect our conclusions because they are focused on its relations with allocation of time, content and quality of care and not on the absolute level of the workload.

There is, by the way, no evidence that the actual objective workload has changed dramatically over the past ten years in the Netherlands. Although the percentage of patients who consulted their GP at least once a year has increased from 72.4% (in 1988) to 75.2% (in 1996), the number of consultations per person per year has increased only from 3.6 to 3.7 (CBS, 1997). The most important change in GPs' workload was related to the type of consultations. The percentage of home visits dropped from 13.2% in 1988 to 8.8% in 1996. The percentage of telephone calls increased from 5.3% to 10.5% in the same period (CBS, 1997). Also regarding the number of working hours per week no important differences between 1988 and 1996 were found. An average working week in the national survey contained 50 working hours (Groenewegen & Hutten, 1994). In a recent publication an average of 49 working hours was found (Heiligers et al., 1997). These figures are, however, not completely comparable because of the different research methods used. The national survey worked with a daily diary during one week, while in the study by Heiligers et al. (1997) GPs were directly asked to fill in their number of working hours in a mailed questionnaire. However, van den Hombergh et al. (1997) also calculated that full-time working GPs spent 50 hours per week on their core activities, in the Netherlands. As mentioned in Chapter 1, this number was based on information from the appointment schemes and personal estimates from the GPs.

3.8 Statistical analyses

Two main methods of statistical analysis were used in this research, depending on the level at which the dependent variable is situated. Firstly, the dependent variable can be a characteristic of a GP. Information on working hours (presented in Chapter 4) was for instance available only per GP and not for each working day. The amount of variation in daily workload, which is studied in Chapter 5, was also a GP characteristic. Secondly, the

dependent variable can be situated at the level of the working day. In Chapter 6, the content of care will be studied at this level: the percentage of consultations with specific interventions and the average length of consultations will be the dependent variables. In Chapter 7, quality of care is also analysed as characteristic of the working day: the percentage of deviations from the 33 indicators for appropriate care is the dependent variable.

When the dependent variable was situated at the GP-level, linear regression analysis was performed using the SPSS programme. To test our hypotheses whether the relation between workload and allocation of time were influenced by GP- or practice-characteristics (Chapter 4), interaction terms between workload and the characteristic mentioned in the hypothesis were included in the equation, controlling for relevant main effects. To avoid multicollinearity, centred scores were used to calculate the interaction terms.

When the dependent variable is a characteristic of the working day, the independent variables were situated at two levels: the GP-/practice level and the working day level. Because of the nested structure of the data, working days were nested within a GP, multi-level techniques need to be used (Jones & Moon, 1991; Goldstein, 1995; Rasbash & Woodhouse, 1995). Using the MLn programme for multilevel analysis, characteristics of both levels were analysed simultaneously.

When the content of care is considered (Chapter 6), it is very important to take into account the case-mix of the particular day's patients in terms of the health problems presented and socio-demographic background of patients (Miller et al., 1993), whilst at the GP-level relevant variables need to be included that are known to influence the content of care, such as remuneration system, practice mode, location of the practice, the level of delegation to practice assistants, age and gender of the GP.

Workload was included in three ways: daily workload at the working day level, overall workload at the GP-level and the cross-level interaction of overall workload and daily workload. This was to find out whether GPs with a high overall workload reacted differently to their daily workload, compared to GPs with a low overall workload. The daily workload score was centred within each GP.

The research question whether the relation between workload and the content of care is influenced by patient-characteristics or the presented health problem, was analysed by the introduction of interactions between daily and overall workload on the one hand and relevant patient and health problem characteristics on the other. All interactions were centred. In

addition to the interactions mentioned, the main effects of these variables were also in the equations. It is important to mention that all patient and health problem characteristics were aggregated to characteristics of a working day. With regard to the type of health problem presented, a simple distinction was made between four categories: acute physical problems, chronic physical conditions, psychosocial problems and other kinds of health problems (see Groenewegen et al., 1992). The ICPC-codes of the GPs' diagnosis were used to categorize the health problems of the patients. The characteristics of the health problems presented in a consultation were reported by the GPs. This means that for example certainty and severity of the diagnosis and whether it was a new complaint were the perceptions of the GP and not of the patient. It is assumed that the perceptions of the GP will be more related to the content and quality of care than the perceptions of the patients. Information on patients' characteristics, like age, gender, education and the type of insurance, was provided by the patients themselves by means of a small questionnaire (patient census).

In the analyses in Chapter 7, we need to control for the variation in indicator-mix between working days because this might influence the percentage of deviation. Heteroscedastic regression analyses were performed to control for the number of observations per working day. It was not necessary to control for patient- and health problem-characteristics because they were a part of the definition of the indicators. Two GP- /practice-characteristics that were expected to be related to the percentage of deviations, namely the type of practice (single-handed versus partnerships) and GP's age, were part of the models.

3.9 Summary and discussion

Data of this study have been obtained from the Dutch national survey of general practice. This comprehensive survey provides most information needed to answer our research questions. Central to this survey is a three-month recording of all contacts of the participating GPs (and their trainees, locums and assistants). In this research, data of the 159 GPs who worked at least 0.5 WTE in the practice were included. Data recorded included patient characteristics, characteristics of the consultation (e.g. length of consultation), complaints of the patient, diagnosis, and interventions (diagnostic services, treatment, prescriptions, referral).

Out of the 159 GPs, 149 kept a detailed diary covering 24 hours a day during one week (including the weekend). Non-response analysis showed no main differences between the GPs who completed the diary and all participating GPs in the study. Compared to the total population of GPs in the Netherlands, younger GPs, female GPs and GPs working in partnerships were over-represented.

The information was collected between April 1987 and March 1988. Although this is almost 10 years ago, this is still the most recent data set that can be used to test the hypotheses formulated in Chapter 2. No other, more recent, data are available on workload and the daily work of a large number of GPs covering a large number of working days. There is no evidence that the absolute level of Dutch GPs' workload has dramatically changed over the years.

Workload in this study was restricted to its objective aspects. Therefore, it was expressed as the number of consultations handled by the GPs themselves. An overall workload score was calculated for each GP and a daily workload score for each working day of a GP. In these scores office consultations, home visits and telephone consultations were differently weighted.

Two main kinds of analyses were used to test the hypotheses. When data were available only for each GP, linear regression analyses were performed. When information was available at both levels (GP and working day) multilevel analyses were used. In Chapters 4 to 7 the statistical analyses used in that particular chapter are described in more detail.

THE RELATION BETWEEN WORKLOAD AND WORKING HOURS IN GENERAL PRACTICE

4.1 Introduction

One of the opportunities for general practitioners to cope with higher workload in general practice is increasing the number of hours spent in direct patient care or patient contact. This can be realized in two ways: by working more hours in the practice or by cutting back the time spent on other practice activities. Therefore, it was expected that GPs' workload is on the one hand positively related to the hours spent in direct patient care and on the other negatively related to the time spent on other practice or professional activities.

In Chapter 2 it was explained that the positive relation between workload and the hours spent in direct patient care is probably stronger when there is a direct financial incentive to work more hours. This is especially the case when GPs are working independently (no fixed salary) and have relatively more privately insured patients on their lists. A positive relation is also more likely to occur when income is more important for the GP. This was expected to be true of younger and male GPs. Furthermore, a difference between single-handed practices on the one hand and partnerships or group practices on the other was expected. GPs in single-handed practice are more likely to increase the number of hours in patient contact because they are dependent to a greater extent on their patients as a source of social approval. In the next table, the hypotheses are summarized and translated into the variables used in the analyses of this chapter.

Table 4.1 Summary of hypotheses on the relation between GPs' workload and working hours in direct patient care

	Theoretical statement	Expected empirical relations*
HYP1	GPs' workload is positively related to the hours spent in direct patient care.	Positive regression coefficient of the overall workload on the weekly hours in direct patient care.
HYP2	The positive relation between workload and the hours spent in direct patient care is stronger when there is a direct relation between income and working hours in direct patient care.	Stronger positive regression coefficients of overall workload on the weekly hours in direct patient care, in combination with: - GPs working independently - higher % privately insured patients on the list.
HYP3	The positive relation between workload and the hours spent in direct patient care is stronger when income is more important and leisure time is less important.	Stronger positive regression coefficients of overall workload on the weekly hours in direct patient care, in combination with: - male GPs - younger GPs.
HYP4	The positive relation between workload and the hours spent in direct patient care is stronger when GPs are more dependent on their patients as main source of social approval.	Stronger positive regression coefficients of overall workload on the weekly hours in direct patient care, in combination with: - GPs working in single-handed practice.

* Controlling for other important relevant GP- and practice-characteristics.

With regard to the strength of the negative relation between workload and time in other practice activities, there were also a number of hypotheses formulated in Chapter 2. Older GPs, GPs in single- handed practices and GPs without a trainee were considered to be more likely to reduce the time spent on other activities because of a high workload. It was assumed that other professional activities are less important for them in terms of their goal-oriented behaviour. Besides, it was expected that when income is more important or when there is a direct relation between patient care and income, GPs were more likely to cut back on time spent on these activities because most of these activities are not separately remunerated. Therefore, the negative relation will be stronger for male GPs, GPs working independently, GPs with a higher percentage of privately insured patients and younger GPs. It is important to note that the age of the GPs leads to conflicting predictions. On the one hand it was assumed that the importance of other practice or professional activities decreases with age. Older GPs are less dependent on the social approval of their colleagues because their

professional status is, to a large extent, established. As a consequence they are more likely to cut back on time in these activities in favour of time in patient contact. On the other hand, however, it was assumed that younger GPs are more aware of differences in remuneration than older GPs because they still have to recover their investment costs. Because, in general, GPs are not separately paid for the other practice activities, younger GPs are more likely to cut back on time for these activities in favour of direct patient care. The empirical testing of the hypotheses will give more insight into which mechanism is more plausible. It is, however, also possible that the two mechanisms neutralize each other.

Table 4.2 gives a summary of the hypotheses and the expected empirical results in the analyses.

Table 4.2 Summary of hypotheses on the relation between GPs' workload and working hours in other practice-based activities

	Theoretical statement	Expected empirical relations*
HYP5	GPs' workload is negatively related to the hours spent in other practice activities.	Negative regression coefficient of overall workload on weekly hours in other practice-based activities.
HYP6	The negative relation between workload and time in other practice activities is stronger when GPs are less dependent on their colleagues as a source of social approval.	Stronger negative regression coefficients of overall workload on weekly hours in other practice-based activities, in combination with: <ul style="list-style-type: none"> - older GPs - GPs working in single-handed practices.
HYP7	The negative relation between workload and time in other practice activities is stronger when income is more important for a GP.	Stronger negative regression coefficients of overall workload on weekly hours in other practice-based activities, in combination with: <ul style="list-style-type: none"> - younger GPs - GPs working independently - male GPs - higher % privately insured patients - GPs not supervising a trainee.

* Controlling for other important relevant GP- and practice-characteristics.

In this chapter these expectations will be tested.

4.2 Methods

We start with a description of the workload of the 149 selected GPs¹. Secondly, some descriptive statistics of the division of working time among different practice activities are presented. Thereafter the differences in workload and working hours between different kinds of GPs are studied². However, not the actual level of working hours is the main topic of this book but the strength of the relation between workload and the hours spent on different activities. To test the hypotheses whether this relation differs between groups of GPs, linear regression analyses were performed including interaction terms for the expected relations.

4.3 The workload score

The average workload score of the 149 GPs was 155 per week³. However, this score is just an analytic tool which has only limited practical meaning. The workload score is based on the number of office consultations, home visits and telephone calls⁴ per week. For a better understanding of the workload of GPs, descriptive statistics of these components are presented in table 4.3.

On average, the GPs performed 98 office consultations, 23 home visits and about six telephone calls containing a prescription or referral per week. There were, however, great differences between the GPs. The relative variation was higher in home visits and telephone calls than in office consultations. This might also reveal differences in the validity of the registration of the GPs. In home visits and especially in telephone calls, registration errors (e.g. forgetting to record the consultation) are more likely to occur than in office consultations.

¹ 149 GPs worked at least 0.5 WTEs in the practice and had completed the diary.

² As explained in Chapter Three, these figures are not representative for the total GP population in 1987/88, in the Netherlands because they are unweighed.

³ Workload score is the weighted number of surgery consultations (1), home visits (2) and telephone calls (0.5) per week, averaged over the three-month registration period and divided by the number of WTEs of the GP.

⁴ Not all the telephone calls were registered. GPs recorded telephone calls only when a drug was prescribed or when the patient was referred to a specialist.

Table 4.3 Descriptives of GPs' workload (average consultations per week over the three-month registration period): N = 149

	Mean	Sd	CV	Range
Number of office consultations per week	98.3	32.6	0.3	33.1 - 197.0
Number of home visits per week	23.1	13.1	0.6	2.9 - 65.0
Number of telephone calls per week	6.3	6.3	1.0	0.0 - 32.5
Workload score	155	47	0.3	53 - 286

In the light of the discussion about the reduction of list size, it is interesting to see how the workload score was related to the personal list size of GPs. It is obvious that GPs with a larger personal list size had higher workload scores. However, the strength of the correlation coefficient ($r=0.61^{**}$) between these two variables reflects the idea that workload of GPs was also determined by the composition of the practice population (for instance the percentage of elderly patients) and that workload was not fully demand-led. GPs themselves have ways of determining at least a part of the number of consultations by making follow-up appointments or performing home visits on their own initiative. In addition, practice characteristics, such as the opportunities to delegate tasks to practice secretaries, assistant GPs or colleagues, play a role in this respect.

4.4 Working hours in different activities

According to the information from the one-week diaries, the GPs spent, on average, 47 hours per week in their practice: 34.5 hours in direct patient care and 12.3 hours in other practice activities (see Table 4.4). The latter consisted of about 10 hours for practice organization, which included 6.5 hours in practice administration and 3.8 hours per week in meetings with practice secretaries or GP colleagues. Furthermore, 1.4 hours per week were spent on continuing medical education (CME) and about three quarters of an hour on keeping up with the medical literature.

There were, however, considerable differences between the GPs. The working time in patient contact varied between 13.5 and 55.8 hours per week. The coefficients of variation (CVs) show that the largest amount of variation occurred in the time GPs spent on CME and medical literature. Some GPs did not record these activities during the registration week, while others did record 18 and 5 hours respectively. The next section will show whether these differences in workload and working hours were related to specific GP- or practice-characteristics.

Table 4.4 Descriptives of working hours in different practice activities by 149 GPs

Hours per week *in:	Mean	Sd	CV	Range
Direct patient care	34.5	8.9	0.3	13.5 - 55.8
Other practice activities:	12.3	7.2	0.6	0.0 - 37.8
practice administration	6.5	4.4	0.7	0.0 - 19.0
meetings with colleagues	3.8	3.8	1.0	0.0 - 22.5
continuing medical education	1.4	3.1	2.2	0.0 - 18.0
medical literature	0.7	1.2	1.7	0.0 - 5.3

* These unweighed figures represent real or actual working time in the different activities. This means that personal time such as breaks, and time on duty without a specific activity recorded, were not taken into account.

4.5 Differences in working hours and workload between GPs

In Table 4.5 average working hours in different activities and workload are broken down over different groups of GPs. Obviously GPs who worked on a full-time basis in the practice spent more hours in direct patient care than GPs who worked part-time. The difference was almost nine hours per week: approximately one working day. It is important to note that GPs who worked less than 0.5 WTEs are excluded in these analyses, which means that there might be a greater difference between part- and full-time working GPs in the total population. It is surprising that this difference did not occur when the time for other practice activities is concerned. The absolute number of hours spent on practice organization, CME and medical literature did not differ between GPs who were full- or part-time involved in the practice. Thus, full- or part-time involvement in general practice influenced only the hours spent in patient contact and not the hours spent on other activities.

GPs with fixed salaries spent less time on patient care, but they were more involved in

Table 4.5 Average hours spent on different practice activities and workload score per week in different GP groups.

	Patient care	Other activities	Practice administration	Meetings with colleagues	CME	Medical literature	Workload score	N
<i>Involvement in practice</i>								
Full-time	36.1	12.0	6.4	3.6	1.3	0.6	158	122
Part-time	27.3**	14.0	6.8	4.4	1.8	1.0	141	
<i>Working independently</i>								
Yes	35.4	12.0	6.4	3.5	1.5	0.7	157	136
No	25.6**	15.4	7.3	6.3**	1.1	0.6	133	13
<i>Percentage privately insured patient on list</i>								
< 29	34.6	10.9	5.9	3.8	1.0	0.3	168	25
29-38	35.0	11.2	5.7	3.7	0.9	0.9	160	58
39-49	34.5	12.6	6.8	3.1	2.0	0.6	150	40
> 49	33.3	15.9*	8.2*	4.8	2.2	0.7	151	26
<i>GP's age</i>								
< 35	31.1	11.2	7.4	2.9	0.8	0.2	141	20
35-39	35.0	11.9	5.9	3.9	1.4	0.6	153	56
40-50	35.2	13.7	6.9	4.3	1.9	0.6	159	49
> 50	33.3	11.4	6.3	3.1	1.0	1.1	165	24
<i>GP's gender</i>								
Male	35.3	12.1	6.2	3.8	1.4	0.6	159	131
Female	28.5**	14.1	8.4*	3.1	1.8	0.8	129**	18
<i>Supervising trainee</i>								
Yes	33.6	15.9	6.8	6.3	2.3	0.6	147	35
No	34.8	11.2**	6.4	3.0**	1.2	0.7	158	114
<i>Type of practice</i>								
Single-handed	38.4	11.5	6.9	2.8	1.2	0.6	169	49
Partnership	32.6**	12.8	6.3	4.2*	1.5	0.7	148*	100

Significance: * p < .05, ** p < .01

meetings with colleagues and practice secretaries compared to the other GPs. The difference in workload score was not significant according to the usual p-value ($p=.08$).

The figures also indicate a positive relation between the percentage of privately insured patients on the lists of GPs and the hours related to practice organization. This probably reflects the extra time needed for administrative activities because privately insured patients pay their GPs on a fee-for-service basis. This means that bills have to be written and sent to these patients.

There were no significant differences in working hours and workload score between the age groups distinguished. However, GPs younger than 35 were more involved in practice administration compared to the others, and older GPs (50 years of age and over) spent twice as much time on medical literature than the rest of the GPs.

Gender differences are found with respect to hours in direct patient care, practice administration and workload score. Female GPs worked about seven hours less in patient contact, about two hours more in practice administration, and had a lower average workload score in comparison with male GPs.

Supervising a trainee in one's practice meant an increase of more than four hours per week in other practice activities, mainly in meetings with colleagues.

Finally, GPs working in single-handed practices had higher workload scores and worked, on average, more hours per week in direct patient care. GPs in single-handed practice spent less time in meetings with colleagues or practice secretaries.

At first sight, it seems that differences in time spent on direct patient care were related to the differences in workload scores: GPs who spent more hours in patient contact also had a significantly higher workload score per week. However, this bivariate comparison does not control for possible interrelations between the characteristics. GPs with fixed salaries were younger (35.9 as against 42.2) and had a significantly higher proportion of privately insured patients on their lists (46.4 as against 38.7%). Besides, there were significant age differences between male and female GPs (42.4 as against 37.8), GPs in single-handed practices and partnerships (44.0 as against 40.1) and those with and without a trainee in their practice (46.2 as against 40.5). Furthermore, female GPs more often had fixed salaries (22.2 as against 6.9%) and were less likely to work in single-handed practices (11.1 as against 35.9%). Part-time GPs were mainly female, had fixed salaries and worked in partnerships or group practices. More than half of the female GPs (60%)

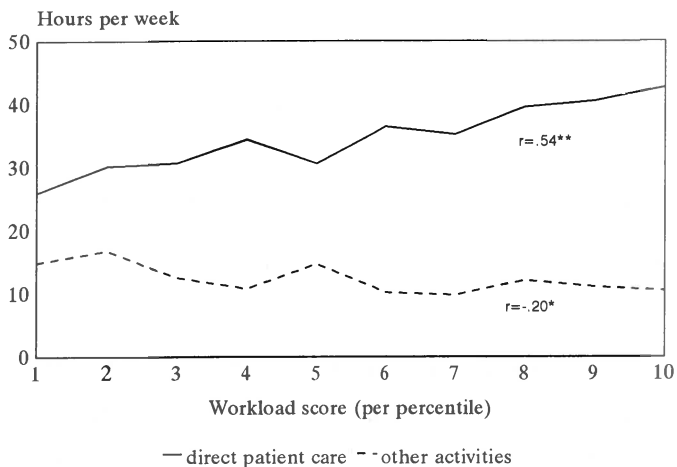
worked part-time compared to 12% of the male GPs. Of the GPs with a fixed salary almost 70% work part-time; 13% of the independently working GPs. Only 4% of the GPs in single-handed practices did not work a full working week in their practice. One out of every four of the GPs in partnerships or group practices worked part-time. No other significant differences between the GP characteristics were found.

The linear regression analyses, which will be presented in the next section, will indicate which factors had an independent influence on working hours in general practice.

4.6 Workload and working hours in direct patient care

According to our first hypothesis GPs will react to a higher workload by working more hours in direct patient care. Figure 4.1 shows that, in correspondence to this general hypothesis, there was a significant positive relation between workload and the number of hours spent in direct patient care per week ($r=0.54^{**}$).

Figure 4.1 Relation between workload and working hours (N=149 Dutch GPs)



The 10% GPs with the lowest workload scores worked an average of 26 hours per week in direct patient care; the 10% GPs with the highest scores spent almost 43 hours on activities directly related to patient care. Despite some small deviations, a clear linear

trend can be recognized in the figure. The results of the linear regression analysis confirmed that workload was the most important predictor of the hours in direct patient care. Even when for example part-time involvement in the practice, gender and age of the GP were taken into account, a strong relation between workload and working hours in direct patient care remained (see Table 4.6)⁵.

Table 4.6 Linear regression analysis on working hours in direct patient care per week for 149 GPs

	B	SE B	Beta
<i>Main effects of GP/practice characteristics</i>			
Workload	0.86	0.13	0.45**
Working independently	2.81	2.61	0.09
Part-time working	-6.44	1.81	-0.28**
Gender (male)	0.33	2.25	0.01
Age	-0.07	0.08	-0.06
Single-handed practice	1.91	1.32	0.10
% privately insured patients on list	0.11	0.06	0.13
% elderly on list	0.13	0.10	0.09
Free-flow consultation hour	1.49	1.17	0.08
<i>Interactions¹ of workload with</i>			
working independently	-0.33	0.54	-0.05
gender (male)	0.13	0.45	0.02
age	-0.00	0.02	-0.01
% privately insured patients on list	0.02	0.01	0.13*
single-handed practice	0.31	0.26	0.08
Constant	15.28	4.89	
R ²	0.47		
Adjusted R ²	0.42		

Significance: * < .05; ** < .01

¹ To avoid multicollinearity, centred scores were used to calculate the interaction terms

The bivariate differences between GPs with a fixed salary and GPs working independently, male and female GPs and GPs working in single-handed practice and partnerships were the results of differences in workload and being involved full-time or part-time in

⁵ In an earlier article (Groenewegen & Hutten, 1995), we found three relevant factors determining GP's working hours in direct patient care: list size, the percentage of elderly on the list and whether the GP operated a free-flow consultation hour. The last two variables mentioned were, therefore, included in the regression analysis, list size was not because in the earlier article it was used as an indicator for workload. In the analysis in this book workload was already taken into account more directly by means of the average workload score.

the practice.

The interaction terms reveal whether the expectations about the strength of the relation between workload and working hours in direct patient care are being confirmed. The only interaction term with a significant regression coefficient was that between workload and the percentage of privately insured patients. Because the equation included a number of variables with small contributions, a stepwise regression analysis was also carried out to indicate the most important explanatory factors without taking other factors into account. This SPSS procedure selected four significant variables: workload, working part-time, percentage of elderly on list and also the interaction term of workload and the percentage of privately insured patients on the list⁶. The idea that GPs will especially work more hours in response to high workload if they have more privately insured patients can be explained through their fee-for-service payment. Fee-for-service payment means a more direct relation between working hours and payment (compared to capitation fees).

The theoretical model predicted different reactions towards financial incentives between GPs with fixed salaries and those working independently in their own practice. The idea for instance that the type of insurance of the patients is related to the reaction to workload is plausible only for the latter group because they will receive direct personal financial gain, in contrast to the GPs with a fixed salary. Therefore, three way interaction terms were also included in the regression equations, but they were not statistically significant (results are not reported).

4.7 Workload and working hours in other practice activities

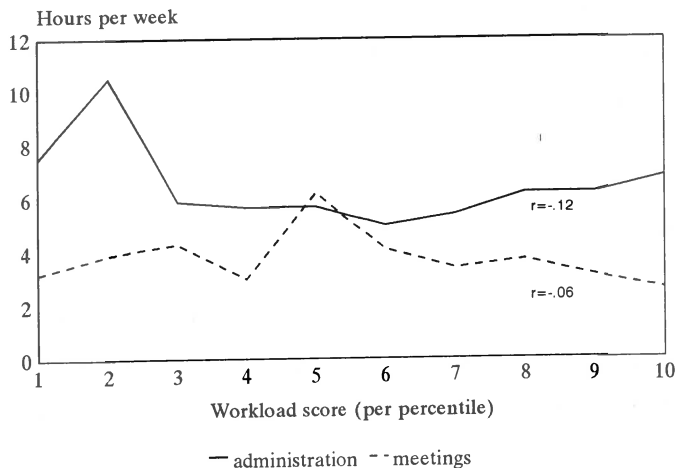
Cutting back on time spent on other practice activities (all activities in the practice except for direct patient care) is one of the coping mechanisms for workload. This means that the extra time spent in direct patient care (because of a higher workload) is compensated by spending fewer hours on the other activities. When time in all other activities was put

⁶ For statistical reasons the main effect of % privately insured was also included in the equation. The five independent variables explained 44% of the variation in hours worked in direct patient care. Betas: workload (0.48), part-time working (- 0.33), interaction of workload and % privately insured (0.15), % elderly (0.12), % privately insured (0.10, n.s.)

together, there was a significant relation to hours in direct patient care ($r=-0.30$). These other activities can be split into four categories: practice administration, professional meetings with colleagues or co-workers, continuing medical education (CME) and keeping up with the medical literature. There were small negative correlations between time in direct patient care and time involved in CME ($r=-0.26^{**}$) on the one hand and between time spent on patient contact and time spent on meetings with colleagues ($r=-0.18^*$) on the other⁷. No significant relations were found with the two other practice activities: practice administration ($r=-0.15$) and keeping up with the medical literature ($r=-0.03$).

In general it is expected that workload, in terms of the number of consultations per week, is negatively related to the hours spent on other practice activities (all other activities except for direct patient care) (hypothesis 5). When all other activities were put together, there was indeed negative significant relation to workload ($r=-0.20^*$) (see Figure 4.1). Figures 4.2 and 4.3 show that only the weekly involvement in CME depended significantly on the workload score.

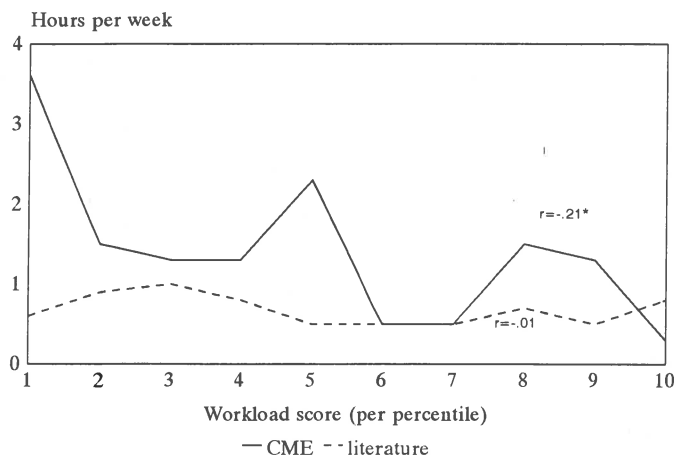
Figure 4.2 Relation between workload and hours in practice organization (N=149 Dutch GPs)



⁷ In multivariate analyses too, these relations were significant.

Figure 4.3

Relation between workload and hours in CME/medical literature (N=149 Dutch GPs)



The 10% GPs with the lowest workload spent, on average, 3.6 hours a week on education; the 10% GPs with the highest workload only 0.3 hours. However, the group with intermediate workload also spent relatively a large amount of time on these activities (2.3 hours per week) (Figure 4.3). The amount of time spent on keeping up with the medical literature was almost constant over the different workload scores. Figure 4.2 shows that GPs with a low workload score (first and second percentile) were much more involved in the practice administration than other GPs. GPs with medium workload scores (third to sixth percentile) spent the least hours on these activities. In the group with the highest workload, a small increase in the time in practice administration can be observed. The time spent on meetings with colleagues or co-workers has a more or less parabolic distribution: the GPs with an average workload score spent most hours talking with their colleagues, while GPs with lowest and highest were less involved. These distributions can be results of other intervening GP- or practice-characteristics. Therefore, linear regression analyses were performed to indicate which GP- or practice-characteristics explain the variation in the number of working hours in these practice activities (see Table 4.7a-e). The interactions in these equations correspond to the hypotheses stated in Table 4.2. When all other practice activities were taken together, two main effects showed up in the regression equation. A higher percentage of privately insured patients on the list and supervising a trainee in the practice led to more time in other practice activities (Table 4.7a).

Table 4.7a Linear regression analysis on working hours in all other practice activities per week for 149 GPs

	B	SE B	Beta
<i>Main effects of GP/practice-characteristics</i>			
Workload	-0.16	0.13	-0.10
Working independently	-2.23	2.56	-0.09
Part-time working	1.73	1.85	0.09
Gender (male)	-0.26	2.26	-0.01
Age	-0.03	0.08	-0.03
Single-handed practice	-0.31	1.32	-0.02
% privately insured patients on list	0.12	0.06	0.17*
supervising trainee	5.66	1.48	0.34**
<i>Interactions¹ of workload with</i>			
working independently	-0.50	0.54	-0.09
gender (male)	0.26	0.45	0.05
age	0.01	0.02	0.04
% privately insured patients on list	-0.01	0.01	-0.08
single-handed practice	-0.06	0.26	-0.02
supervising trainee	-0.03	0.32	-0.01
Constant	11.81	4.90	
R ²	0.17		
Adjusted R ²	0.09		

Significance: * < .05; ** < .01

¹ To avoid multicollinearity, centred scores were used to calculate the interaction terms

The split into different categories of activities shows that supervising a trainee was mainly related to the time spent on professional correlations with colleagues (Table 4.7d). The contribution of the percentage of privately patients cannot be attached to any specific activity. Furthermore, it must be noted that the significant relation between workload and the number of working hours in other practice activities (which was seen in Figure 4.1) disappeared.

In general, the regression equations explained only a very small part of the variation in the time spent on other practice activities. Especially the amount of time spent on practice administration and reading medical literature could not be explained by the factors included in the equation (Tables 4.7b and 4.7e).

The explained variance in continuing medical education (CME), albeit small, was mainly the result of the workload score (Table 4.7d). As was already established with regard to Figure 4.3., high workload coincided with less time in CME, even after controlling for other GP- and practice-characteristics. The stepwise procedure also selected workload as

Table 4.7b Linear regression analysis on working hours in practice administration per week for 149 GPs

	B	SE B	Beta
<i>Main effects of GP/practice-characteristics</i>			
Workload	-0.09	0.08	-0.09
Working independently	-1.60	1.64	-0.10
Part-time working	-0.37	1.18	-0.03
Gender (male)	-1.27	1.44	-0.10
Age	-0.01	0.05	-0.02
Single handed-practice	1.02	0.84	0.11
% privately insured patients on list	0.05	0.04	0.11
Supervising trainee	0.57	0.95	0.06
<i>Interactions¹ of workload with</i>			
working independently	-0.54	0.35	-0.16
gender (male)	0.44	0.29	0.15
age	0.01	0.01	0.04
% privately insured patients on list	0.00	0.01	0.05
single-handed practice	0.04	0.17	0.02
supervising trainee	0.01	0.20	0.00
Constant	8.61	3.13	
R ²	0.09		
Adjusted R ²	0.00		

Table 4.7c Linear regression analysis on working hours in meetings with colleagues per week for 149 GPs

	B	SE B	Beta
<i>Main effects of GP/practice-characteristics</i>			
Workload	0.06	0.07	0.08
Working independently	-2.44	1.28	-0.18
Part-time working	0.58	0.93	0.06
Gender (male)	0.62	1.13	0.05
Age	-0.04	0.04	-0.09
Single-handed practice	-1.17	0.66	-0.14
% privately insured patients on list	0.03	0.03	0.07
Supervising trainee	4.11	0.74	0.46**
<i>Interactions¹ of workload with</i>			
working independently	0.03	0.27	0.01
gender (male)	-0.36	0.22	-0.14
age	-0.00	0.01	-0.04
% privately insured patients on list	-0.01	0.01	-0.10
single-handed practice	-1.17	0.66	-0.14
supervising trainee	0.22	0.16	0.10
Constant	4.68	2.45	
R ²	0.27		
Adjusted R ²	0.20		

Significance: * < .05; ** < .01

¹ To avoid multicollinearity, centred scores were used to calculate the interaction terms

Table 4.7d Linear regression analysis on working hours in continuing medical education per week for 149 GPs

	B	SE B	Beta
<i>Main effects of GP/practice-characteristics</i>			
Workload	-0.13	0.06	-0.20*
Working independently	1.50	1.14	0.14
Part-time working	1.08	0.82	0.13
Gender (male)	0.49	1.01	0.05
Age	0.01	0.04	0.01
Single-handed practice	-0.06	0.59	-0.01
% privately insured patients on list	0.04	0.03	0.14
Supervising trainee	1.10	0.66	0.15
<i>Interactions¹ of workload with</i>			
working independently	-0.05	0.24	-0.02
gender (male)	0.22	0.20	0.11
age	0.01	0.01	0.07
% privately insured patients on list	-0.01	0.01	-0.15
single-handed practice	0.05	0.12	0.03
supervising trainee	-0.23	0.14	-0.14
Constant	-0.94	2.19	
R ²	0.13		
Adjusted R ²	0.04		

Table 4.7e Linear regression analysis on working hours in reading medical literature per week for 149 GPs

	B	SE B	Beta
<i>Main effects of GP/practice-characteristics</i>			
Workload	-0.00	0.02	-0.01
Working independently	0.30	0.46	0.07
Part-time working	0.44	0.33	0.14
Gender (male)	-0.08	0.41	-0.02
Age	0.02	0.02	0.15
Single-handed practice	-0.09	0.24	-0.03
% privately insured patients on list	0.00	0.01	0.02
Supervising trainee	-0.12	0.27	-0.04
<i>Interactions¹ of workload with</i>			
working independently	0.05	0.10	0.06
gender (male)	-0.04	0.08	-0.05
age	0.00	0.00	0.04
% privately insured patients on list	0.00	0.00	0.06
single-handed practice	-0.07	0.05	-0.13
supervising trainee	-0.02	0.06	-0.03
Constant	-0.56	0.88	
R ²	0.06		
Adjusted R ²	0.00		

Significance: * < .05; ** < .01

¹ To avoid multicollinearity, centred scores were used to calculate the interaction terms

the only relevant independent variable in the equation⁸. To check whether this means that GPs cut back on time of CME to spend more time on direct patient care, this last variable was introduced into the regression analysis. The eventual negative regression coefficient of the workload score and the coefficient of the hours spent on patient contacts was significant. From this result it can be concluded that spending more time on direct patient care because of higher workload is compensated by a reduction of the time available for CME.

One fifth of the variation in professional meetings with practice secretaries or colleagues was explained by the independent variables included in the regression equation. As mentioned, mainly supervising a trainee in the practice led to extra hours in professional meetings. The workload score of GPs had no significant regression coefficient.

In all regression equations, the interactions did not have significant contributions in explaining the variation in working hours spent on other practice activities. This means that the corresponding hypotheses are not supported. The introduction of three-way interactions showed that the expected relations did not differ between GPs working independently in their own practice and those with a fixed salary.

4.8 Summary and discussion

In the light of the discussion about quality of care in general practice, it is important to study the reactions of GPs to their workload in terms of allocation of time. Different reactions have different impacts on the performance of GPs in daily practice. In this chapter, two possible coping mechanisms were studied: working more hours in direct patient care and cutting back on time spent on other practice or professional activities.

Starting point of the theoretical model (as described in Chapter 2) is that the GPs' choices are in the first instance driven by their willingness to help patients as appropriately as possible. Therefore, a positive relation is expected between workload and working hours in direct patient care. The results of this study support this hypothesis (HYP1). Even when other important factors were taken into account, workload remained the main factor

⁸ Workload explained 4% of the variation in hours spent on CME: its Beta was -0.21

in explaining differences in the hours that GPs spent on direct patient care in a random working week.

The analyses indicate that all GPs seem to react in the same way. No differences were found between groups of GPs (e.g. male as against female, younger as against older), which does not confirm the hypotheses 3 and 4. This is however, possible that our idea that income is less relevant and leisure time is more relevant for female and older GPs is not correct. Maybe the instrumental goals to get physical well-being do not differ for gender or age of GPs. The results of this chapter also indicate that GPs working in single-handed practices are more dependent on their patients as main source of social approval questionable. The results of this study show, however, that GPs will be additionally motivated to work more hours in direct patient care in reaction to higher workload when there is a direct relation between working time and remuneration (HYP2). GPs with a larger proportion of privately insured patients on their personal lists worked more hours in patient care when they were confronted with a larger number of contacts. This can be explained by the fact that privately insured patients pay their GPs separately for each consultation, which enforces the direct relation between working time and income. This only partly confirms the second hypothesis. Contrary to the expectations, independently working GPs and GPs with a fixed salary did not differ in this respect. It was assumed that the first group would be more aware of financial incentives than the second group because they have a direct personal financial benefit. It is, however, possible that GPs with a fixed salary also take into account the financial situation of the practice as a whole, which of course indirectly influences their personal financial benefits.

There are only a few other studies that can be compared with ours. Mechanic (1975) concluded that, in the USA, the working hours of prepaid physicians were not related to the number of consultations. In other words, they reacted to a higher workload by reducing the length of consultations or by creating waiting lists. Physicians in a fee-for-service payment system tended to work more hours when confronted with an increasing number of consultations. These results cannot directly be transferred to the Dutch situation because in the Netherlands none of the GPs are exclusively paid on a fee-for-service basis. All GPs have a mixture of prepaying patients (publicly insured) and fee-for-service patients (privately insured). Therefore, the difference between independently working GPs and GPs with a fixed salary will be weaker in the Netherlands compared to

Mechanic's study. Nevertheless, the result that GPs with a higher percentage of fee-for-service patients on their list were more likely to cope with a higher workload by working more hours indicates that the remuneration system affects the decisions of GPs in the allocation of time in the daily practice.

In an earlier article, we concluded that in the Netherlands there is a stronger relation between GP's list size (as an indicator for workload) and the number of working hours in patient contact than in England and Wales during the old contract (Calnan et al., 1992). This difference is in line with the conclusion in this chapter because in the Netherlands there is a more direct relation between remuneration and working hours (a mixture between capitation and fee-for-service) than in the old British system (mainly capitation fees and fixed allowances).

A second reaction to high workload studied in this chapter is reducing the time for other practice-based or professional activities in favour of time in direct patient contact. Four categories of other practice activities can be distinguished: practice administration, continuing medical education (CME), professional meetings with colleagues or co-workers, and reading medical literature. Hours spent on patient contact were negatively related, although to a small extent, to time involved in CME and talking with colleagues or co-workers.

Hypothesis 5, in which a negative relation between workload and the hours worked in other practice activities is postulated, is not supported. In a linear regression model including other relevant factors, no significant contribution of workload was found in explaining the total time spent in all other practice activities. Earlier results of our research also support the conclusion that time spent on all other practice activities taken together is relatively independent of the workload in general practice: no relation was found between list size and the time spent on other practice activities (Groenewegen et al., 1992; Groenewegen & Hutten, 1995). The expectations that GPs are more likely to cut back on time in all other practice activities when these are less important to them (HYP6) or when income is more important for a GP (HYP7) were not supported in this study. The related interactions in the regression equation had no significant coefficients. Probably, in general, the amount of time GPs have to spend on these activities is more or less fixed and the decision room of GPs is limited. As a consequence, the distinguished

goals, such as income, leisure time, and social approval can not really influence the decisions to a large extent.

The split into four separate categories of other practice activities shows that workload is only negatively related to the amount of time spent on continuing medical education in the regression analysis that contained other relevant factors. As explained in Chapter 2, this might influence the quality of care provided by the GP. Therefore, this factor must be taken into account in Chapter 7, in which the relation between workload and quality of care is studied. The hours in the other categories of practice activities had no significant relation to the workload of the GP. In fact, our regression models could explain none or a very small part of the variation in these activities.

This finding is in line with the results of a few other studies of GPs' participation in continuing medical education. A British survey reported that almost 80% of the 105 GPs who completed the questionnaire had experienced problems in the participation in CME (Pickup et al., 1983). The most important obstacles mentioned were lack of time, practice commitments and the need to preserve family life. Another study in England also revealed that pressure of work and lack of time were important barriers to attendance of educational meetings and courses (Forrest et al., 1989). Furthermore, the lack of financial incentives was often mentioned by the GPs. In the Netherlands, GPs reported the same kinds of restrictions (Delnoij, 1993). Practice workload, the lack of leisure time and, to a lesser extent, tiredness in the evening were often mentioned. An interesting result of this Dutch study was that male GPs were more likely to consider practice workload as an obstacle to participating in CME than female GPs. Tiredness in the evening was more often mentioned by female GPs. No differences in this respect were found between the type of practice or the age of the GP. In terms of our theoretical model, we can say that the decision room of GPs is larger with regard to the decision to participate in CME compared to other practice activities (except for direct patient care). Therefore workload can play a role.

The general conclusion that can be drawn from the results presented in this chapter is that GPs partly cope with higher workload by working more hours in direct patient care. This is only partly compensated for by spending fewer hours in continuing medical education per week. The relation between workload and working hours in direct patient care is not completely proportional, which indicates that other coping mechanisms mentioned in

Chapter 2, such as reducing the length of consultation, are also likely to occur. Furthermore, these results might explain why, in many studies, workload and the average length of consultations are often only weakly (negatively) related (compare e.g. Butler & Calnan, 1987; Knight, 1987; Hofman-Okkes, 1991; Groenewegen et al., 1992). Because GPs with a higher workload spent more hours on patient contacts, the negative effect on the length of consultations will be less strong.

In this chapter it was implicitly assumed that GPs can more or less independently decide how many hours they will spend on different activities in their practice. It is, however, also possible that decisions about the allocation of time work in the opposite direction. GPs are confronted with patients in a specific consultation and the circumstances in which this consultation take place determine the decision the amount of time spent on the individual patient. The sum of these decisions is the time spent on direct patient care per week. For a better understanding of this relation it is necessary to study differences within GPs. Workload must also be considered a situational characteristic which can influence the decisions made in a particular consultations, for instance on a particular working day. When workload is regarded as a situational characteristic instead of a personal characteristic of the GP, this assumes that the workload of one GP varies between working days. In the next chapter, the amount of fluctuation in the daily workload of GPs will be studied.

DAY-TO-DAY DIFFERENCES IN GENERAL PRACTITIONERS' WORKLOAD

5.1 Introduction

In the literature, GPs' workload has often been conceptualized in terms of stable GP- or practice-characteristics such as list size, consultation rates and booking intervals (Groenewegen & Hutten, 1991). As explained, workload can also be regarded as a situational aspect, for instance number of consultations at a particular moment. Research has shown that general GP-characteristics (e.g. age, gender and overall workload) and structural features (e.g. practice type and remuneration system) are less relevant to explain GPs' professional behaviour than situational aspects at the moment a decision is made (Flierman, 1991; Uunk et al., 1992; Kristiansen & Mooney, 1993; Groenewegen, 1996). This implies that situational workload (e.g. during a specific day) might have a stronger impact on the professional activities of GPs than overall workload in terms of the average number of consultations or list size. This expectation will be studied in Chapter 6. In Chapter 4, the overall workload of GPs has already been described. This chapter focuses on the description of the daily workload of GPs.

Theoretically it is expected that daily workload is coped with by other mechanisms than overall workload, resulting in different patterns of activity. For this to occur there has to be some amount of variation in workload between the working days of each GP. If no fluctuations in daily workload occur, there cannot be an effect on the GPs' activities in their consultations. In this chapter a description will be given of the daily workload of general practitioners, and especially the amount of variation or fluctuation in the daily workload of GPs will be explored. Furthermore, for a fuller understanding of this variation, it will be related to some practice- and GP-characteristics to indicate whether this amount of variation differs between GPs and in different practice settings.

5.2 Methods

In this chapter, data were used on 159 Dutch GPs¹ who recorded information about their daily workload during a period of three months. As explained in Chapter 3, in total 7918 working days were selected.

For each selected working day, one workload score was computed. As in the preceding chapter, the different consultations were weighted: home visits (2), office consultations (1) and telephone calls (0.5). In this way workload is expressed in terms of consultation units. There is, however, an important difference between the daily workload score used in this chapter and the overall workload score presented in Chapter 4. The latter was controlled for the number of GP's whole time-equivalents of practice participation: this was not possible for each working day because information about the number of hours scheduled for a specific day was not available.

To describe the amount of fluctuation in daily workload, three indications were used: the range per GP (the difference between the lowest and highest daily number of consultations or workload score), the standard deviation of daily workload for each GP and the coefficient of variation. The latter is a measure of the relative variability. The standard deviation is divided by the mean, which makes it possible to compare the relative homogeneity in different subjects when they have different means (Blalock & Blalock, 1971).

To indicate which GP- and practice-characteristics influence the amount of fluctuations in the daily workload, linear regression analysis was performed. The dependent variable in this equation was the logarithm of the standard deviation. This transformation roughly transformed the distribution of the standard deviations into a normal distribution. Therefore, it was less sensitive to extreme values. The standard deviation of daily workload is related to its mean. The mean daily workload is probably influenced by the same factors as the standard deviation. For instance, larger list sizes lead to higher workload and higher average workload makes higher standard deviations possible. To control for this effect, besides the theoretically relevant variables (which will be discussed later), the logarithm of the mean daily workload per GP was included in the regression equation. In

¹ In Chapter 4 information of 149 GPs was used because 10 GPs did not complete the diary.

this way a distinction can be made between the arithmetical effect and the real effects of GP- and practice-characteristics. The combination of a logarithmic transformation of the standard deviation and including the logarithm of the mean workload as an explanatory variable implies that the standard deviation is assumed to be proportional to some power of the mean.

5.3 The daily workload of GPs

The average daily workload score of the participating 159 GPs was almost 33 consultation units. An average working day of an average GP contained 22.5 office consultations, almost 5 home visits and 1 telephone call resulting in prescription or referral². As is shown in Table 5.1 the average daily workload varied between GPs. The minimum daily workload score was 14.5 and the maximum almost 62. Also with regard to the different types of consultations important differences between GPs were found. One GP had for instance an average of 0.5 home visits per working day, while another GP had an average of 13.1.

Table 5.1 Descriptives of the mean daily workload of GPs (n=159)

	Mean	Sd	Min	Max
Office consultations	22.5	6.0	11.0	38.8
Home visits	4.9	2.7	0.5	13.1
Telephone calls	1.3	1.4	0.0	7.9
Workload score	32.9	9.8	14.5	61.8

This chapter is not focused on the differences in daily workload between GPs, but fluctuations in daily workload within GPs. In Figures 5.1 and 5.2 average workload scores of GPs on different days of the week are presented.

On average, the highest workload was recorded on Mondays: almost 25 office consultations, 5.5 home visits, and 1.5 telephone calls including drug prescription or referral,

² Not all the telephone calls were registered. GPs recorded telephone calls only when a drug was prescribed or when the patient was referred to a specialist.

which sum up to an average workload score of 37. On Fridays too workload was relatively high: 23 office consultations, 5 home visits and 1.5 telephone calls resulting in a workload score of 33.5. GPs were less busy on Thursdays: 20, 4.5 and 1.3 contacts respectively and a total score of 30. Although the absolute differences at this aggregated level were rather small, all were statistically significant, except the number of telephone calls ($p < 0.05$).

Figure 5.1 Workload and number of consultations on different days of the week (N=159 GPs)

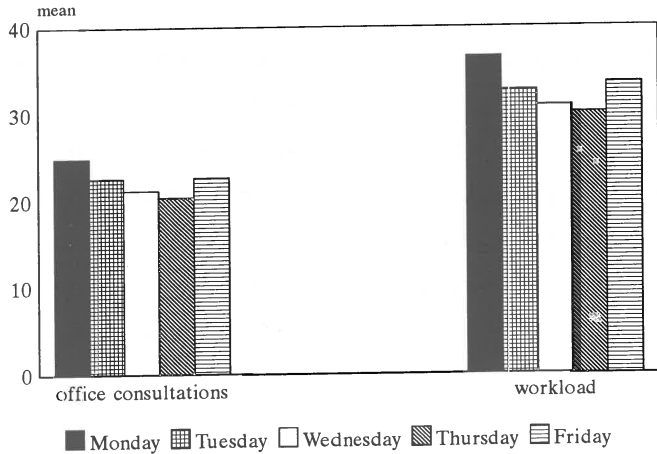
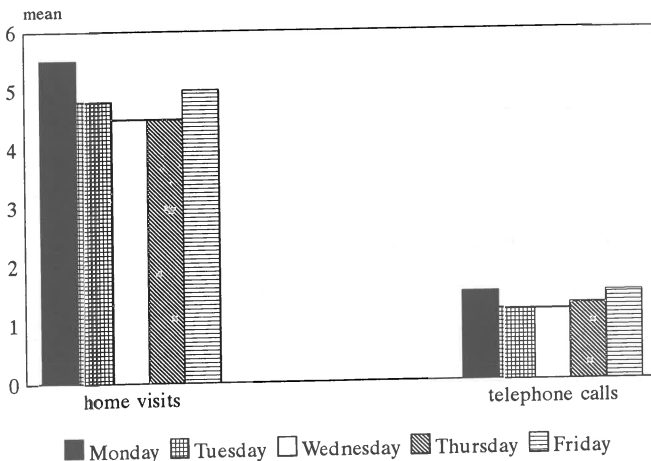


Figure 5.2 Number of home visits and telephone calls on different days of the week (N=159 GPs)



5.4 Fluctuation in GPs' daily workload

The amount of fluctuation in daily workload can differ between GPs. Some GPs will be more able to control their workload than others and therefore their daily workload will be more constant over time.

In this section the amount of fluctuation in the daily workload of GPs is described using three measures: the range per GP between his minimum and maximum daily workload, the standard deviation of the daily workload per GP and the related coefficient of variation (CV).

Table 5.2 Descriptives of the range of daily workload of GPs (n=159)

	Mean	Sd	Min	Max
<i>Difference between least and most busy day for:</i>				
Office consultations	27.3	9.2	9.0	55.0
Home visits	11.0	4.1	2.0	21.0
Telephone calls	5.6	4.0	0.0	23.0
Workload score	38.3	11.6	12.0	67.0

On average there was a difference of 38 in the workload score between the busiest and the least busy working day (see Table 5.2). During the busiest day an average GP performed 27 office consultations and 11 home visits more than during the least busy working day. Furthermore, he was confronted with five extra telephone calls. These figures indicate that there was a large amount of fluctuation in the daily workload of GPs. There were, however, also differences between GPs in this amount. Table 5.2 shows that the ranges in the number of consultations and workload between the busiest and the least busy working day differed between GPs. One GP for instance had 55 extra office consultations on the busiest day compared to the least busy day, while this difference was only 9 for another GP. Also, the standard deviations of the ranges were high. The difference in daily workload score of a GP was minimally 12 and maximally 67. It is possible that these extreme differences are the result of specific situations during a particular working day on which no information was available in the data set.

Next, for each GP the standard deviation of his daily workload was calculated. Table 5.3

provides the descriptives of the standard deviations.

Table 5.3 Descriptives of standard deviations of daily workload of GPs (n=159)

	Mean	Sd	Min	Max
<i>Standard deviations of daily workload for:</i>				
Office consultations	6.2	2.0	2.6	13.1
Home visits	2.6	0.9	0.7	5.6
Telephone calls	1.3	0.9	0.0	5.3
Workload score	8.6	2.5	3.2	16.1

On average the standard deviations were the highest for the office consultations compared to home visits and telephone calls. Also, the standard deviations of the number of consultations and workload score of working days differed highly between GPs. The standard deviation of workload of one GP was e.g. 3.2, while the highest score was 16.1. This means that the amount of fluctuation in daily workload could be more than 5 times higher in one GP compared to another GP. This, however, might be caused by difference of the mean daily workload. Therefore, also the coefficients of variation were calculated for each GP that control for the differences in the means (see Table 5.4).

Table 5.4 Description of coefficients of variation of daily workload per GP (n=159)

	Mean	Sd	Min	Max
<i>Coefficients of variation of daily workload for:</i>				
Office consultations	0.28	0.05	0.16	0.43
Home visits	0.64	0.25	0.28	1.54
Telephone calls	1.69	1.11	0.43	7.21
Workload score	0.27	0.05	0.16	0.54

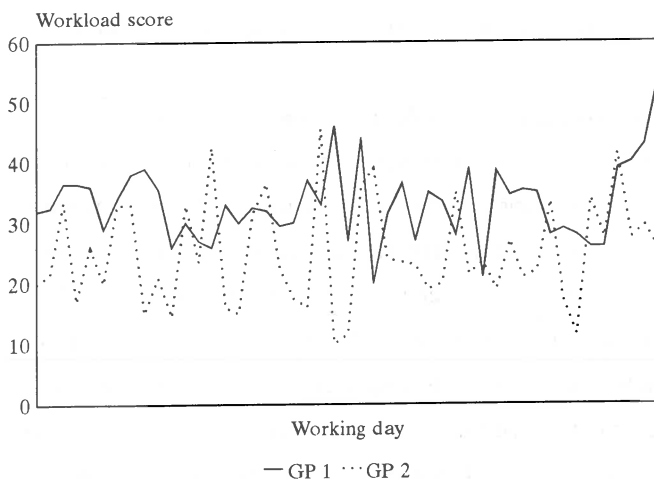
The largest differences in fluctuations between GPs can be seen in telephone calls. The average coefficient of variation was 1.69, which was almost three times as high as the coefficient of home visits. The amount of fluctuation in office consultations was the lowest, which was also reflected in the coefficient of variation of the workload score. It is possible that this might be caused by a registration bias because not all telephone calls

were registered. Also, fluctuations in the other types of consultations were high. The maximum calculated coefficient of variation was 2.5 as high as the minimum: for home visits this was even 5.

With regard to our research it is important to mention that there was a reasonable difference in the coefficients of variation of the workload score of GPs. The lowest coefficient was 0.16, the highest was 3 times higher, namely 0.54.

To illustrate the difference in variation of workload between working days of GPs, the next figure shows the workload patterns of two GPs during their registration period. They were randomly selected: GP1 from the 10 percent with the lowest coefficients of variation and GP2 from the 10 percent with the highest. It is clear that the fluctuations in daily workload of GP2 were much larger than those of GP1.

Figure 5.3 Workload pattern of two GPs



From the results presented in this section, two conclusions can be drawn. Firstly, GPs' workload is not constant over time. Each GP is confronted with major differences in the amount of workload between working days. Secondly, it was illustrated that the amount of fluctuation in daily workload differs between GPs.

5.5 Explaining differences in fluctuations in GPs' daily workload

In this section the factors will be studied that are related to the amount of variation in daily workload of a GP. GPs' workload is influenced by two kinds of factors: those situated on the demand side (list size and practice composition) and on the supply side (GP-characteristics and practice setting) (Groenewegen & Hutten, 1995). We start with a theoretical discussion of whether these factors can be related to the amount of fluctuation in daily workload.

Regarding the demand side, it is expected that list size is negatively related to daily workload fluctuations because larger lists lead to a higher overall workload. When a GP has a high overall workload, the variation in daily workload will be less because of the 'ceiling'-effect. The maximum number of contacts which can be handled by GPs during one working day is limited. A GP with a high overall workload is more likely to reach that ceiling than one with a lower overall workload. Therefore, the workload differences between working days will be less strong: there is, in fact, always a situation of high workload.

The second aspect on the demand side is the practice composition. In general, we assume that GPs will be more able to plan their consultations during surgery hours than during out-of-hours duty. The composition of the practice population is therefore relevant only if certain patient categories can be identified that have relatively more emergency or out-of-hours calls. In a review of the literature, Hallam (1994) concluded that comprehensive information on the current utilization and demand of out-of-hours primary care services was not available. She referred to a number of studies indicating that especially young children (under 5) were heavily overrepresented in out-of-hours calls to GPs. Social deprivation was also mentioned: low-educated people were more likely to contact the GP outside normal working hours. In another English study it was also concluded that children under 5 had the highest consultation rates with out-of-hours primary care centres (Cragg et al., 1994). Therefore, the percentage of children under 5 years of age and the percentage of low-educated patients on the GPs' lists were included in our analysis. We expect that these percentages are positively related to the amount of fluctuation in daily workload.

Supply-related variables can be distinguished in three types: personal GP characteristics,

aspects of the practice organization and the involvement of GPs in different kinds of activities. In general, it is assumed that the amount of variation in daily workload is associated with the GPs' opportunities to manage their own workload. More control over the workload leads to more stable workload patterns. An important factor is whether the GP receives a fixed salary or not. A fixed salary is based on a fixed number of working hours, which are more likely to determine the number of consultations that a GP can manage during one day than when GPs work independently in their own practice. Therefore, we predict that GPs with a fixed salary have more constant daily workload patterns than GPs working independently. Furthermore, a difference is expected between GPs who are involved full-time in their practice and those working part-time. Part-time workers often have other obligations (e.g. in family life or in other jobs) that restrict their allocation of time in general practice. This particular 'ceiling-effect' is why it is expected that full-time working GPs have more variation in their daily workload than part-time working GPs.

The main aspect of practice organization that might be related to the daily fluctuations in workload is running a free-flow consultation hour. About one third of the Dutch GPs ran this kind of surgery during the time of our study. Workload in this hour is mainly demand-led, which means that the GP cannot or can hardly manage or regulate it. Therefore, it may be expected that running a free-flow consultation hour will lead to more differences in daily workload. There might also be a difference between GPs working in single-handed practices and those in partnerships because the latter provide better opportunities for structuring the workload (Branthwaite & Ross, 1987; Freeman, 1989). Therefore, the amount of variation in daily workload is expected to be higher in single-handed practices. This argument also holds for the delegation of contacts to the practice secretary and participation in a rota system for the evenings. When GPs can delegate more contacts to their practice secretary they are more able to control their own number of consultations and therefore the variation in daily workload of the GP will be smaller. In addition, participation in a rota system for the evenings will have the same effect. Firstly because of the increased opportunities to delegate and secondly because in this system out-of-hours calls will be managed more easily. In the Netherlands, some GPs, mainly in rural areas, are doing home deliveries. This special task can be positively related to the fluctuations in daily workload because deliveries are more difficult to plan

than other activities. It is unlikely that other aspects of the task profiles of GPs, such as running a dispensary or supervising a trainee in the practice, are related to the variation in daily workload of GPs.

In sum, it is expected that more fluctuations in the daily workload will occur in GPs:

- with a smaller list
- with a higher percentage of children below 5 on their list
- with a higher percentage of low-educated people on their list
- who work independently in their own practice
- who work full-time in the practice
- who run a free-flow consultation hour
- who work in a single-handed practice
- who delegate fewer consultations to their practice secretary
- who do not participate in a rota system for the evenings
- who perform home deliveries.

In table 5.5 bivariate comparisons of the three measures of variation in daily workload for these relevant factors are presented.

Table 5.5 Indicators of fluctuations of daily workload: means of dispersion parameters for different categories

	Average range of daily workload	Average Sd of daily workload	Average CV of daily workload	N
<i>Personal list size</i>				
< 1250	26.5	6.6	0.28	22
1250-2000	34.4	8.0	0.29	43
2000-2750	41.9	9.2	0.26	73
> 2750	46.2	10.2**	0.23**	21
<i>% children below 5 on list</i>				
< 5%	38.9	8.6	0.25	37
5-10%	38.5	8.6	0.27	103
> 10%	36.3	8.6	0.28*	19
<i>% low-educated patients on list</i>				
< 10%	33.6	7.5	0.27	33
10-20%	38.9	8.6	0.26	87
> 20%	41.1*	9.6**	0.28	39
<i>involvement in practice</i>				
Full-time	40.3	9.0	0.27	127
Part-time	30.7**	7.2**	0.28	32
<i>Working independently</i>				
Yes	39.5	8.8	0.27	136
No	31.6**	7.6*	0.28	23
<i>% of consultations by practice secretary</i>				
≤ 29%	38.8	8.7	0.26	79
> 29%	37.9	8.6	0.28	80
<i>Rota system evenings</i>				
Yes	38.0	8.5	0.27	151
No	43.7	10.3*	0.28	8
<i>Free-flow consultations</i>				
Yes	39.9	9.1	0.28	63
No	37.3	8.3*	0.26	96
<i>Type of practice</i>				
Single-handed	39.9	9.0	0.26	105
Partnership	37.5	8.5	0.27	54
<i>Doing home deliveries</i>				
Yes	40.8	9.3	0.28	53
No	37.1	8.3*	0.26	106

* Significance: * P < .05, ** p < .

There were significant differences in the amount of fluctuation in daily workload with

regard to the personal list size of GPs. The difference between the minimum and maximum daily workload was greater when GPs had more patients on their lists. The daily workload of an average GP with a small personal list (< 1250 patients) differed by a maximum of 26 consultation units, while the difference between the busiest and least busy working day was 46 for the average GP with a large list (> 2750 patients). Larger lists also corresponded to higher standard deviations of daily workload. The mean standard deviation of GPs with small lists was 6.6 and it increased linearly to 10.2 for GPs with the larger number of patients on their list. In contrast with these two positive relations, the third measure of fluctuation, the coefficient of variation, had a negative relation to list size. GPs with fewer than 2000 patients on their list did not differ in this respect but GPs with list sizes between 2000 and 2750 and especially those with the largest lists had considerably lower coefficients of variations for the daily workload scores. This means that the relative variability was less in these two groups than in the groups with smaller list sizes. Probably the larger ranges and standard deviations were the results of the fact that the mean workload of GPs with larger lists was higher than the mean workload of GPs with smaller lists.

When the personal lists of GPs contained a relatively low percentage of children below 5, the coefficient of variation in daily workload was a little lower than in practices with a larger percentage of children under 5. The range and standard deviations did not differ in this respect.

A second characteristic of the composition of the practice population was the percentage of low-educated patients. A higher percentage meant larger ranges between the minimum and maximum value of daily workload and the standard deviations were also higher. Thus a relatively higher number of low-educated patients in the practice population increased the amount of fluctuation in the daily workload.

GPs with a part-time involvement in the practice and those with fixed salaries had smaller ranges and lower standard deviations. Running a free-flow consultation hour and doing home deliveries also led to higher standard deviations of daily workload.

No differences in the three indicators of fluctuation in daily workload were found with respect to the type of practice (single-handed or partnership) and the amount of delegation to practice secretaries.

Six results of these bivariate analyses are in line with our expectations about GP- and

practice-characteristics affecting the amount of fluctuation in daily workload. However, it is not clear whether significant differences in ranges and standard deviations are the result of differences in the average workload instead of fluctuations between working days. In the regression analysis it is possible to separate the two effects. As explained in Section 5.2, the dependent variable is the logarithm of the standard deviation and the logarithm of the mean workload over all working days per GP was included as independent variable. If there is only an arithmetical effect, the distribution of the logarithm of the standard deviation will be proportional to the distribution of the logarithm of the mean workload. This means that the standardized regression coefficient will be one. Hence, if this coefficient deviates from one, real effects also exist. The results of the regression analysis are presented in Table 5.6.

Table 5.6 Regression analysis on the logarithm of the standard deviation

	B	SE B	Beta
Logarithm of mean daily workload	0.82	0.07	0.84**
List size (< 1250)			
1250-2000	0.09	0.05	0.13
2000-2750	-0.03	0.05	-0.05
> 2750	-0.07	0.07	-0.08
% children below 5 (< 5%)			
5-10	0.05	0.03	0.08
> 10	0.12	0.05	0.13*
% low-educated patients (< 10%)			
10-20	0.03	0.04	0.05
> 20	0.10	0.05	0.15*
Working independently	-0.04	0.04	-0.05
Full-time involvement	0.07	0.04	0.10
Free-flow consultations	0.06	0.03	0.11*
% contacts by practice secretary (> 29)	0.04	0.03	0.07
Rota system evenings	-0.04	0.07	-0.03
Single-handed practice	-0.02	0.03	-0.03
Doing home deliveries	0.06	0.03	0.10*
Constant	-0.91	0.23	
R ²	0.71		
Adjusted R ²	0.68		

Significance: * p < .05; ** p < .01

Obviously the logarithm of the mean daily workload score was the most important explanatory variable in the regression equation. Its beta was 0.84, which means that the distribution of the logarithm of the standard deviation was not completely proportional to the logarithm of the mean workload. The analysis revealed four other variables with a significant regression coefficient. The composition of the practice population was relevant to explain the amount of fluctuations in the daily workload of GPs. Those with a high percentage of children below 5 or a high percentage of low-educated patients on their lists were confronted with a larger amount of fluctuation in their daily workload (using the logarithm of the standard deviation as indicator). Also, two factors situated on the supply side had significant contributions in the regression equation: running a free-flow consultation hour and doing home deliveries both led to greater differences in the daily workload of a GP.

This multivariate analysis showed that the bivariate differences for list size, working independently or having a fixed salary, full- or part-time involvement in the practice and participation in a rota system for the evenings (see Table 5.5), were not significant when other factors are taken into account. This can be explained in two ways. Firstly, the bivariate differences were caused by other GP- and practice-characteristics that are related to the particular characteristic. Secondly, these differences reflect variation in the absolute level of daily workload instead of differences in the amount of fluctuation.

Table 5.7 Mean daily workload for different categories of GPs

	Mean daily workload
<i>Personal list size</i>	
< 1250	23.1
1250-2000	27.4
2000-2750	35.8
> 2750	44.3*
<i>Involvement in practice</i>	
Full-time	34.7
Part-time	25.8*
<i>Working independently</i>	
Yes	33.9
No	27.2**
<i>Rota system evenings</i>	
Yes	32.7
No	36.3

Significance: * P < .05, ** p < .01

The mean workload of GPs with a larger list, those working independently and working full-time in practice was higher compared to their counterparts (see Table 5.7). With regard to participation in rota systems for the evenings no significant difference in the mean workload was found.

5.6 Summary and discussion

In this chapter the daily differences in GPs' workload were studied. It was shown that, in general, the workload of GPs was not completely stable over time. The average range between the least busy and the busiest working day of a GP was 38 consultation units, 27 office consultations, 11 home visits or 6 telephone calls. Although we had removed the working days with special surgeries, it is still possible that some differences are the result of the specific situation during a particular working day on which no information was available in the data set.

According to the information from the three-month registration of all contact in general practice, GPs had more consultations on Mondays and Fridays compared to other days of the week. Traditionally, Mondays are very busy in general practice because complaints are presented that started in the weekend: for instance sport injuries are often mentioned in this respect. Furthermore, most patients do not contact their GP during the weekend and will therefore postpone their visit until Monday. A higher workload on Fridays might be because patients are afraid that a complaint may get worse during the weekend. Furthermore, people may want to see their own GP and in the weekend they can often only contact a 'strange' locum.

The amount of fluctuation in daily workload differs between GPs. Broader ranges between minimum and maximum workload were reported by GPs with larger lists, GPs working full-time in the practice and GPs working independently. Higher standard deviations of daily workload were seen in GPs with larger lists, those with more low-educated patients in their practice population, GPs working full-time and independently, GPs who did not participate in rota systems for the evenings, who operated a free-flow consultation hour and were involved in home deliveries. The third measure of fluctuation, the coefficient of variation, was significantly higher for GPs with smaller lists and GPs

with a high percentage of children under 5 on their lists.

It is problematic to explain the amount of fluctuation in daily workload by these GP- and practice-characteristics because the measures used can be highly related to the mean workload. The regression analyses showed that the differences in fluctuations with regard to list size, full-time involvement in the practice and working independently were more related to the fact that these characteristics increase the mean workload instead of the amount of fluctuation in daily workload. Real effects on the amount of fluctuation in daily workload were found for four factors: two situated on the demand side and two on the supply side. The two aspects of the composition of the practice population, the percentage of young children and low-educated patients, led to larger daily differences in GPs' workload. Running a free-flow consultation hour and doing home deliveries were the two supply-related aspects. Remarkably, the factors all have in common that they restrict the GPs' own possibilities to plan or manage their workload: less personal control means more fluctuation.

In general it can be concluded that the daily workload of a GP can fluctuate to such an extent, that these variations might influence the treatment of patients on different working days. In the next chapter it will be investigated whether these daily fluctuations influence the kind of care that is provided by a GP or whether his overall workload, as described in Chapter 4, is more important in this respect.

GENERAL PRACTITIONER'S WORKLOAD AND THE CONTENT OF CARE: THE DIFFERENCE BETWEEN A 'BUSY PRACTICE' AND A 'BUSY DAY'

6.1 Introduction

The main assumption in this study is that general practitioners react to high workload through their allocation of time, by extending their working hours in direct patient care or/and reducing the length of their consultations. In Chapter 4, it was shown that GPs with a higher workload spent more time on direct patient contacts per week and less time on continuous medical education, compared to GPs with a lower workload. This, however, does not mean that they will not (also) reduce the duration of patient contacts because these two coping mechanisms may occur together. In this chapter, it will be investigated whether and under which circumstances GPs reduce the consultation time of individual patients because of high workload. We will not look at the length of consultations only but also at the interventions taking place within the consultations, because length and content of consultations may be regarded as two sides of the same coin. Three ways to reduce the consultation time were mentioned in Chapter 2: avoiding time-consuming interventions or doing less time-consuming interventions, spending less time on each intervention within a consultation, and postponing work to the future. The second alternative could not be analysed because there was no information available on the time spent on each separate intervention or activity within a consultation. The other two are the starting point for studying the relation between workload and content of care.

Before the theoretical considerations and hypotheses (which were stated in Chapter 2) are summarized, we have to discuss the level of analysis in this chapter because this steers the translation of the hypotheses into empirical expectations to be tested in the statistical analyses. As explained in Chapter 3, the dependent variables (length of consultations and interventions taking place during the consultations) were calculated for each working day of a GP by aggregating over the consultations. The working day is the smallest unit of analysis and not the separate consultations. The MIn programme for multilevel analysis

that will be used in this chapter and available hardware would not be able to handle the large amount of cases if we had opted for the consultation itself as unit of analysis¹. As a consequence, the theoretical statements from Chapter 2 have to be translated into expected empirical relations on the level of the working day.

In Section 2.5, general hypotheses were formulated on the relation between workload and the length of consultations. It was expected that higher workload decreases the time spent on each individual patient. This holds true, according to our hypotheses, for both overall and daily workload. The GP will take not only the needs and expectations of the 'index patient' (the person consulting the GP) into account but also the needs and expectations of the other patients, for instance those in the waiting room. This means, in statistical terms, that we expect to find negative regression coefficients of overall workload, reflecting the variation between GPs ('between-GP' regression coefficients), and negative regression coefficients of daily workload, reflecting variation within GPs ('within-GP' regression coefficients), on the average length of consultations per working day in the multilevel analyses (see Table 6.1, HYP8).

According to hypothesis 9, GPs are less likely to cut down on the time spent on each individual patient when the patient has more freedom to change GPs or to go directly to a medical specialist if he feels dissatisfied with the consultation. The idea is that, in general, patients are able to judge whether a GP has spent sufficient time on a consultation. When they feel that they received less time (that is to say, attention) than expected, they might consider another physician. It was already explained that it is easier for privately insured patients to change GPs or go directly to a medical specialist because they pay for each consultation separately, while for publicly insured patients there are more administrative restrictions in these respects because of the capitation payment. Therefore, the expected negative relation between workload and length of consultations will be stronger when more publicly insured patients consult the GP. Furthermore, it was expected that this negative relation is stronger when GPs work in partnerships because they are less dependent on their patients as a source of social approval (see Table 6.1, HYP9).

The possibility of reducing the length of consultations is also restricted by certain patient

¹ This will be discussed in more detail in Section 6.2.

characteristics and the kind of health problem they present. The extent to which GPs' workload affects the duration of the consultation depends on the amount of decision room the patient and health problem give to a GP. In Section 2.5, it was argued that this decision room is larger for psychosocial problems, minor health complaints and when the diagnosis is less certain. Furthermore, it was expected that GPs' decisions are more restricted by higher than by lower-educated patients. For our analyses, these characteristics of the patient and his health problem were calculated as working day variables. The question whether these variables influence the strength of the relation between workload and the length of consultations will be answered through the introduction of the interaction terms of workload and these variables in the analyses (see Table 6.1, HYP10).

Table 6.1 Summary of hypotheses on the relation between GPs' workload and the length of consultations

	Theoretical statement	Expected empirical relation*
HYP8	GPs' workload is negatively related to the length of their consultations.	Negative regression coefficients of daily and overall workload score on the average length of consultations per day.
HYP9	The negative relation between GPs' workload and the length of consultations is stronger when: <ul style="list-style-type: none"> - patients have less freedom to change GPs or go directly to a medical specialist. - GPs are less dependent on their patients as a source of social approval. 	Stronger negative regression coefficients of daily workload and overall workload on the average length of consultations, in combination with: <ul style="list-style-type: none"> - higher % publicly insured during working day - GPs working in partnerships.
HYP10	The negative relation between GPs' workload and the length of consultations is stronger when the decision room of the GP in a consultation is less restricted by the patient and his health problem.	Stronger negative regression coefficients of daily workload and the overall workload on the average length of consultations, in combination with: <ul style="list-style-type: none"> - higher % psychosocial problems - lower level of certainty of diagnoses - lower level of severity of problems presented during a working day - lower educational level of patients consulting.

* Controlling for other important relevant GP-, practice-, patient- and health problem-characteristics

It was already mentioned that we study two ways to reduce the time of a consultation in

this chapter: avoiding time-consuming interventions and doing less time-consuming interventions on the one hand and postponing work to the future on the other. In this phase the difference between overall and daily workload becomes important. It was expected that both aspects will have different consequences for the choices of interventions in the consultation. The time frame makes the difference. On a busy day, GPs will avoid directly time-consuming interventions and perform more less directly time-consuming activities. Overall workload was expected to have the same effect. However, on a busy day a GP may also decide to postpone work to the future. This means an increase in the choice of interventions that are more time-consuming in the near future such as out-of-office diagnostics and making follow-up appointments. When a GP has a high overall workload, the opposite was expected. Postponing work to the future does not solve a situation of high workload because the practice is always busy. Therefore, interventions that are less time-consuming in the near future will be chosen more often and those that are more time-consuming in the near future will be used less often.

To test these hypotheses, it is necessary to define more and less time-consuming types of care; more insight is required into the amount of time that is needed to perform the different activities. The problem is, however, that no detailed empirical information is available to assess the actual time required for each separate aspect of care. Most research concerns the length of consultations without looking at the time allocation within the consultation in detail. The information available is often not specific enough to serve our intentions. Boots (1983) for instance presented the percentage of the total working hours, during a day, spent on different interventions but not for each consultation. Verhaak (1987) related some interventions to the length of the consultations, but again no information was provided on the actual time allocation within the consultations. Furthermore, our way of grouping the different interventions is too specific to make a direct comparison with the results of other studies possible. Because relevant empirical data are not available, we can formulate only common-sense assumptions on the expected time consumption in a consultation and in the near future. They are presented in Table 6.2.

Table 6.2

The expected time consumption of interventions by GPs

	Direct time consumption in the consultation	Time consumption in the near future
Physical examination	+	0
Practice-based diagnostics	?	?
Out-of-office diagnostics	-	+
Wait and see		+
Counselling and advice	+	0
Technical medical interventions	+	0
Prescription of drugs	-	0
Referral to specialist	?	-
Referral to primary care	?	-
Follow-up appointment	-	+

Time consumption: + = more, 0 = neutral, - = less time-consuming, ? = no expectation

Physical examination, counselling and technical medical interventions are three interventions that directly take time in the consultation. Practice-based diagnostics (diagnostic tests done in the practice itself) can be done directly in a consultation or afterwards. This means that nothing can be said about the required time in the consultation. The practice strategy also determines whether a patient has to consult the GP again to discuss the test results. This means that no general expectations could be formulated for the direct time consumption and the time consumption in the near future.

Out-of-office diagnostics, prescription of drugs, 'wait and see' and making follow-up appointments may be regarded as less directly time-consuming. The exact amount of time in a consultation related to a referral is not clear. The action itself, that is writing the referral letter, takes time but may be done at the end of a working day. GPs probably take some time in a consultation to consider a possible referral. They must have good reasons for it, because they know the decision will be directly known to other health care workers. This means that they have an interest in avoiding unnecessary referrals because these may affect their social approval. Therefore, it is not expected that the number of referrals will be higher on busy working days than on less busy days.

Out-of-office diagnostics, 'wait and see', and making follow-up appointments are more likely to be time-consuming in the near future. The chance of a repeat consultation or return visit is expected to be higher. Referrals clearly decrease this chance and are, therefore, considered to be less time-consuming in the near future.

In Table 6.3 we use these considerations to translate hypotheses 11 and 12 (see Chapter 2) into empirical expectations that will be tested in the analyses of this chapter. Similar to the length of consultation, we expect that the empirical relations of hypotheses 11 and 12 are more likely to occur or stronger when the patient and his health problem give the GP more freedom in his decisions (HYP13). This means that the negative and positive relations between workload and the interventions are stronger when psychosocial problems or less severe health problems are presented, when the GP is less certain of the diagnosis and when lower-educated patients consult their GP. When hypothesis 13 is strictly applied, we expect GPs in busy practices to be more likely to refer their patients when they present minor complaints. This needs some clarification. In this study we formulate only hypotheses on the relation between workload and referrals. This does not mean that GPs will refer more patients when they present less severe health problems. The decision to refer a patient will be positively related to the severity of the problems: in analytical terms this means that there is a main positive effect of severity on the percentage of referrals. Because this relation is in fact based on medical considerations no influence of workload is expected: in the case of severe health problems it is appropriate to refer a patient to specialist care. When minor problems are presented, the decision to refer is less determined by medical considerations and therefore, other aspects such as workload can play a more important role. As a consequence, the relation between overall workload and the percentage of referrals will be stronger in this situation.

Next to characteristics of the patient and presented health problem, the relations between overall and daily workload and the choice of interventions are conditioned by the consequences of this choice for the income and/or social approval of the GP (HYP14). The choice of more or less directly time-consuming interventions is not clearly related to income because Dutch GPs are not paid a separate fee per intervention but receive a fee for each consultation with their privately insured patients. When less appropriate care is provided by a GP this might negatively influence his social approval and, as explained, this might lead to a loss of income in the longer run. Therefore, we expect that GPs are more likely to reduce time for publicly insured patients but not for privately insured patients. However, contrary to the length of consultations, patients are less able to judge whether the care provided (in terms of interventions undertaken) was appropriate or not. Therefore, the social approval from patients and, although indirectly, the threat of losing

income in the future are not expected to be related to the kind of interventions chosen in a consultation. The situation is different with regard to the social approval received from colleague GPs. We expect that workload affects the choice of interventions to a lesser extent when GPs work in partnerships. Their medical decisions will be more directly monitored by their colleagues and therefore the chance of criticism and reduction of social approval is much higher than for GPs working in single-handed practices. As a consequence, GPs working in single-handed practices will be more likely to choose fewer directly time-consuming interventions and fewer interventions that are more directly time-consuming as a reaction to high workload.

The option to postpone work because of a high daily workload is more likely to be chosen when it brings financial benefits to the GP. As mentioned, privately insured patients pay for each consultation separately. Therefore, interventions that increase the chance of a return visit are more likely to occur on working days with a relative by high number of privately insured patients and when the GP works independently. This implies that the negative relation between overall workload and the choice of more time-consuming interventions in the near future will be stronger when more publicly insured patients (with a capitation fee) consult a GP and when GPs have a fixed salary. In these situations, the chance is also higher that GPs will react to a high overall workload by referring patients to specialist or other primary health care workers.

Finally, because of the consequences for their social approval by colleagues, GPs in partnerships are less likely to let workload influence their decisions. Besides, GPs in single-handed practices depend more on their patients as a source of social approval and this condition can also have a positive influence on the decision to refer a patient to cope with a high overall workload. It is assumed that patients often prefer to be referred to secondary care. An international comparative study showed that almost 60% of the referrals by Dutch GPs were influenced by patient pressure (Fleming, 1993).

Theoretical statement	Expected empirical relation*
<p>HYP11 Daily workload and overall workload of GPs are negatively related to the choice of more directly time-consuming interventions and positively related to the choice of fewer directly time-consuming interventions, under the condition that the expected time consumption of the interventions in the near future is neutral.</p>	<p>Negative regression coefficients of daily workload and overall workload on the percentage of consultations including:</p> <ul style="list-style-type: none"> - psychological examination - counselling and advice - technical medical interventions per day. <p>Positive regression coefficients of daily workload and overall workload score on the percentage of consultations ending with a prescription of drugs per day.</p>
<p>HYP12 The daily workload of GPs is positively related to the choice of more time-consuming interventions in the near future, while the overall workload of GPs is negatively related to the choice of more time-consuming interventions in the near future and positively related to the choice of fewer time-consuming interventions in the near future.</p>	<p>Positive regression coefficients of daily workload score on the percentage of consultations including:</p> <ul style="list-style-type: none"> - out-of-office diagnostics - wait and see - follow-up appointments per day. <p>Negative regression coefficients of overall workload score on the percentage of consultations including:</p> <ul style="list-style-type: none"> - out-of-office diagnostics - wait and see - follow-up appointments per day. <p>Positive regression coefficients of overall workload score on the percentage of consultations including:</p> <ul style="list-style-type: none"> - referrals to specialist care - referrals to primary care per day.
<p>HYP13 The relations between overall and daily workload and the choice of interventions within consultations will be stronger when the decision room of the GP in a consultation is less limited by the patient and his health problem.</p>	<p>Stronger negative regression coefficients of daily workload and overall workload on the percentage of physical examination, counselling, technical medical interventions, in combination with:</p> <ul style="list-style-type: none"> - higher % psychological problems - lower level of certainty of diagnoses - lower level of severity of problems presented during a working day - lower educational level of patients consulting. <p>Stronger positive regression coefficients of daily workload and overall workload on the percentage of prescription, in combination with:</p> <ul style="list-style-type: none"> - higher % psychosocial problems - lower level of certainty of diagnoses - lower level of severity of problems.

Theoretical statement	Expected empirical relation
	<p>presented during a working day</p> <ul style="list-style-type: none"> - lower educational level of patients consulting. <p>Stronger positive regression coefficients of daily workload on the percentage of out-of-office diagnostics, wait and see, follow-up appointments, in combination with:</p> <ul style="list-style-type: none"> - higher % psychosocial problems - lower level of certainty of diagnoses - lower level of severity of problems presented during a working day - lower educational level of patients consulting. <p>Stronger negative regression coefficients of overall workload on the percentage of out-of-office diagnostics, wait and see, follow-up appointments, in combination with:</p> <ul style="list-style-type: none"> - higher % psychosocial problems - lower level of certainty of diagnoses - lower level of severity of problems presented during a working day - lower educational level of patients consulting. <p>Stronger positive regression coefficients of overall workload on the percentage of referrals, in combination with:</p> <ul style="list-style-type: none"> - high % psychosocial problems - lower level of certainty of diagnoses - lower level of severity of problems presented during a working day - lower educational level of patients consulting.
<p>HYP14 The relations between overall and daily workload and the choice of interventions within consultations are conditioned by the consequences of this choice for the income and/or social approval of the GP.</p>	<p>Stronger negative regression coefficients of daily workload and overall workload on the percentage of physical examination, counselling, medical technical interventions, in combination with:</p> <ul style="list-style-type: none"> - GPs working in single-handed practices. <p>Stronger positive regression coefficients of overall workload on the percentage of referrals, in combination with:</p> <ul style="list-style-type: none"> - higher % publicly insured during a working day - GPs with fixed salaries - GPs working in single-handed practices.

6.2 Methods

In this chapter, data were used from the same 159 GPs, during 7918 working days, as in the preceding chapter. The calculation of the workload scores was already explained in Chapter 4 (overall workload) and Chapter 5 (daily workload). The length of office consultations was noted by the GPs. Average length was also calculated per GP and per working day. Content of care was defined as the percentage of specific interventions in the surgery consultations of the GP. These percentages were calculated both on a daily basis and as averages per GP. The interventions were grouped into ten categories: physical examination, practice-based diagnostics, out-of-office diagnostics, the decision to 'wait and see', counselling (therapeutic communication, health education, advice), technical intervention (vaccinations, minor surgery), drug prescription, referral to specialist care, referral to primary care (for instance dietician or physiotherapist), and follow-up appointments.

The analyses were performed in three steps. Firstly, the relations between workload and the content of care were studied at the GP level by means of Pearson's correlations. Secondly, the relation between workload and content of care per working day was analysed. The 'within-GP' deviation scores of the length of consultations and the percentage of interventions (that is the score on a working day minus the mean score) were correlated to the deviation score of daily workload. In this way we controlled for the fact that working days were nested within GPs and therefore differences between GPs can also be reflected in the difference between working days.

Thirdly, with the MLn programme for multilevel analysis overall and daily workload were analysed simultaneously. In the introduction to this chapter it was already mentioned that we had to opt for working days instead of separate consultations as the level of analysis. In the first instance we wanted to separate two levels of analyses, the GP level and the level of consultations. However, this resulted in an enormous data set containing more than 200,000 cases. This choice required logistic regression analyses because of the dichotomous dependent variables (whether or not an intervention was chosen in a specific consultation). It turned out to be impossible to perform this analysis because of hardware limitations. Therefore in our multilevel analyses the percentage of consultations with specific interventions and the average length of consultations were the dependent variables

at the level of the working day.

The multilevel analyses consisted of four steps. Firstly, intraclass correlations were calculated in the null model without explanatory variables. These correlations give the percentage of the total variation situated at the GP level. In the second model, all controlling variables (relevant characteristics of the health problem, patient, GP and practice) were introduced. Thirdly, three aspects of workload were added to the model: overall workload, daily workload and the cross-level interaction of overall workload and daily workload. This is to find out whether GPs with a high overall workload reacted differently to their daily workload, compared to GPs with a low overall workload. The daily workload score was centred within each GP. Finally, in the fourth step, the research question whether the relation between workload and the content of care was influenced by patient-characteristics, the presented health problem and GP-/practice-characteristics, was analysed by the introduction of interactions between daily and overall workload on the one hand and these characteristics on the other. All interactions were centred. In addition to the interactions mentioned, the main effects of these variables were also in the equations. Some other relevant characteristics of the patient and health problem were taken into account because they were expected to influence the choice of interventions in a consultation, namely: age and gender of the patient, the type of problem presented (acute, chronic, psychosocial or other) and whether the patient presents this health problem for the first time to the GP (new or existing problem). Relevant GP- or practice-characteristics were the level of delegation to practice secretaries (the percentage of consultations performed by them) and the level of urbanization of the place where the practice was situated. All other characteristics such as age, gender and remuneration system were already in the equation because they were mentioned in the expected empirical relations stated in Tables 6.1 and 6.3. The goodness of fit of the models was considered by the comparison of the percentage reduction of variance in the different steps.

6.3 Length and content of consultations by GPs

Patient care in general practice is many-sided and characterized by a large amount of variation (see for instance Marinus, 1993). Patients contact their GPs for many different reasons, for instance administrative requests, somatic complaints, psychological distress and social problems. GPs themselves have a fairly wide range of opportunities to react. The actual choices of GPs in this respect are regarded as the content of care. In our research we selected ten main elements of the content of care. Table 6.4 shows the amounts in which the activities were undertaken by the 159 GPs in their office consultations and the mean length of consultations per GP.

Table 6.4 Descriptive statistics of GPs' length of consultations and percentage of interventions in office consultations² (n=159)

	Mean	Sd	CV	Range
Mean length of consultations (in minutes)	8.7	1.9	0.22	3.3 - 15.0
Percentage:				
physical examination	72.2	9.1	0.13	50.2 - 88.5
practice-based diagnostics	7.7	3.4	0.44	0.9 - 24.5
out-of-office diagnostics	7.6	2.8	0.37	1.3 - 16.8
wait and see	5.4	4.3	0.80	0.1 - 22.2
counselling and advice	62.3	24.5	0.39	9.2 - 97.2
technical medical interventions	9.6	3.9	0.41	2.8 - 22.4
prescription of drugs	45.5	8.2	0.18	23.8 - 71.8
referral to specialist	5.6	1.8	0.32	1.5 - 13.5
referral to primary care	3.9	1.5	0.38	0.7 - 8.1
follow-up appointment	30.0	10.3	0.34	5.2 - 68.0

On average, a consultation in general practice took almost 9 minutes. There was, however, a large interdoctor variation in this respect. One GPs spent an average of 3.3 minutes on each consultation while another one devoted 15 minutes.

A consultation usually begins with the exploration of the presented problem. Three of the interventions are related to this aspect: physical examination, diagnostic tests performed in the practice itself and requests for out-of-office laboratory tests. Physical examination

² The length of the consultation and the interventions were registered by GPs themselves. Therefore differences in registration attitude could also influence the results.

turned out to be a part of most of the consultations by GPs (an average of 72%). Both kinds of diagnostic tests were performed or requested in relation to about 8% of the health problems presented. The decision to 'wait and see' was made in more than 5% of the cases. Counselling (including talking, health education and giving information on disease or treatment) was often registered by the GPs on the consultation forms (in 62% of the cases). Technical medical interventions were performed in relation to one out of ten presented health problems. Furthermore, GPs decided to prescribe at least one drug in almost half of the cases. GPs referred more often to specialist care than to primary care (5.6 versus 3.9%). Finally, we see that almost one third of the health problems led to a concrete appointment for a follow-up consultation.

The coefficients of variation (CVs) indicate that the highest interdoctor variation was found with regard to the decision to 'wait and see'. Also with regard to diagnostic tests, counselling, technical medical interventions and referral to primary health care high coefficients of variation were found. We have to be aware that especially in the case of the decision to 'wait and see' and counselling, high interdoctor variation can also reflect differences in registration behaviour instead of differences in working style. The CVs of physical examination and prescription of drugs were the lowest, but still the ranges between minimum and maximum indicate large differences between GPs.

To describe the intradoctor variation (that is the amount of variation in length of consultations and the interventions between working days of the same GP), the same three measures were used as in the preceding chapter: the range per GP between his minimum and maximum score, the standard deviations per GP and the related coefficients of variation (see Table 6.5). These measures were averaged over the 159 GPs in our data set.

Table 6.5 Mean range, standard deviations and coefficients of variation of daily differences in length of consultations and the percentage of interventions by 159 GPs in office consultations

	Mean range	Mean sd	Mean cv
Mean length of consultations (in minutes)	5.7	1.2	0.14
Percentage:			
physical examination	46.9	10.4	0.15
practice-based diagnostics	24.7	5.8	0.83
out-of-office diagnostics	24.3	5.9	0.82
wait and see	21.1	5.2	1.44
counselling and advice	50.5	11.6	0.24
technical medical interventions	28.1	6.7	0.75
prescription of drugs	52.1	11.4	0.26
referral to specialist	20.4	5.1	0.94
referral to primary care	16.5	4.2	1.15
follow-up appointment	48.0	10.7	0.39

The results show considerable differences between working days of GPs in the mean length of consultations and the percentage of interventions undertaken. The average difference between the day with the longest and the day with the shortest average length of consultations was almost 6 minutes. There were large differences between the minimum and maximum scores on working days for physical examination, counselling and advice, prescription of drugs and making follow-up appointments.

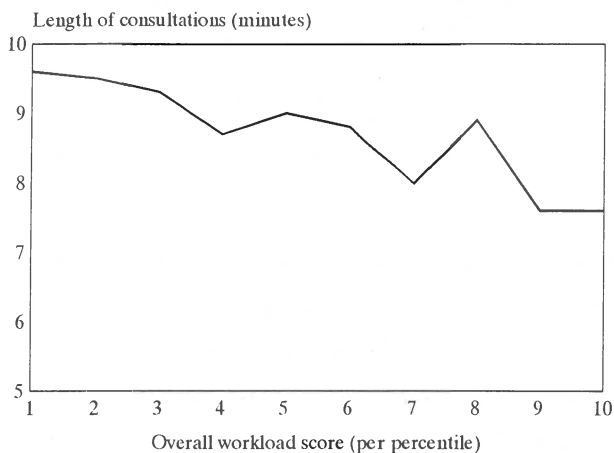
Also the coefficients of variation indicate that the behaviour of GPs was not stable over working days. Relatively low 'within-GP' variation was found for physical examination, counselling and advice and prescribing drugs. The percentage of 'wait and see', diagnostics, referrals and technical medical interventions differed to a greater extent between the working days of a GP. In the multilevel analyses, presented in the next sections, the variation will be split between the two analytic levels (GP and working day) to determine where most of the variation was situated.

6.4 Workload and length of consultations

In this section the hypotheses presented in Table 6.1 will be tested. Before the results of our main statistical analysis are presented, we will firstly consider the relation between

workload and the length of consultations without taking other variables into account. There was a negative relation between overall workload and the average length of consultations of GPs: $r = -0.33^{**}$ (see Figure 6.1).

Figure 6.1 Relation between overall workload and length of consultations (N=159 Dutch GPs)



The largest difference was found when the two extremes were compared. The average length of consultations of the 20% GPs with lowest overall workload was 9.5 minutes, which was almost 2 minutes more than the average of the 20% GPs with highest overall workload score.

For a first impression of the influence of daily workload on the length of consultations, the deviation scores were calculated of the average length of consultations and the workload per working day. The Pearson's correlation coefficient over all 7917 working days was -0.10^{**} .

We may conclude that, in line with our expectations, both overall and daily workload lead to shorter consultations. However, before we confirm our hypothesis, we have to control for other relevant variables and both aspects of workload need to be included in one analysis. This was done in the multilevel analysis, which is partly presented in Table 6.7.³ In the following table the intraclass correlation and the percentage reduction of the

³ In Table 6.7 only variables that were mentioned in the theoretical expectations are presented. The complete results, including the controlling variables, can be found in Appendix 1.

variance in the different models are presented.

Table 6.6 Comparison of multilevel models on average length of consultation per working day: null model, model I (controlling variables), model II (adding workload variables) and model III (adding interactions)

Dependent variable	Intraclass correlation	% reduction of variance					
		Model I		Model II		Model III	
		Level I	II	I	II	I	II
Average length of consultations	68.1	18.9	24.3*	3.5	5.0*	1.7	2.3*

* A significant improvement of the model at both levels (Chi² test; p < 0.05)

The intraclass correlation indicates that 68% of the variation in the average length of consultations was situated at the GP level. This means that differences between GPs were larger in this respect than differences between working days. However, there was also a considerable amount of variation within GPs: almost one third of the total variation was situated at the working day level. The introduction of the controlling variables (characteristics of GPs, practices, patients and health problems) strongly reduced the amount of variance at both levels. This also holds true for the workload variables (model II) and the interactions (model III).

As mentioned, in Appendix 1 the complete results of the multilevel analysis are presented. Characteristics of the patients (gender, age, educational level, type of insurance) and the health problems they presented (certainty and type of diagnosis) during a working day turned out to be the most important predictors of the average length of consultations. Also, strong effects were found for the location of the practice, but other GP- or practice-characteristics had no significant regression coefficients. The next table shows the coefficients of the workload variables and the interactions.

Table 6.7

Results of multilevel analysis on average length of consultation per working day

	B	SE B	Beta
<i>Main effects</i>			
Daily workload	-0.02	0.01	-0.09*
Overall workload	-0.17	0.04	-0.35**
% publicly insured	-0.69	0.12	-0.05**
Working in partnership	0.36	0.28	0.08
% psychosocial problems	3.53	0.29	0.11**
Mean uncertainty	0.15	0.07	0.02*
Mean severity ¹	-0.09	0.08	-0.01
Mean level of education ¹	0.44	0.07	0.05**
<i>Interactions</i>			
Daily and overall workload	0.00	0.00	0.00
Daily workload with:			
- % publicly insured	0.01	0.01	0.02
- working in partnership	-0.01	0.00	-0.02*
- % psychosocial problems	-0.07	0.02	-0.02**
- mean uncertainty	0.00	0.01	0.00
- mean severity ¹	0.00	0.009	0.00
- mean level of education ¹	0.01	0.01	0.01
Overall workload with:			
- % publicly insured	0.05	0.03	0.07
- working in partnership	-0.12	0.06	-0.15*
- % psychosocial problems	-0.04	0.05	-0.00
- mean uncertainty	0.05	0.01	0.03**
- mean severity ¹	-0.03	0.01	-0.03**
- mean level of education ¹	0.05	0.01	0.03*

Significance: * $p < 0.05$; ** $p < 0.01$ ¹These variables were recoded: a high score means less severe or lower education. In this way they are formulated in the same direction as in the empirical expectations of Table 6.1.

The results clearly indicate that both aspects of workload, overall and daily workload, had their own independent relation with the length of consultations: this finding supports the empirical expectations of hypothesis 8. The influence of overall workload was stronger than that of daily workload. There was no evidence that GPs with a high overall workload reacted differently to daily workload than GPs with a lower overall workload.

The interaction terms were included in the analysis to test hypotheses 9 and 10. The finding that both aspects of workload had a stronger negative relation with length of consultation when GPs work in partnerships was explained by the idea that these GPs depend less on their patients as a source of social approval. The other expectation of

hypothesis 9, on the type of insurance of patients, was not confirmed.

According to hypothesis 10, the decision room of the GP determines the strength of the relation between workload and the length of consultations. When a GP has more decision room, non-medical factors such as workload will be more likely to influence his decisions in consultations. Some of the interactions related to this idea had significant coefficients in the multilevel equation. The negative relation between daily workload and the average length of consultations was, as expected, stronger on days with a higher percentage of psychosocial problems presented. Furthermore, the result that a higher overall workload was more strongly negatively related to the length of consultations when less severe health problems were presented is also in line with our expectations.

We also expected that workload is more likely to determine the length of consultations when the GP is confronted with lower-educated patients or less certain diagnosis. This does indeed hold true, but the directions deviated from the expectations. A lower average educational level and a higher level of uncertainty of the diagnosis on a working day weakened the negative influence of overall workload on the length of consultations.

The main conclusion of this section is that both aspects of GPs' workload, daily and overall workload, lead to shorter consultations. Furthermore, some specific circumstances were identified that strengthen or weaken this general, negative relationship.

6.5 Workload and the content of care

The relation between the two aspects of workload and the interventions undertaken in office consultations will be studied in this section. Analogous to the preceding section, we first studied these relation without taking other relevant variables into account. By means of the multilevel analyses, the hypotheses that were formulated in Table 6.3, will be tested.

In the first column of Table 6.8, Pearson's correlations are presented between the overall workload and the content of care as average per GP ($n=159$). The second column shows the correlations between daily workload and the characteristics of office consultations during the 7918 working days. As explained, in this last calculation deviation scores were

used.

Table 6.8 Pearson's correlations between workload and content of care by 159 GPs (column 1) and over 7918 working days (column 2)

Content of care (means)	Correlation with overall workload	Correlation with daily workload
Percentage:		
Physical examination	0.05	0.02*
Practice-based diagnostics	-0.14	-0.02
Out-of-office diagnostics	-0.34**	-0.02
Wait and see	-0.21**	0.01
Counselling	-0.06	-0.02*
Technical medical intervention	-0.13	0.02
Prescription	0.33**	0.01
Referral to specialist	-0.05	-0.01
Referral to primary care	-0.10	-0.01
Follow-up appointment	-0.03	-0.04**

Significance: * $p < 0.05$; ** $p < 0.01$

With regard to overall workload, three significant correlations were found (see also Figures 6.2 and 6.3).

GPs with a high overall workload were less likely to order out-of-office diagnostic tests. In addition, the strategy to wait and see how the complaints develop was chosen less in busy practices. These are two aspects with a greater chance of a return visit and therefore we did indeed expected negative relations with overall workload. However, the most concrete action in this respect, namely making a follow-up appointment, was not significantly related to overall workload. Furthermore, busy GPs had higher prescription rates than less busy GPs. The direction of the significant correlations of overall workload were all in line with the expectations stated in hypotheses 11 and 12. The other expected relations with overall workload were not found.

Also, three correlations with daily workload were statistically significant but much smaller in size. On a relatively busy working day, GPs performed relatively more physical examinations, did less counselling and made fewer follow-up appointments. Only the direction of the correlation between daily workload and the percentage of counselling corresponded to the expectations: the other two did not.

In the multilevel analyses both aspects of the workload were analysed simultaneously,

Figure 6.2

Relation between overall workload and aspects of the content of care (N=159 Dutch GPs)

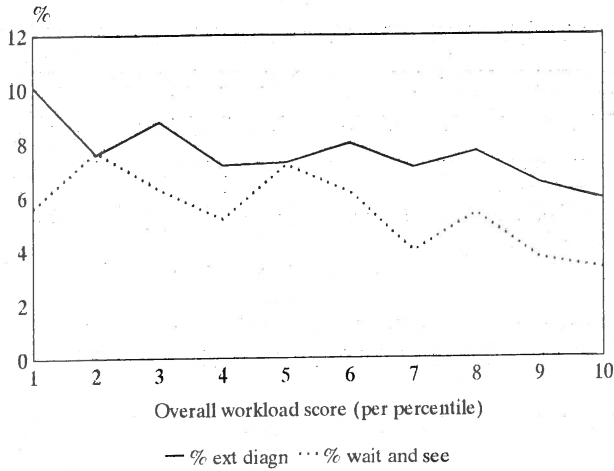
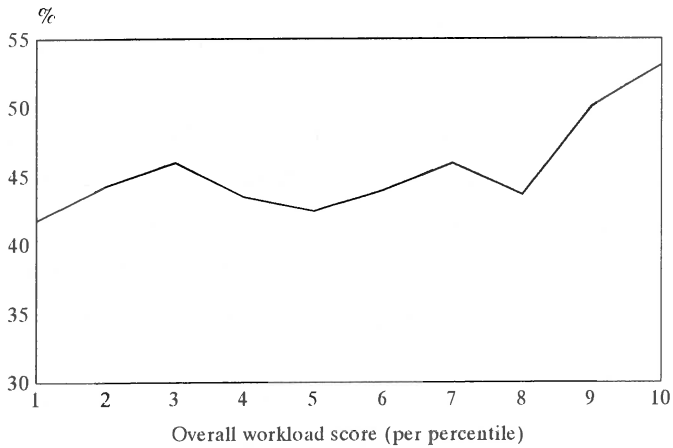


Figure 6.3

Relation between overall workload and prescription of drugs (N=159 Dutch GPs)



together with other relevant GP- and working day-characteristics. The intraclass correlations in the multilevel analyses were compared (see Table 6.9). The percentage reduction of variance in the three models was analysed to see whether the variables in the model were relevant in explaining the differences in the ten aspects of the content of care.

Table 6.9 Comparison of multilevel models on 10 aspects of the content of care per working day: null model, model I (controlling variables), model II (adding workload variables) and model III (adding interactions)

Dependent variable	Intraclass correlation	% reduction of variance					
		Model I		Model II		Model III	
		Level I	II	Level I	II	Level I	II
Percentage:							
Physical examination	41.5	16.7	18.4*	0.2	0.6	0.1	-0.0
Practice-based diagnostics	23.1	9.3	24.2*	0.1	0.0	0.0	1.9
Out-of-office diagnostics	15.5	5.3	10.9*	0.2	1.2	0.6	3.3
Wait and see	35.4	5.0	11.5*	1.3	3.9	0.6	1.4
Counselling	80.5	9.3	10.5*	0.1	0.0	1.2	1.5
Technical medical intervention	23.2	6.2	19.6*	1.6	7.5*	0.1	0.2
Prescription	32.3	10.6	25.8*	1.9	6.9*	0.3	1.0
Referral to specialist	9.7	3.4	1.7*	0.0	-0.0	-0.1	0.1
Referral to primary care	8.4	2.1	15.4*	0.0	0.1	0.2	2.0
Follow-up appointment	46.6	24.6	38.6	0.5	1.0*	-0.2	-0.7

* A significant improvement of the model at both levels (Chi² test; p < 0.05)

The intraclass correlations demonstrate that, in general, the variation in the activities of GPs in consultations with their patients was to a larger extent situated at the working day level. There were, however, exceptions. On the one hand, variation in counselling and giving advice was more related to differences between GPs than between working days, which means that this may be regarded as a relative stable GP characteristic. On the other hand, referral rates were clearly less stable GP-characteristics. The intraclass correlations of referrals to specialists as well as other primary health care providers, such as physiotherapists, were low. Variation in referrals was more related to differences at the working day level. This means that specific circumstances on a particular working day were more likely to cause different referral rates than characteristics of the GP or his practice.

Almost three quarters of the variation of practice-based diagnostics was situated at the level of the working days. This means that the GP's decisions to perform practice-based diagnostics differed greatly between working days. The intraclass correlation of out-of-office diagnostics was smaller than that of practice-based diagnostics: 15.5% of the total variation was situated at the GP level. This means that the differences between the working days were the largest.

According to the intraclass correlation of physical examinations, only a little more of the variation was situated at the working day level (58.5%). This means the 'within-GP' and

'between-GP' variations were both considerable. The decision to 'wait and see' differed more between working days than between GPs. However, the intraclass correlation shows that a large part of the total variation was situated at the GP-level. Furthermore, 23% of the total variation in technical medical interventions was also situated at the GP level: differences between working days were larger. The intraclass correlation shows that 32% of the total variation in prescription rates was situated at the GP level. The largest part was related to differences in working days. The total amount of variation in the percentage of follow-up appointments was almost equally divided amongst the two levels. Differences between GPs as well as daily differences within GPs seem to be important.

In general, it can be concluded that, except for counselling and advice, most variation was situated at the level of the working days. This means that the specific circumstances on a particular working day led to differences in the content of care. However, it is important to realize that case-mix variables were, in our analyses, defined as characteristics of a working day.

The introduction of the controlling variables led to significant reductions of the variance in all equations. In most cases, the reduction at the second level (the GP level) was much higher than at the first level. With regard to the referrals to specialist care, the total reduction was rather poor: only 3% at level 1 and almost 2% at level 2. The largest reduction was seen for follow-up appointments. The controlling variables reduced almost 25% of the variance between working days and even nearly 40% of the variance between GPs. When model II (with the workload variables) is compared with model I, a significant improvement was found in the case of technical medical interventions, prescriptions of drugs and making follow-up appointments. For the other aspects of the content of care, the workload variables only played a minor role. The final model, including the interactions, did not lead to a significant reduction of the percentage of variance in any of the cases. This means that all interactions as a whole were not important to explain the percentages of interventions on the working days. It is, however, possible that some of these interactions had a significant coefficient in the equations.

In the remaining part of this section each dependent variable will be discussed separately. Again, the regression coefficients of the variables mentioned in the hypotheses are only presented in the tables. Also, when none of these variables had a significant effect in the

equation, the figures are not presented in a table in this section because this means that workload did not have any influence at all. The complete results of all analyses can be found in Appendix 1.

Physical examination

In Table 6.10a the results of the multilevel analysis on the percentage of physical examination are presented. As was clear from the discussion of the percentage reduction of variance in the previous part of this section, there was no important influence of GPs' workload. Only one significant effect was found: only in combination with a higher percentage of psychosocial problems did daily workload decrease the chance that physical examinations were performed. In hypothesis 13, this was explained by the assumption that the decision room of GPs is larger when psychosocial problems are presented.

Table 6.10a Results of multilevel analysis on percentage of physical examinations per working day

	B	SE B	Beta
<i>Main effects</i>			
Daily workload	-0.02	0.02	-0.01
Overall workload	0.14	0.19	0.05
Working in single-handed practice	-0.84	1.46	-0.03
% psychosocial problems	-27.49	2.27	-0.14**
Mean uncertainty	0.28	0.52	0.01
Mean severity ¹	1.76	0.61	0.05**
Mean level of education ¹	-0.01	0.54	-0.00
<i>Interactions</i>			
Daily and overall workload	0.00	0.00	0.01
Daily workload with:			
- working in single-handed practice	0.01	0.03	0.00
- % psychosocial problems	-0.37	0.18	-0.02*
- mean uncertainty	-0.00	0.04	-0.00
- mean severity ¹	0.04	0.04	0.01
- mean level of education ¹	-0.08	0.05	-0.01
Overall workload with:			
- working in single-handed practice	-0.04	0.29	-0.01
- % psychosocial problems	0.27	0.38	0.01
- mean uncertainty	-0.02	0.11	-0.00
- mean severity ¹	-0.12	0.12	-0.02
- mean level of education ¹	0.02	0.12	0.00

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

When the whole equation is considered (see Appendix 1), we clearly see that characteristics of the presented health problem (for instance whether it is a new or already existing complaint, severity and type) were important variables explaining the number of physical examinations performed during a working day. Patient-characteristics also played a role, namely gender, age and type of insurance. GP- or practice-characteristics were, on the whole, not important: only GPs who delegated more consultations to their practice secretaries did more physical examinations.

Practice-based diagnostics

We did not formulate concrete empirical expectations on the relation between the two aspects of workload and the percentage of practice-based diagnostics on a working day. Therefore, we included all possible relevant interactions in the analysis to see whether this can tell us more about the relation. As can be seen in Appendix 1, none of the workload variables (and their interactions) were related to the percentage of diagnostic tests performed in the practice itself. This aspect of the content of care was mainly determined by characteristics of the health problems and, although to a lesser extent, by patient- and GP-characteristics.

Out-of-office diagnostics

In contrast to the diagnostic tests done in the practice itself, requests for external laboratory tests were influenced by daily workload (see Table 6.10c). On a busy working day, GPs ordered fewer diagnostic tests. This is opposite to the expectation stated in hypothesis 12. We assumed that test ordering is less directly time-consuming in a consultation and, therefore, a positive relation with daily workload is expected. Furthermore, the type of insurance of the patient was relevant. The negative influence of daily workload was stronger when relatively more privately insured patients consulted the GP. This result is not in line with hypothesis 14. We expected a stronger positive relation because GPs have a financial gain when a privately insured patient has an extra consultation discussing the test results.

Table 6.10c Results of multilevel analysis on the percentage of out-of-office diagnostics per working day

	B	SE B	Beta
<i>Main effects</i>			
Daily workload	-0.08	0.04	-0.11*
Overall workload	0.01	0.10	0.01
% privately insured	2.08	0.57	0.05**
Working in single-handed practice	-0.47	0.46	-0.04
Working independently	-0.26	0.67	-0.01
% psychosocial problems	-2.90	1.36	-0.03
Mean uncertainty	4.83	0.30	0.24**
Mean severity ¹	-0.35	0.33	-0.02
Mean level of education ¹	-0.83	0.33	-0.03*
<i>Interactions</i>			
Daily and overall workload	0.00	0.00	0.01
Daily workload with:			
- % privately insured	-0.10	0.05	-0.09*
- working in single-handed practice	0.01	0.02	0.01
- working independently	-0.01	0.02	-0.00
- % psychosocial problems	-0.11	0.11	-0.01
- mean uncertainty	0.03	0.03	0.01
- mean severity ¹	0.01	0.02	0.01
- mean level of education ¹	-0.01	0.03	-0.00
Overall workload with:			
- % privately insured	0.09	0.12	0.04
- working in single-handed practice	0.04	0.09	0.02
- working independently	0.23	0.13	0.06
- % psychosocial problems	-0.24	0.23	-0.01
- mean uncertainty	0.01	0.07	0.00
- mean severity ¹	-0.01	0.06	-0.00
- mean level of education ¹	-0.12	0.07	-0.02

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Appendix 1 shows that daily workload was an important variable in the equation compared to the other variables. Only the GP's uncertainty of the diagnosis had a larger standardized regression coefficient. Furthermore, the results indicate that characteristics of the presented health problems were relevant determinants.

Wait and see

As is shown in Table 6.10d, in general the decision to 'wait and see' was not influenced

by either aspect of workload. This means that the relation between overall workload and the decision to 'wait and see', which was shown in Table 6.9, disappeared when other variables were taken into account. Only in combination with a lower degree of severity of the presented health problems was daily workload positively related to the decision to 'wait and see'. This was predicted in hypothesis 13: less severe health problems increase the decision room of GPs and therefore workload can play a role.

Table 6.10d Results of multilevel analysis on the percentage of 'wait and see' per working day

	B	SE B	Beta
<i>Main effects</i>			
Daily workload	0.03	0.03	0.04
Overall workload	-0.16	0.12	-0.10
% privately insured	-0.13	0.56	-0.00
Working in single-handed practice	-0.53	0.71	-0.04
Working independently	-0.81	1.04	-0.04
% psychosocial problems	1.12	1.32	0.01
Mean uncertainty	1.38	0.30	0.06**
Mean severity ¹	0.99	0.35	0.05**
Mean level of education ¹	0.19	0.32	0.01
<i>Interactions</i>			
Daily and overall workload	0.00	0.00	0.00
Daily workload with:			
- % privately insured	0.05	0.05	0.04
- working in single-handed practice	-0.01	0.02	-0.01
- working independently	-0.02	0.02	-0.01
- % psychosocial problems	-0.04	0.11	-0.00
- mean uncertainty	-0.03	0.02	-0.01
- mean severity ¹ 0.04	0.02	0.02*	
- mean level of education ¹	-0.02	0.03	-0.01
Overall workload with:			
- % privately insured	0.02	0.12	0.05
- working in single-handed practice	0.14	0.14	0.06
- working independently	0.03	0.19	0.01
- % psychosocial problems	0.02	0.22	0.00
- mean uncertainty	0.11	0.07	0.02
- mean severity ¹	-0.00	0.07	-0.00
- mean level of education ¹	-0.02	0.07	-0.00

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Appendix 1 shows that mainly characteristics of the health problems and the patients

determined the decision to 'wait and see' how the complaints develop. This decision was more likely to occur in relation to new problems, acute health problems and older patients. Furthermore, female GPs more often decided to 'wait and see' compared to their male colleagues.

Counselling and advice

In general, there was no significant relation between workload and counselling or giving advice (see Table 6.10e). Only under the condition that higher percentage of psychosocial problems was presented did daily workload lead to less counselling and advice in the consultations. This was expected because the decision room of a GP is larger when psychosocial problems are presented and therefore non-medical aspects such as workload can be involved in the GPs' decisions (see hypothesis 13).

Table 6.10e Results of multilevel analysis on percentage of counselling and advice per working day

	B	SE B	Beta
<i>Main effects</i>			
Daily workload	-0.03	0.02	-0.01
Overall workload	-0.45	0.52	-0.08
Working in single-handed practice	-1.78	4.12	-0.03
% psychosocial	38.07	2.76	0.10**
Mean uncertainty	0.17	0.63	0.00
Mean severity ¹	1.11	0.77	0.01
Mean level of education ¹	1.39	0.66	0.01
<i>Interactions</i>			
Daily and overall workload	0.01	0.00	0.01
Daily workload with:			
- working in single-handed practice	-0.05	0.03	-0.01
- % psychosocial problems	-0.47	0.22	-0.01*
- mean uncertainty	-0.02	0.05	-0.00
- mean severity ¹	0.01	0.04	0.00
- mean level of education ¹	0.03	0.06	0.00
Overall workload with:			
- working in single-handed practice	1.25	0.81	0.13
- % psychosocial problems	0.12	0.46	0.00
- mean uncertainty	-0.00	0.14	-0.00
- mean severity ¹	-0.22	0.15	-0.02
- mean level of education ¹	-0.15	0.14	-0.01

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

The complete multilevel analysis (in Appendix 1) shows that the amount of counselling and advice was related to the type of health problem and the age of the patient. Furthermore older GPs reported less of these activities. It is, however, not clear whether this means that they did less counselling or registered these activities less often (see Section 6.6).

Technical medical interventions

According to the results presented in Table 6.10f overall workload contributed significantly to the explanation of the percentage of technical medical interventions. A higher overall workload meant, in general, that fewer of these kinds of interventions were performed. This result is in line with the expectation in hypothesis 11. However, contrary to our expectation in hypothesis 13, the negative relation between overall workload and technical medical interventions was less strong when the uncertainty of the diagnoses was greater according to the GP.

Table 6.10f Results of multilevel analysis on percentage of technical medical interventions per working day

	B	SE B	Beta
Daily workload	0.01	0.01	0.01
Overall workload	-0.21	0.08	-0.12**
Working in single-handed practice	1.17	0.61	0.07
% psychosocial problems	-6.56	1.58	-0.06**
Mean uncertainty	-3.13	0.35	-0.13*
Mean severity ¹	-0.10	0.40	-0.00
Mean level of education ¹	-0.26	0.38	-0.01
<i>Interactions</i>			
Daily and overall workload	-0.00	0.00	-0.01
Daily workload with:			
- working in single-handed practice	0.01	0.02	0.01
- % psychosocial problems	-0.08	0.13	-0.01
- mean uncertainty	0.03	0.03	0.01
- mean severity ¹	-0.01	0.02	-0.00
- mean level of education ¹	-0.04	0.03	-0.01
Overall workload with:			
- working in single-handed practice	0.01	0.12	0.00
- % psychosocial problems	0.04	0.26	0.00
- mean uncertainty	0.17	0.08	0.03*
- mean severity ¹	0.09	0.08	0.02
- mean level of education ¹	-0.03	0.08	-0.00

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

In Appendix 1, it is shown that the degree of urbanization of the place where the practice was situated was an important factor explaining the percentage of technical medical interventions by a GP. They were less related to the type of health problems presented. However, logically, they were less performed when more psychosocial problems were presented. The uncertainty of the diagnoses, according to the GP, was also important.

Prescription of drugs

As expected in hypothesis 11, there was a relatively strong main effect of overall workload on the percentage of prescription of drugs on different working days (see Table 6.10g). GPs with a busy practice were more likely to prescribe drugs than GPs with less busy practices. The strength of this relation did not change under any of the conditions: the interactions had no significant coefficients in the multilevel equation. Surprisingly, daily workload had no effect.

Table 6.10g Results of multilevel analysis on percentage of prescription of drugs per working day

	B	SE B	Beta
<i>Main effects</i>			
Daily workload	0.01	0.02	0.00
Overall workload	0.45	0.16	0.15**
Working in single-handed practice	2.61	1.23	0.09*
% psychosocial problems	4.70	2.66	0.02
Mean uncertainty	-3.65	0.60	-0.08**
Mean severity ¹	0.33	0.69	0.01
Mean level of education ¹	0.38	0.64	0.01
<i>Interactions</i>			
Daily and overall workload	0.00	0.00	0.00
Daily workload with:			
- working in single-handed practice	-0.02	0.03	-0.01
- % psychosocial problems	0.19	0.21	0.01
- mean uncertainty	0.08	0.05	0.02
- mean severity ¹	-0.05	0.04	-0.01
- mean level of education ¹	-0.02	0.06	-0.00
Overall workload with:			
- working in single-handed practice	-0.08	0.24	-0.02
- % psychosocial problems	0.43	0.44	0.01
- mean uncertainty	-0.14	0.13	-0.01
- mean severity ¹	-0.03	0.14	-0.00
- mean level of education ¹	-0.01	0.14	-0.00

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Again, the analysis shows that the health problems presented in the consultations determined mainly whether medication was prescribed (see Appendix 1). Furthermore, gender and type of insurance of the patient were relevant. The only GP characteristic with a significant coefficient was the type of practice: GPs working in single-handed practices reported higher prescription rates in comparison with GPs in partnerships.

Referral to specialist care

Although the introduction of workload variables and the interactions did not lead to a significant reduction of the variance, one of the theoretical expectations was confirmed in the results (see Table 6.10h). In general, GPs' workload did not lead to higher referral rates. Only when the average educational level of the patients consulting was lower on a working day did overall workload had a positive relation to referrals to specialist care. This finding is in line with the expectation formulated in hypothesis 13 and is explained by the assumption that the decision room of GPs is larger for lower-educated patients than for higher-educated patients.

Table 6.10h Results of multilevel analysis on the percentage of referrals to specialist care per working day

	B	SE B	Beta
<i>Main effects</i>			
Daily workload	-0.01	0.01	-0.01
Overall workload	-0.07	0.08	-0.06
% publicly insured	0.13	0.48	0.00
Working in single-handed practice	0.29	0.33	0.03
Fixed salary	0.78	0.49	0.05
% psychosocial problems	-3.57	1.15	-0.05**
Mean uncertainty	2.67	0.25	0.16**
Mean severity ¹	1.14	0.27	0.07**
Mean level of education ¹	0.56	0.28	0.03
<i>Interactions</i>			
Daily and overall workload	0.00	0.00	0.00
Overall workload with:			
- % publicly insured	0.12	0.10	0.07
- working in single-handed practice	-0.01	0.07	-0.01
- fixed salary	0.00	0.09	0.00
- % psychosocial problems	0.14	0.19	0.01
- mean uncertainty	-0.05	0.06	-0.01
- mean severity ¹	-0.04	0.05	-0.01
- mean level of education ¹	0.16	0.06	0.04**

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

It was already concluded that our model explained only a very small part of the variation in referral rates. Characteristics of the health problem were the most important determinants in the multilevel equation (see Appendix 1). The positive influence of the GP's age was the only significant effect of the GP- and practice-characteristics.

Referrals to primary care

Table 6.10i shows that GPs in busy practices had higher referral rates to primary health care workers, mainly physiotherapists, than GPs in less busy practices. This was also expected in hypothesis 12. The standardized coefficient was one of the largest in the equation. The interactions indicate that the strength of this positive relation was also influenced by the level of uncertainty of the diagnosis and the type of insurance of the patients.

In accordance with hypothesis 13, the positive relation between overall workload and referral rates was stronger when the GPs were more uncertain about the diagnoses in the consultations during a working day. This is related to the assumption that the decision room of GPs is larger and therefore workload might become relevant for the decision to refer a patient.

The positive relation was less strong on working days when the percentage of publicly insured patients was higher. This finding is not in line with the expectation in hypothesis 14. We expected that GPs are more likely to refer patients to other primary health care providers as a reaction to high overall workload when more publicly insured patients consult because of the different capitation system.

Table 6.10i Results of multilevel analysis on the percentage of referrals to primary care per working day

	B	SE B	Beta
<i>Main effects</i>			
Daily workload	-0.01	0.01	-0.01
Overall workload	0.12	0.06	0.12*
% publicly insured	0.40	0.40	0.01
Working in single-handed practice	-0.76	0.24	-0.08**
fixed salary	0.39	0.35	0.03
% psychosocial problems	-1.03	0.96	-0.02
Mean uncertainty	0.48	0.21	0.04*
Mean severity ¹	-0.98	0.22	-0.08**
Mean level of education ¹	-0.94	0.23	-0.06
<i>Interactions</i>			
Daily and overall workload	0.00	0.00	0.01
Overall workload with:			
- % publicly insured	-0.19	0.09	-0.14*
- working in single-handed practice	0.01	0.05	0.01
- fixed salary	0.06	0.07	0.02
- % psychosocial problems	0.04	0.16	0.00
- mean uncertainty	0.08	0.04	0.03*
- mean severity ¹	-0.00	0.04	-0.00
- mean level of education ¹	0.01	0.05	0.00

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

In Appendix 1, the complete results of the multilevel analysis are presented. As for most of the aspects of the content of care, characteristics of the health problem (severity, chronic diseases, uncertainty) had a relevant influence on the referral rates to primary health care. Age and gender of the patient also played a significant role. Type of practice and the degree of urbanization of the place where the practice was situated were also relevant. No effects were found of other GP-characteristics.

Follow-up appointments

According to hypothesis 12, it is expected that a higher daily workload will increase the chance of a follow-up appointment. An opposite effect is expected for a higher overall workload. The results in Table 6.10j do not support this idea. Neither aspect of workload had a significant main effect in the multilevel equation. Only under the condition of a

higher level of uncertainty of the diagnosis was higher daily workload positively related to the number of follow-up appointments. Again, the decision room of GPs seems to be important.

Table 6.10j Results of multilevel analysis on the percentage of follow-up appointments per working day

	B	SE B	Beta
<i>Main effects</i>			
Daily workload	0.01	0.06	0.01
Overall workload	-0.20	0.24	-0.06
% privately insured	1.07	1.02	0.01
Working in single-handed practice	0.77	1.44	0.03
Working independently	-0.63	2.12	-0.01
% psychosocial problems	-7.59	2.38	-0.04**
Mean uncertainty	-1.17	0.54	-0.03*
Mean severity ¹	-2.73	0.64	-0.07**
Mean level of education ¹	0.83	0.57	0.02
<i>Interactions</i>			
Daily and overall workload	0.00	0.00	0.01
Daily workload with:			
- % privately insured	0.05	0.09	0.02
- working in single-handed practice	-0.02	0.03	-0.01
- working independently	0.05	0.04	0.01
- % psychosocial problems	-0.12	0.19	-0.01
- mean uncertainty	0.10	0.04	0.02*
- mean severity ¹	0.07	0.04	0.01
- mean level of education ¹	-0.04	0.05	-0.01
Overall workload with:			
- % privately insured	-0.07	0.22	-0.02
- working in single-handed practice	0.07	0.22	0.02
- working independently	0.29	0.40	0.03
- % psychosocial problems	-0.45	0.39	-0.01
- mean uncertainty	0.02	0.12	0.00
- mean severity ¹	0.15	0.13	0.02
- mean level of education ¹	0.06	0.12	0.01

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

In general, the number of follow-up appointments during a working day was mainly determined by characteristics of the health problems presented during that day and characteristics of the patients. GP- and practice-characteristics were less important (see Appendix 1).

In conclusion, the influence of the two aspects of workload on the content of care in general practice was limited. A higher overall workload corresponded to fewer technical medical interventions, more prescription of drugs and more referrals to other primary health care providers. In the case of daily workload only a general negative relation with out-of-office test ordering was found. The strength of these general relations was often influenced by specific circumstances. Moreover the other aspects of the content of care were influenced by workload only under very specific conditions. They were often related to the decision room of the GP: when GPs have more freedom of choice, workload becomes a more important factor than in a situation where the GP has less freedom to choose between alternatives. When these special conditions are taken into account, daily workload was also related to physical examinations, out-of-office diagnostics, the decision to wait and see how complaints develop, counselling and advice, and follow-up appointments. Overall workload was also associated with referrals to a specialist. The next table summarizes these findings.

Table 6.11 Summary of the findings on the relation between workload and the content of care

A higher **daily workload** was related to:

- fewer out-of-office diagnostics: in general
stronger negative relation when more privately insured patients consulted
- less physical examination: only in combination with a higher percentage of psychosocial problems presented
- less counselling: only in combination with a higher percentage of psychosocial problems presented
- more wait and see: only in combination with a lower severity of health problems presented
- more follow-up appointments: only in combination with a higher level of uncertainty of the diagnoses

A higher **overall workload** was related to:

- fewer technical medical interventions: in general
stronger negative relation when the GP was more certain of the diagnosis
 - more prescription of drugs: in general
 - more referrals to specialist only in combination with a lower educational level of patients
 - more referrals to primary care: in general
stronger positive relation when more privately insured patients consulted
stronger positive relation when the GP was less certain of the diagnoses
-

6.6 Summary and discussion

In this chapter the hypotheses on the relation between two aspects of workload, daily and overall workload, on the one hand and length and content of office consultations of GPs on the other were translated into empirical expectations that were tested by means of multilevel analyses.

A first important conclusion that can be drawn from the results is that the care provided by GPs is not constant over working days. The intraclass correlations indicate that, in most cases, the variation between working days is higher than the variation between GPs. One important exception is counselling. For this aspect of the content of care, the variation is mainly situated at the GP-level. It is, however, not clear whether these differences between GPs are due to working style (that means that certain GPs counsel more in their consultations than other GPs) or that they are caused by differences in registration behaviour. Counselling includes giving information on the disease or treatment, talking, reassuring, and advising; activities that are so common in a consultation that maybe some GPs do not recognize them as separate activities and have not registered them on the form. In a study among physiotherapists, it was shown that these kinds of activities are less recorded in a self-registration than when the activities in the same consultations were scored by independent observers (Sluijs, 1991). Van den Brink-Muinen (1996) also mentioned that self-registration of these kinds of activities leads to different results than independent observations.

The finding that the treatment given by GPs varies between working days indicates that the specific circumstances under which the treatment is given play an important role. We have seen that, in most cases, treatment is mainly determined by characteristics of the patients and the health problem they presented. Not only the type of health problem⁴ is relevant but also whether the complaints were presented to the GP for the first time, the GP's perception of the severity of the problems and his uncertainty of the diagnosis. The role of GP- and practice-characteristics is, in general, limited. This result concurs with for instance Flierman (1991), Uunk et al. (1992) and Kristiansen & Mooney (1993), who also concluded that GP-characteristics and structural features are less relevant to an

⁴ In this research, a distinction was made between four categories: acute, chronic, psychosocial and other.

explanation of GPs' professional behaviour than situational aspects at the moment a decision is made. It should be pointed out that a large part of the variation of the activities of the GPs could not be explained by the variables in the multilevel models. However, the purpose of our research was not to explain differences in the treatments of GPs, but to analyse their relation to workload.

What do our results tell us about our hypotheses? In hypothesis 8 it was stated that GPs' workload is negatively related to the length of consultations. This hypothesis is supported: busy doctors have shorter consultations and consultations are shorter on busy days. Both aspects of workload, daily and overall workload, have independent effects, although the overall workload has the highest impact. In Chapter 1, it was concluded that earlier studies report ambiguous results with regard to the relation between workload and the length of consultations. According to our findings this cannot be explained by the use of different workload concepts. Furthermore, our analyses indicate special conditions that influence the strength of this negative relation. An interesting result is that in partnerships GPs are more likely to reduce the length of consultations in reaction to both high daily and overall workload than GPs working in single-handed practices. In hypothesis 9, this is explained by the assumption that GPs in partnerships are less dependent on their patients as a source of social approval. Therefore, the possible dissatisfaction of patients, because they feel that the GP has spent not enough time on them, will have a lesser impact on GPs in partnerships. An alternative explanation might be that consultations in partnership are, in general, longer than consultations in single-handed practices and therefore it might be easier to reduce them a little without affecting the appropriateness of care. In our analysis, however, the main effect of working in a partnership was not statistically significant. In hypothesis 9, it was also stated that the type of patients' insurance will influence the strength of the relation between workload and length of consultations, but our findings did not support this idea. It is possible that the theoretical differences between privately and publicly insured patients are not recognized by GPs in their day work. Nowadays their appointment systems do not take into account the payment status of the patients: GPs have no exclusive appointment times for privately and publicly insured patients. This situation has gradually developed: there is anecdotal evidence that GPs started to introduce appointment systems (in the 1960s) for their

privately insured patients to avoid them from waiting in an overcrowded waiting room with the risk that they would consult another doctor the next time. In a situation where GPs have a mixture of patients with a different payment system, but where the appointment system does not differentiate, the possibilities to allocate time according to the type of remuneration are restricted.

Hypothesis 10 is focused on the decision room of the GP: when the patient or the health problem presented gives the GP more freedom to decide what he will do, workload can play an important role in this decision. Our results indicate that this is indeed important. Daily workload has a stronger negative impact on the length of consultations when more psychosocial problems are presented. The negative relation between overall workload and the length of consultations is stronger when the GP's perception of the severity of the health problem is lower on a working day. Both findings are in line with the expectations. Generally, more uncertain diagnoses mean longer consultations on a working day and, in combination with a high overall workload, this effect is even stronger. This is not what we expected. We had the idea that less severe problems give the GP more decision room and therefore workload will lead to shorter consultations. But, it seems that the GPs use this decision room to increase the length of consultation when they have a high overall workload. This might be explained by the assumption that busy GPs are less likely to postpone workload to the future and want to reduce the chance of a return visit by a patient. Maybe, in this respect, spending some extra time in a specific consultation to clarify the health problem presented can save time in the near future. Another explanation might be that GPs are less certain about the diagnoses on busy working days, e.g. because of feelings of stress. As a consequence, they take more time for a consultation to reduce the chance of mistakes. The last interaction to be discussed is that between overall workload and the educational level of the patient. The negative relation between overall workload and length of consultations is less strong when the average educational level of the patients is lower on a working day. This is in contrast with our expectations. We assumed that GPs have more decision room when low-educated people consult and therefore workload is expected to have a stronger negative relation.

In sum, we can say that, as stated in hypothesis 10, the decision room of the GP needs to be taken into account when the relation between workload and the length of consultations is studied.

Hypotheses 11 and 12 concern the relations between the two aspects of workload and the ten aspects of the content of care. It is difficult to translate these hypotheses into empirical expectations because it is difficult to assess the amount of time that is required for these activities in a particular consultation and the time consumption in the near future (that is whether they increase the chance of a return visit). Available research results are not specific enough and there might be large differences between GPs in this respect because a doctor's personal speed will be determined by his knowledge, skills and experience. Therefore, we formulated our own assumptions, which can be subject to debate. This might be a reason why several hypotheses could not be confirmed because no significant or the opposite relation is found. Therefore, more detailed research is required on the allocation of time within a consultation.

In contrast to hypothesis 11, daily workload is not related to the direct time consumption of the interventions in a consultation. With regard to overall workload, two of the four expected empirical relations are supported in the multilevel analyses. In general, busy GPs are less likely to perform technical medical interventions like minor surgery and injections themselves and have higher prescription rates. This findings concur with results of other studies, which also reported a positive relation between workload and prescription rates (for instance Hartzema & Christensen, 1983; Bradley, 1992; McGavock et al., 1993; Davidson et al., 1994). In an American study, it was concluded that GPs with a high workload do fewer clinical procedures (Camasso et al., 1994). The same study did not show that more productive physicians are more likely to end a consultation with a prescription. However, physicians' production was measured as the number of patients seen per hour. This is probably more related to our daily workload score and, in this way, this finding is in line with our results.

Hypothesis 12 points to the time consumption in the near future. It is assumed that some interventions clearly differ in this respect. Interventions that increase the chance of a return visit, such as out-of-office diagnostics, 'wait and see', and making follow-up appointments are expected to be more frequently chosen on busy working days. It is a way to postpone work. However, we found only a negative relation between daily workload and the percentage of out-of-office diagnostics, which is in contrary to our expectations. The idea that GPs who are always busy are less likely to postpone is also not supported by our findings. In fact, there is no general tendency in general practice

that high workload is coped with by postponing work. Furthermore, according to hypothesis 12, GPs with busy practices are more likely to refer their patients. This does indeed hold true for referrals to other primary health care providers such as physiotherapists, but not for referrals to specialists. This difference might be related to the assumption that these two kinds of referrals have different consequences for the GP. When he refers the patient to primary health care providers, the GP will remain the treating physician and therefore medically responsible for the patient. After a referral to specialist care the GP will have less influence on the care provided to the patient: the specialist takes over treatment for a considerable part (Kersten, 1991). Furthermore, as explained earlier, GPs have an interest in avoiding unnecessary referrals because these can affect social approval. Maybe social approval from specialists is more relevant, in this respect, than from primary health care providers and, as a consequence, the influence of workload is more important in the decision to refer a patient to other primary health care providers. In hypothesis 13 the impact of the decision room of a GP is discussed. When a GP has more freedom in a consultation, that means that the appropriate treatment is less medically determined, workload can have a stronger influence. This hypothesis results in a large number of empirical expectations. Only a few of them are supported in the multilevel models. The strength of daily workload with four aspects of the content of care is determined by conditions that give the GP more freedom to act. Only in combination with a higher percentage of psychosocial problems presented on a working day does daily workload decrease the number of physical examinations and amount of counselling undertaken by a GP in the consultations. Cormack & Howells (1992) mentioned that GPs with a high workload are less likely to counsel and talk when psychosocial problems are presented and are more likely to prescribe benzodiazepines. We have not found that the relation between workload and the prescription of drugs is stronger when more psychosocial problems are presented. However, we took into account only whether a drug was prescribed in a consultation and not which drug. Maybe if we look at benzodiazepines separately, an effect of workload would be established. Furthermore, daily workload leads to more 'wait and see' only in combination with a lower average level of the severity of the presented health problems. When the GPs regards the health problems as less severe, the decision room is larger and therefore daily workload can be a part of the consideration wait and see how the complaint develops. We also found that the general

idea that more follow-up appointments are made on busy working days holds true only in combination with a higher level of uncertainty of the diagnosis. This condition means more decision room for a GP, which makes it more likely that workload is taken into account by the GP.

The relation between overall workload and three aspects of care is influenced by more decision room for a GP. Two are in line with our expectations. Referral rates to specialist care are positively influenced by overall workload only in combination with a lower average educational level of the patients on a working day. Furthermore, it is shown that the general negative relation between overall workload and referral rates to primary care is stronger when the average uncertainty of the diagnosis is higher. Finally, we found that the general negative relation between overall workload and technical medical interventions is less strong in combination with a higher level of uncertainty. This is not as expected: the greater decision room works in the opposite direction to that expected.

In hypothesis 14, we assume that GPs' reaction to a high workload, in terms of the content of care, is conditioned by the consequences of this choice for the income and/or social approval of the GP. Differences are expected between GPs working in partnership and those in single-handed practices, between GPs with a fixed salary and those working independently, and when a higher percentage of privately insured patients consult the GP. Only with regard to the last condition are significant effects on the strength of the relation between workload and two aspects of the content of care found. We expected that GPs are more likely to cope with a high daily workload by ordering diagnostic tests outside the practice, when a higher percentage of privately insured patient consult them. Out-of-office diagnostics are more time-consuming in the near future because patients have to contact the practice to hear the test results. Privately insured patients pay for this extra consultation separately, while for the publicly insured patients it is part of their capitation fee. However, we found that, in general, on busy days, fewer diagnostic tests are ordered and that this negative effect is even stronger when more privately insured patient consult the practice. It might be possible that this negative effect is compensated by the choice of other interventions, for instance more practice-based diagnostics or more referrals for privately insured patients, but our analyses do not support this idea. An alternative explanation is that GPs are reserved to initiate return visits for privately insured patients because of the related costs or maybe these patients themselves tell the GP that they only

will return when it is really needed. Furthermore, we saw that the general negative relation between overall workload and referrals to primary care is weaker when a larger number of publicly insured patients consult the GP. We expected the opposite because of the capitation fee of publicly insured patients. It is, however, possible that this contrary finding is related to the type of remuneration. As explained, after a referral to another primary care provider GPs are still medically responsible for the treatment. This means that they are still in control and can ask the patient for a return visit to evaluate for instance the treatment. When GPs refer a privately insured patient to a specialist they lose, at least to some extent, control because the medical responsibility is taken over by the specialist. The chance of a return visit is less in this case. To put it more generally, a referral to another primary care provider is a smaller threat to the income of a GP than a referral to a specialist.

Finally, we want to discuss some methodological limitations of our analyses. Firstly, because of practical reasons, we were only able to study the expected relations at the level of working days. This might not be specific enough to measure the exact influence of workload as a situational characteristic in the definition of a crowded waiting room. The daily workload is determined afterwards and it is not certain whether the GP is aware of the total workload on a working day, when the decisions in the consultations are made. Furthermore, this aggregation of consultation-characteristics to the level of the working day can cause difficulties in the interpretation. An effect at an aggregated level can differ in meaning from the effect on the level of the consultations. Secondly, it is important to mention that we investigated only whether a particular intervention is recorded by the GP. We did not take into account the quality and how much time is spent on an activity. Thirdly, the interventions were regarded as independent choices, but they can be related. Finally, the categorization of the interventions in ten groups might influence the results. Therefore, we also looked at the separate of some categories but this did not change our findings.

With these limitations in mind, the policy gradually to lower the average list size in the Netherlands, which was approximately 2,350 at the time of the data collection, still seems worthwhile. List size is related to the overall workload. Our results show that, although both aspects of workload independently reduce the length of consultations in general

practice, the overall workload of GPs is a more important factor for explaining the differences than the daily workload. This, in general, also holds true for the content of care. The idea that GPs will postpone work to the future when confronted with a busy day is not confirmed. GPs with a busy practice, which is related to a larger list size, have developed coping styles that they use on both busy and quiet days. They do fewer technical interventions, prescribe drugs more often, and are more likely to refer patients to primary care.

THE RELATION BETWEEN WORKLOAD AND QUALITY OF CARE IN GENERAL PRACTICE

7.1 Introduction

In the previous chapters, it was shown that workload of general practitioners is related to the way they allocate their time and to some aspects of the treatment of their patients. High overall workload coincides with working more hours in direct patient care, spending less time on continuing medical education and having shorter consultations. In general, GPs with a higher overall workload have higher prescription rates, perform fewer technical medical interventions and refer more often to another primary care provider, mainly physiotherapists. Daily workload is only negatively related to the number of requests for out-of-office diagnostics. In this chapter the consequences of these choices for the quality of the care provided by GPs will be studied.

Since the 1980s, quality of GP care has become an important issue in many European countries (Grol et al., 1993). In the Netherlands too, policy makers, researchers and GPs have become aware of the important role of general practice in the health care system and the necessity to assure a high quality of care (Rutten & Thomas, 1993; van der Velden et al., 1993). Quality of care is a multi-dimensional concept and different definitions and measurements can be used. It can be seen from the perspectives of actors involved in health care (Donabedian, 1980; Øvretveit, 1992; Grol et al., 1993). The medical profession, in this study the GPs, will for instance be more likely to focus on effective or appropriate patient care and will evaluate whether their own professional criteria for good treatment are met. Policy makers and financiers of health care are more likely to define quality in terms of efficiency and cost-effectiveness. Patients are more concerned with accessibility (for instance waiting lists) and affective aspects of care, such as communication style, interpersonal skills and personal treatment (Williams & Calnan, 1991; Lewis, 1994; Baker, 1996). Although these perspectives are related to some extent, they can lead

to different judgements of the same situation. Winefield et al. (1995) for instance showed that patient and doctor satisfaction with specific consultations do not correspond. Substantial differences between the physician's and patient's perspective were also reported by Smith and Armstrong (1989), Bensing (1991), Batalden & Nelson (1991) and Waal et al. (1993). Following Grol et al. (1993), quality in general practice may be described as the relation between actual care and the expectations of the actors involved. This means that the measurement of the actual care provided by GPs plays an important role in the determination of quality (Lamberts, 1986; Grol et al., 1993).

Our research is focused on the professional perspective. Quality was operationalized in terms of the amount of deviation from professional criteria of appropriate care in the daily practice. Therefore, in this research, quality of care was considered to be lower when GPs deviated from the professional standards of care that were developed by the medical profession itself, in this case the Dutch College of General Practitioners (NHG).

Besides these different perspectives and expectations of the various actors, it is also important to determine which aspect of the quality of care will be studied. As mentioned in Chapter 1, Donabedian (1980) defined three aspects: structure, process and outcome. With regard to general practice, a distinction is made between quality of the practice-organization, the GP's affective behaviour and his technical medical behaviour (NRV, 1990; Rutten & Thomas, 1993). In this study only the latter aspect will be taken into account, which is part of the process in terms of Donabedian.

Different methods of measuring quality of care have been used in the research literature (see e.g. Rethans et al., 1996). A first distinction can be made between direct and indirect indicators for quality of care. Indirect indicators such as the number and types of prescriptions or referrals were used, assuming that higher prescribing or referral rates indicate a lower quality of care (see e.g. Mokkink, 1986). Judgements by other physicians or researchers were often used as direct measures: e.g. by inspection of written material, mostly medical records (see e.g. Chassin et al., 1986), by observation of audio- or video-registrations of consultations (see e.g. Bensing, 1991) or the use of standardized patients in the daily practice (see e.g. Rethans, 1992). These methods, however, have important restrictions in the light of this research on the relation between workload and quality of care. Indirect measures do not take into account whether the intervention was

appropriate in relation to the presented health problem. Direct methods are time-consuming and often limited to a rather small part of the daily work of the GPs, for instance a particular intervention or the treatment of a particular disease. In this study, a method was developed for assessing the appropriateness of medical care in general practice, using indicators derived from professional standards of care and the patient-linked information on morbidity and intervention recorded by the participating GPs in the Dutch national survey of general practice. This approach is comparable to the study by the RAND Corporation on geographic variations in the use of health care services (Chassin et al., 1986, 1987, 1989). In this study these variations were related to the appropriateness of the medical and surgical procedures. Indicators for appropriateness were developed by means of reviews of the medical literature and consensus meetings with panels of expert physicians. The information from medical records was related to the indicators to assess the appropriateness of the actual procedures by the physicians in different areas. The next section provides more detailed information on our method.

In Chapter 2, two hypotheses on the relation between workload and quality of care in general practice were formulated. The central assumption was that time is an important condition for providing appropriate care in general practice. A lack of time might influence the quality of care provided by GPs. Therefore, in general, a negative relation between workload and the quality of care was expected. Operationally this means that a positive relation was expected between workload and the percentage of deviations from the indicators derived from the professional standards of care.

There are several underlying mechanisms that can explain this relation. When GPs work longer hours, they might become tired and less concentrated, which might lead to less appropriate care. When GPs spend less time in continuing medical education, as do GPs with a high workload, this might affect their skills and knowledge, which can also lead to less appropriate care. The relation between the length of consultations and the quality of care has already been discussed in Chapter 1. Although conflicting results have been reported in the literature, there is some evidence that shorter consultations indicate a lower quality of care. Howie et al. (1989) even considered the rate between long and short consultations as a proxy for quality of care. In a recent publication of the Royal College of General Practitioners, it was concluded that length of consultations was

directly associated with quality of care in the United Kingdom (Howie et al., 1997). Quality was defined in terms of the ability of the GP to enable patients: that is patients' ability to understand and cope with their health problem. This outcome measure was completed by patients immediately after a consultation with their GP. Before this consultation, patients had to complete a health needs questionnaire. Longer consultations were strongly associated with higher enablement and shorter consultations with lower enablement. As explained in Chapter 6, time spent in a consultation was expected to be directly related to the content of care. In the next table, these expectations are summarized and translated into the variables used in the analyses of this chapter.

Table 7.1 Summary of hypotheses on the relation between GPs' workload and quality of care

	Theoretical statement	Expected empirical relations*
HYP15	In general, GPs' workload is negatively related to quality of care provided.	Positive regression coefficient of overall and daily workload on the percentage of deviations from indicators derived from professional standards of care.
HYP16	The negative relation between GPs' workload and quality of care is caused by spending more hours in direct patient care, less time in continuing medical education (CME), and shorter consultations.	<p>Positive regression coefficients on the percentage of deviations from the indicators during working days of:</p> <ul style="list-style-type: none"> - number of hours in direct patient care per week. <p>Negative regression coefficient on the percentage of deviations from indicators during working days of:</p> <ul style="list-style-type: none"> - number of hours spent on CME per week; - average length of consultations.

* Controlling for other important relevant GP- and practice-characteristics and case-mix variables.

7.2 Methods

Because we use the professional standards developed by the Dutch College of General Practitioners, this section starts with a brief description of how these standards were produced. Then we shall discuss how we have transformed them into the indicators for appropriate care that were used in this research. Finally, information will be given on the statistical method used to analyse the relation between workload and quality of care (the

number of deviations from these indicators).

Since 1989, the Dutch College of General Practitioners (NHG) has published standards of care introducing recommendations and guidelines for an appropriate treatment of common complaints and diseases in general practice (Rutten & Thomas, 1993). The aim of the College is to achieve widely accepted and practical guidelines based on most recent scientific insights. They can support the individual GP in his daily practice and can be used in quality assurance activities such as peer review and refresher courses (Tielens, 1989). The following procedure is followed to formulate these guidelines. Firstly, the College selects a topic for standard-development. This is mainly a specific health problem or diagnosis that is often seen or treated in general practice. A selected working group of experienced and expert GPs is formed that writes a first draft of the standard. This draft is sent to a sample of 50 'average' GPs for comment. Also, other experts in the specific field are consulted. Comments and recommendations are discussed by the working group, which produces a revised version. An independent scientific committee formally authorizes the guidelines. Finally, the standard is officially published in the journal of the college (*Huisarts en Wetenschap*).

A survey showed that a majority of the Dutch GPs, both members and non-members of the College, reacted positively to this procedure. They considered the College 'representative' and capable of formulating widely accepted standards of care in general practice (Grol, 1989). Figures from the Dutch national survey of general practice showed that the guidelines in the standards often reflected the actual treatment provided by most GPs in daily practice, before the standard was published (van der Velden et al., 1993).

As mentioned in Chapter 3, the data that were used in this research were collected in 1987-1988. Therefore, a set of indicators for the quality of care needed to be defined that could be used to assess the appropriateness of care in that period of time. An advisory committee of five representatives of the College was asked to guide this process. Furthermore, experts such as co-authors of a particular standard were asked for support and advice.

Firstly, 14 standards were selected from the standards that were published before 1993. It was assumed that these standards were relevant to the data of the registration period of

this study. It seems improper to relate the care of GPs in our research to standards published more than five years after the data collection. Furthermore, the following selection criteria were used:

- incidence and prevalence: the diagnosis or health problem discussed in the standard is commonly presented in general practice.
- type of complaint/disease: both chronic and acute conditions need to be included.
- availability of data: a sufficient number of cases and information on important guidelines need to be available in the data set.

Secondly, the 14 selected standards were screened for relevant indicators. Main guidelines were listed and transformed into dichotomous variables, indicating whether or not the GP worked in accordance with the guideline in the standard. The exact procedure and the decisions made by the advisory committee were described in an earlier report (van der Velden et al., 1993).

In this research, a selection of indicators (see Appendix 2) was used to assess the appropriateness of some decisions by GPs in their consultations. There were, however, several limitations that need to be discussed. Firstly, the selected standards represented about 20% of the surgery contacts handled by GPs during the three registration months. Other frequent reasons for encounter in general practice, such as psychosocial problems, gastric complaints, musculoskeletal problems (back, knees) and family planning (oral contraceptives), were not included. A second restriction was the limited number of indicators per standard that could be assessed in the data set. Sufficient information was available only for 2 to 6 guidelines per standard. Although it was often recorded whether an intervention was provided, there was no information on how exactly it was performed. For instance, GPs had registered counselling but the exact content of the counselling was unknown. Therefore, it was not possible to check whether this was done in line with the guidelines of the standard. Furthermore, it turned out to be difficult to weight the different indicators: for instance, is not making a follow-up appointment as important as prescribing the wrong drug from the point of view of quality of care? Finally, some members of the advisory committee had doubts whether standards published after the data collection could be used as strict indicators for the quality of care of the participating GPs. The latter problem was solved in two ways. Firstly, a group of 10 practising GPs was asked to identify indicators reflecting common views of best practice before the

standard was published on the one hand and new or 'revolutionary' indicators on the other. When the majority regarded an indicator as revolutionary, it was removed from further analysis. Secondly, we looked at the scores on the remaining indicators. When the percentage of deviations from the indicator was higher than 70%, the indicator was removed. After this procedure, a set of 33 indicators remained that could be used to judge the appropriateness of care recorded by the GPs in the Dutch national survey of general practice, in 1987-1988. These indicators covered 12 professional standards of care: type II diabetes mellitus (NIDDM), sprained ankle, urinary tract infection, acute otitis media, acute sore throat, peripheral arterial vascular disease, acne vulgaris, hypertension, migraine, cholesterol, asthma in children, and asthma/COPD in adults (treatment)¹.

To calculate the percentage of deviations from the indicators, it was necessary first to identify the consultations in which each indicator could be applied. Firstly, the relevant diseases, diagnoses and health problems were defined. For this reason, the definitions and restrictions mentioned in the standards needed to be operationalized in terms of the variables available in the data set. A main point was the translation of the diseases or health problems into the relevant ICPC-codes². This was done by members of the advisory committee, often together with one of the authors of the standard itself³. Secondly, several indicators required a further selection of relevant consultations. As a consequence, the number of selected consultations could differ between the indicators of the same standard. For instance, for the two indicators in relation to hypertension, two different selections were made: the indicator for pharmaceutical therapy could be applied only in new episodes of illness⁴ and when a prescription was recorded, whereas the indicator for follow-up appointment was relevant to each consultation for hypertension. In Appendix 2 an extended description is given of the indicators used in this research and the

¹ This means that no measurable indicators could be used in this research for two standards: mammography and asthma or COPD in adults (diagnosis).

² As mentioned in Chapter 3, complaints and diagnoses in the national survey of general practice were coded by the International Classification For Primary Care.

³ In certain cases, it was necessary that they checked personally whether the standard could be applied.

⁴ A new episode of illness means that the illness or health problem has been recognized for the first time in the registration period.

selection of the relevant consultations. Furthermore, the percentage of deviations from each indicator and relevant literature are presented in this appendix.

The set of 33 indicators could be divided into four main dimensions of the work of GPs, namely diagnostics, prescription of drugs, referrals and follow-up appointments. It is possible that the relation with workload might differ between these four dimensions. Therefore, five deviation percentages were taken into account in the analyses: one including all indicators (overall), one including the 4 indicators related to diagnostics, one including the 18 indicators related to prescription of drugs, one for the 3 indicators related to referral, and one including the 8 indicators related to follow-up appointments.

To analyse the relations between GPs' workload and aspects of the allocation of time on the one hand and quality of care on the other, the percentage of deviations from the indicators was calculated per GP as well as per working day. Because information obtained from the diaries (hours spent on direct patient care and on continuing medical education) was included in the analyses, only the 149 GPs who completed this diary were selected⁵. At least one indicator could be measured on 6972 working days. The subsets of indicators on diagnostics could be measured on 3250 working days, indicators on prescription on 4522, indicators on referrals on 2861, and indicators on follow-up appointments on 6535 working days.

As in Chapter 6, multilevel analyses are performed to analyse simultaneously the influence of overall and daily workload on the percentage of deviations per working day. In these analyses we need to control for the variation in indicator-mix between working days: in other words, we have to take into account that a GP might be confronted with different health problems on a working day and that this can affect the score. For the same reason, differences in the kinds of dimensions, diagnostics, prescription of drugs, referral or follow-up are included in the analyses when all indicators are taken together (overall score).

The number of observations was relatively low per working day and differed greatly between days. Besides, as can be seen in Appendix 2, the overall percentage of deviations

⁵ This was the same group as in Chapter 4.

varied between the indicators. This means that a distinction could be made between 'easy' or 'difficult' indicators or, in other words, between indicators that more or less reflect common practice in 1987/1988. Especially because of the low number of observations per working day, we needed to control for this. For this reasons, heteroscedastic regression analyses were performed (Goldstein, 1995)⁶. Also, two GP- and practice-characteristics that were expected to be related to the percentage of deviations, namely the type of practice (single-handed versus partnerships) and GP's age, were part of the models.

The multilevel analyses consisted of two steps. In the first step all controlling variables and both aspects of workload were introduced as explanatory variables. In the second step the three aspects of the allocation of time of the GP were added: two GP-characteristics (time spent on direct patient care and time spent on CME) and one characteristic of the working day (the average length of consultations). This procedure firstly showed whether workload was related to the percentage of deviations (hypothesis 15) and whether this relation was caused by aspects of the allocation of time (hypothesis 16).

Because controlling variables had to be included in the random part of the equations, it was not possible to calculate intraclass correlations to divide the total variance between the two levels of analysis.

7.3 Deviations from indicators for appropriate care: differences between GPs

In this section, differences between GPs are discussed in the percentage of deviations from the indicators for appropriate care. Table 7.2 shows the mean percentage of deviations and the amount of variation between GPs in this respect.

⁶ This means that the following uncorrelated random effects were included at the first level: constant, $\sqrt{n1/N}$, $\sqrt{n2/N}$ and $\sqrt{n3/N}$ ($n1$ = number of times indicators with low variation (0-10%) were scored on working days; $n2$ = number of times indicators with medium variation (10-25%), $n3$ = number of times indicators with high variation (> 25%), and N = total number of times indicators were scored on this working days. In one of the subsets the number of indicators was small and two groups instead of three were used: those with low (<15%) and high (>15%) variation.

Table 7.2 Percentage of deviations from indicators for appropriate care by GPs: descriptive statistics (N=149)

	Mean	Sd	Range
Overall	25.6	8.3	7.5 - 53.3
Indicators concerning:			
diagnostics	34.8	21.0	0.0 - 85.0
prescription	24.9	12.1	0.0 - 71.4
referral	28.6	13.4	0.0 - 66.7
follow-up appointment	29.4	13.3	5.2 - 65.6

As explained in the previous section, we have to be careful in interpreting these raw results. The number of observations differed between the GPs, and this could affect their scores. This is especially true of those subsets of indicators that could be measured in a limited number of cases, namely those concerning diagnostics and referrals. For the three other measures, this seems to be less problematic⁷. On average, GPs deviated in one out of four cases from the indicators for appropriate care. The range indicates that there are large differences between the GPs: the GP with the lowest score treated his patients in more than 90% of the cases according to the relevant indicator, while the GP with the highest deviation score did this in half of the cases.

On average, the highest percentage of deviations from the indicators was found in the use of diagnostic tests; the lowest percentage of deviations occurred in the field of the prescription of drugs. In each subset of indicators there were large differences between GPs.

7.4 Workload, allocation of time and deviations from indicators for appropriate care

For a first impression of the relations between GPs' workload and allocation of time on the one hand and the percentage of deviations on the other, Pearson's correlation coefficients were calculated at the level of GPs (see Table 7.3).

⁷ Ranges of the number of observations per GP: overall (39-515); diagnostics (3-77); prescription (6-151); referral (2-83); follow-up appointment (27-315).

Table 7.3

Pearson's correlations between GPs' workload and aspects of the allocation of time on the one hand and the percentage of deviations from indicators for appropriate care on the other

	Overall	Percentage of deviations			
		Diagnostics	Prescription	Referral	Follow-up
Overall workload	0.16	0.11	0.13	0.00	0.07
Time in direct patient care	0.25**	0.15	0.26**	-0.07	0.06
Time in CME	-0.11	0.02	-0.15	-0.10	-0.08
Mean length of consultations	-0.05	-0.04	-0.10	0.13	-0.01

Significance: * $p < 0.05$; ** $p < 0.01$

Only two statistically significant correlations were found. GPs who spent more time in direct patient care per week were more likely to deviate from the indicators in general, and especially in the subset of indicators related to prescription, than GPs who spent less time in direct patient care.

Although most coefficients were not statistically significant at 0.05-level, some of them were large enough to regard them as weak indications for a relation. In this way, we see that the positive relation with the total number of hours in direct patient care occurred also in two other dimensions in the work of the GP, namely diagnostics and follow-up. With regard to the subset on referral the opposite relation was found.

Workload had a positive relation with the percentage of deviations in all dimensions. Spending more time in CME was negatively associated with deviations in all dimensions, except in diagnostics. It is interesting that the average length of consultations was the variable with the weakest correlation with the percentage of deviations from indicators for appropriate care. The results indicate that longer consultations might be related to more appropriate prescriptions, but also to less appropriate referrals.

In sum, these first results seem to be line with the expectations as formulated in Table 7.1. GPs' workload and the three aspects of the allocation of time correlated with the percentages of deviations as expected. Only the relations with hours in direct patient care and the mean length of consultations with the subset of indicators for referrals were not in line with the expectations: more time spent on direct patient care was negatively related to

the percentage of deviations, and GPs with longer consultations were more likely to deviate from the indicators in the field of referrals.

However, it is not possible to draw hard conclusions from these findings because most of the correlation coefficients were not significant, these results might be influenced by the differences in the number of observations per GP, and the differences in standard-mix were not taken into account. This will be solved by the use of multilevel analyses. In Table 7.4 the results are shown when all 33 indicators were studied together.

When the aspects of the allocation of time were not taken into account (step I), GPs in single-handed practices were more likely to deviate from the indicators than GPs working in partnerships. In the second step the coefficient was no longer significant but it changed only a little. Daily workload was clearly not related to the percentage of deviations. Although not statistically significant at 0.05-level, overall workload had a relatively large coefficient in the first equation. It is interesting to notice that this coefficient reduced strongly after the aspects of the allocation of time were included (step II). The coefficients of time in direct patient care, continuing medical education and the mean length of consultations were not significant because of their standard errors, but the direction of their affect was in line with the expectations in hypothesis 16. As expected, the mixes of standards on the working days were important determinants.

Table 7.4 Results of multilevel, heteroscedastic regression analysis on the percentage of deviations from all 33 indicators for appropriate care in general practice, per working day

	Step I		Step II	
	B	SE B	B	SE B
Cons	25.26	0.62**	25.32	0.62**
<i>Workload</i>				
Daily workload	0.03	0.02	0.02	0.02
Overall workload	0.24	0.14	0.10	0.16
<i>Allocation of time</i>				
Time in direct patient care	-	-	0.11	0.09
Time in CME	-	-	-0.21	0.21
Mean length of consultations	-	-	-0.11	0.16
<i>GP-characteristics</i>				
GP's age	0.05	0.08	0.06	0.08
Single-handed practice	2.90	1.36*	2.44	1.38
<i>Standard-mix¹</i>				
% hypertension	-0.27	0.03**	-0.27	0.03**
% cholesterol	-0.27	0.05**	-0.27	0.04**
% p.a.v	-0.02	0.04	-0.02	0.04
% asthma (children)	0.10	0.03**	0.10	0.03**
% asthma/COPD (adults)	0.11	0.02**	0.11	0.02**
% urinary tract infection	0.00	0.02	0.00	0.02
% acute otitis media	-0.07	0.03*	-0.07	0.03*
% acute sore throat	-0.19	0.03**	-0.19	0.03**
% sprained ankle	-0.22	0.03**	-0.22	0.03**
% migraine	0.17	0.05**	0.17	0.05**
% diabetes	-0.11	0.02**	-0.11	0.02**
<i>Dimension of the work²</i>				
% prescription	-0.18	0.04**	-0.18	0.04**
% referral	-0.33	0.05**	-0.33	0.05**
% follow-up	-0.02	0.04	-0.02	0.04

Significance: * p < 0.05; ** p < 0.01

¹ Reference category: % acne vulgaris

² Reference category: % diagnostics

In the subset of indicators for appropriate diagnostics, no influence of GP-characteristics could be found (Table 7.5).

Table 7.5 Results of multilevel, heteroscedastic regression analysis on the percentage of deviations from indicators for diagnostics in general practice, per working day

	Step I		Step II	
	B	SE B	B	SE B
Cons	35.40	1.46**	35.44	1.47**
<i>Workload</i>				
Daily workload	0.04	0.06	0.03	0.06
Overall workload	0.42	0.32	0.33	0.37
<i>Allocation of time</i>				
Time in direct patient care	-	-	0.12	0.20
Time in CME	-	-	0.29	0.50
Mean length of consultations	-	-	-0.23	0.43
<i>GP-characteristics</i>				
GP's age	0.11	0.20	0.11	0.20
Single-handed practice	1.36	3.17	1.36	3.25
<i>Standard-mix¹</i>				
% cholesterol	-0.34	0.03**	-0.34	0.03**
% urinary tract infection	0.11	0.02**	0.11	0.02**
% sprained ankle	-0.34	0.02**	-0.34	0.02**

Significance: * $p < 0.05$; ** $p < 0.01$

¹ Reference category: % diabetes

When the indicators regarding pharmaceutical therapy were separately considered, some significant relations occurred (Table 7.6). Again there was clearly no influence of daily workload on the percentage of deviations from the indicators for appropriate care. There are, however, reasons to assume that overall workload influences the number of deviations. As in the overall analysis (Table 7.4), the large coefficient of overall workload in the first equation (not significant at the 0.05-level) disappeared completely when the aspects of the allocation of time were included. Step II shows that two of these aspects were relevant to the appropriateness of pharmaceutical therapy. GPs who worked more hours in direct patient care deviated to a larger extent from the indicators than GPs who worked fewer hours in direct patient care. Besides, the findings indicate that longer consultations were related to fewer deviations from the standard (although this coefficient was not significant at 0.05-level). Furthermore, there was also an influence of the GP's age: older GPs deviated in more cases from the indicators than younger GPs.

Table 7.6 Results of multilevel, heteroscedastic regression analysis on the percentage of deviations from indicators for appropriate pharmaceutical therapy in general practice, per working day

	Step I		Step II	
	B	SE B	B	SE B
Cons	25.85	0.81**	25.94	0.79**
<i>Workload</i>				
Daily workload	0.01	0.04	0.00	0.04
Overall workload	0.29	0.17	-0.00	0.20
<i>Allocation of time</i>				
Time in direct patient care	-	-	0.23	0.11*
Time in CME	-	-	-0.29	0.30
Mean length of consultations	-	-	-0.50	0.28
<i>GP-characteristics</i>				
GP's age	0.30	0.11**	0.30	0.11**
Single-handed practice	1.49	1.73	0.64	1.75
<i>Standard-mix¹</i>				
% hypertension	0.13	0.03**	0.13	0.03**
% cholesterol	0.13	0.06*	0.14	0.06*
% p.a.v	-0.05	0.04	-0.05	0.04
% asthma (children)	0.18	0.03**	0.18	0.03**
% asthma/COPD (adults)	0.11	0.02**	0.11	0.02**
% urinary tract infection	0.18	0.02**	0.18	0.02**
% acute otitis media	0.05	0.02*	0.05	0.02*
% acute sore throat	0.22	0.03**	0.22	0.03**
% migraine	0.32	0.03**	0.32	0.03**
% diabetes	0.49	0.06**	0.49	0.03**

Significance: * $p < 0.05$; ** $p < 0.01$

¹ Reference category: % acne vulgaris

In the next table, the results of the analysis of the indicators for appropriate referrals are presented. Both aspects of workload were clearly not related to the percentage of deviations. Only the coefficient of the GP's age (in the second step) was nearly significant at the 0.05-level. This indicates that, as was also seen with regard to pharmaceutical therapy, older GPs were more likely to deviate from the indicators.

Table 7.7

Results of multilevel, heteroscedastic regression analysis on the percentage of deviations from indicators for appropriate referrals in general practice, per working day.

	Step I B	SE B	Step II B	SE B
Cons	28.18	0.24**	28.18	0.24**
<i>Workload</i>				
Daily workload	-0.01	0.02	-0.01	0.02
Overall workload	0.04	0.06	0.04	0.07
<i>Allocation of time</i>				
Time in direct patient care	-	-	0.01	0.03
Time in CME	-	-	-0.07	0.10
Mean length of consultations	-	-	0.16	0.12
<i>GP-characteristics</i>				
GP's age	0.04	0.03	0.05	0.03
Single-handed practice	0.87	0.54	0.83	0.55
<i>Standard-mix¹</i>				
% urinary tract infection	-9.90	0.60**	-9.90	0.60**
% sprained ankle	-9.70	0.61**	-9.70	0.61**

Significance: * $p < 0.05$; ** $p < 0.01$

¹ Reference category: % acne vulgaris

The analysis of the indicators for appropriate follow-up appointments did not reveal any influence of workload, allocation of time or other GP-characteristics in the equation (Table 7.8).

Table 7.8 Results of multilevel, heteroscedastic regression analysis on the percentage of deviations from indicators for appropriate follow-up appointments in general practice, per working day

	Step I		Step II	
	B	SE B	B	SE B
Cons	29.66	0.87**	29.68	0.87
<i>Workload</i>				
Daily workload	0.03	0.03	0.03	0.03
Overall workload	0.16	0.18	0.11	0.22
<i>Allocation of time</i>				
Time in direct patient care	-	-	-0.01	0.12
Time in CME	-	-	-0.32	0.29
Mean length of consultations	-	-	-0.10	0.21
<i>GP-characteristics</i>				
GP's age	-0.11	0.12	-0.10	0.12
Single-handed practice	2.47	1.90	2.47	1.95
<i>Standard-mix¹</i>				
% hypertension	-0.20	0.02**	-0.20	0.02**
% p.a.v	0.16	0.04**	0.16	0.04**
% asthma (children)	0.30	0.04**	0.30	0.04**
% asthma/COPD (adults)	0.64	0.02**	0.65	0.02**
% urinary tract infection	0.16	0.02**	0.16	0.02**
% acute sore throat	-0.28	0.02**	-0.28	0.02**
% diabetes	-0.13	0.02**	-0.13	0.02**

Significance: * $p < 0.05$; ** $p < 0.01$

¹ Reference category: % acne vulgaris

7.5 Summary and discussion

In this chapter the relation was studied between workload and quality of care in general practice. Quality was operationalized in terms of deviations from professional indicators for appropriate care. The actual care of 149 GPs, as recorded in the Dutch national survey of general practice, was compared to 33 indicators that have been derived from 12 standards of care published by the Dutch College of General Practitioners (NHG). In addition to the overall score of the total set of indicators, four subsets were distinguished that were related to different dimensions of the work of GPs, namely diagnostics, prescription of drugs, referral, and making follow-up appointments. GPs differed in the extent to which they deviated from the indicators. On average, this was done in 25% of

the cases, but the lowest score of a GP was 7.5% and the highest 53.3%. The highest percentage of deviations occurred with regard to indicators for appropriate diagnostics (almost 35%); the lowest is found in the field of the prescription of drugs (25%).

As explained in Chapter 2, quality of care is not regarded as a choice of a GP, like the content of care in the previous chapter, but as a result of GPs' reactions to their workload in terms of the allocation of their time. High workload is coped with by working more hours in direct patient care, fewer hours in continuing medical education, and shorter consultations (see Chapters 4 and 6). These three aspects might have a negative impact on the quality of care. Therefore, we expected a positive relation between the two aspects of workload, overall and daily workload, and the percentage of deviations from the indicators for appropriate care (hypothesis 15). The results of the analyses do not confirm this hypothesis. No statistically significant evidence was found that the workload of GPs directly affects the quality of care from a professional point of view. However, the relatively large correlations and coefficients of overall workload in the multilevel analyses, although not statistically significant, are an indication that hypothesis 15 cannot be definitely rejected. Only in the subsets of indicators for appropriate referral and follow-up were these coefficients rather low. Moreover, the direction of the coefficients of overall workload was in line with the expectations.

In hypothesis 16 it was stated that the influence of workload on quality of care is caused by the three aspects of allocation of time that are discussed above. Some evidence is provided that this is at least partly true. GPs who worked more hours in direct patient care were more likely to deviate from the indicators. With regard to pharmaceutical therapy, this effect was statistically significant. Furthermore, the introduction of the three aspects of the allocation of time in the multilevel analyses strongly reduced the contribution of the workload variables. The contributions of the number of hours spent in direct patient care were in all multilevel analyses, except for follow-up appointments, in the expected direction. The same holds true for hours in continuing medical education, but then the indicators for appropriate diagnostics were the exceptions. Length of consultations was negatively related to the percentage of deviations, except for referrals. As mentioned, these coefficients were, however, not statistically significant. This means that, on the whole, no strong relation between GP's workload and the quality of care is found. This is in line with the conclusion of the previous chapter that the treatment of patients is

mainly determined by characteristics of the presented health problem and that more structural aspects such as workload or remuneration play only a minor role.

Finally, some remarks will be made on the procedure used to measure quality of care in this study. Firstly, quality could be measured only in a restricted way. Only professional guidelines were used to assess the appropriateness of the provided care. Aspects of quality care that seem to be related to the patients' perspective, such as communication style, affective behaviour and organizational aspects (waiting lists and accessibility), were not studied. In addition, a selected group of 12 standards of care was considered and within the available data set it was only possible to check some guidelines of these standards. This means that the professional view could only partly be considered.

A second, more fundamental, point of discussion is whether the NHG-standards can be used to derive indicators for appropriate care and whether they are related to quality of care (see e.g. de Maeseneer & Meyboom-de Jong, 1991; van Duijn & Meyboom-de Jong, 1995). It is argued that the standards are guidelines and that a GP might have good reasons for deviating from the guideline in that particular consultation. Moreover, the guidelines cannot be regarded as absolute or permanent indicators for good practice: a number of guidelines have already been adapted or changed because of new medical insights. Rutten & Thomas (1993) stated that there are a lot of snags to using NHG-standards in measuring quality of care in general practice. Although they are aware of the fundamental criticism mentioned above, they think NHG-standards can and will be used to provide more insight into the behaviour of GPs, as a group as well as individuals. For this reason, it is important to collect relevant information. According to Rutten & Thomas (1993), valid information can be gathered only during a registration period of at least one year. In shorter registration periods, as in the Dutch national survey of general practice, only information on a part of the episode of illness is collected. In this way, one of the most important characteristics of family medicine, continuity of care, cannot show up well.

Another point of discussion was already mentioned in Section 7.2, namely whether these indicators can be used to measure appropriate care in the National survey of general practice because the data collection was already finished before the first NHG-standard was published.

With regard to the first point of discussion, we recognize that our measurement of quality of care is restricted. Our first intention was to assess whether the GP did the 'right thing' in a particular case, but this has been abandoned because it requires an analysis including all guidelines of a standard. Instead of total standards, we used only some aspects of the standards to indicate whether certain interventions were appropriate, according to professional standards of care.

The remark that one has to be very careful in using the guidelines from NHG-standards as absolute indicators for the quality of care is clear. Indeed, individual GPs can have good reasons to deviate from the guideline in a particular case, but when a GP deviates more or less systematically from the indicators the appropriateness of his care might, at least, be regarded as questionable. Furthermore, the selection of the consultations in which the indicators are applied is important in this respect. In this study, special conditions were often taken into account, but it was not always clear whether all relevant aspects that influenced the choice of treatment were recorded by the GP.

The remark on the length of the registration period is indeed true for chronic conditions or illness such as hypertension and diabetes, but in many acute conditions or illness a long registration period is not necessary because most episodes of illness include only one contact with the GP (Groenewegen et al., 1992). Furthermore, we think that a particular guideline of the NHG-standards can be used to assess the appropriateness of a decision in a particular consultation, as long as it is clearly determined whether a guideline could be applied. For instance, the guideline that, for a particular condition or illness, a follow-up appointment is required after each consultation can be applied in each consultation for that condition or illness. A guideline or indicator concerning first-choice medication can be applied in all consultations in which a drug is prescribed for the first time.

In Section 7.2, we already discussed how we have solved the problem that the NHG-standards were published after the data collection. Firstly, a group of 10 GPs judged whether the indicators reflected the common view of good practice in the year of the data collection. Secondly, when the GPs deviated from an indicator in more than 70% of the cases, this indicator was removed. Thirdly, in the multilevel analyses, we controlled for the fact that some indicators were more related to the situation in 1987/88 than others.

In sum, the central element in this discussion on the use of NHG-standards for measuring

quality of care is the aim of the study. When the aim to assess whether a particular GP works according to the NHG-standard(s), the whole standard needs to be studied and the whole treatment by the GP in the episode of illness has to be taken into account. When, as in this study, the aim is to confront data from the daily practice with professional guidelines to indicate whether a particular aspect of the treatment can be defined as appropriate, this is not necessary. However, as explained, it is extremely important to select the right consultations in which the guidelines or indicators could be applied.

SUMMARY AND CONCLUSIONS

8.1 Summary of the results

In the Netherlands, general practitioners (GPs) have an important and central position in the health care system. In general, all inhabitants are on the list of their own personal GP and he is the first physician to be contacted for most health problems. Formally, he is the gate-keeper of the system, which means that other health care facilities are often accessible only after a referral or prescription. In several recently published Dutch policy documents, this central position has been emphasized: *Zorg in het regeerakkoord* (VWS, 1995), *Gezond en Wel* (VWS, 1995), *De wereld verandert en de huisarts verandert mee* (LHV, 1995), *Poortwachter in de Praktijk* (PWH, 1995), *De huisarts van morgen* (CTV, 1996). Strengthening general practice is regarded as an important tool for increasing efficiency and improving quality of health care. A point of concern is the workload of GPs. A strong position as gate-keeper means that GPs must be able to treat their patients appropriately and too high a workload might be a threat. Therefore, it is relevant to study the relation between GPs' workload on the one hand and their activities in daily practice and the quality of these activities on the other. In this book three relations of workload were studied, namely with:

- allocation of time (working hours in different activities and length of consultations);
- content of care (activities within a consultation);
- quality of care (deviations from professional indicators for appropriate care).

Workload was defined in terms of the numbers of consultations handled by a GP within a certain time frame. This means that subjective aspects of workload, such as burnout, were not taken into consideration.

In *Chapter 1*, the relevant literature on these three topics was discussed. It was concluded that contradictory results and interpretations of the relation between workload and the content or quality of care were found.

An important reason why results of different studies are difficult to compare is the conceptualization of workload. In most research, workload is conceptualized in terms of list size, consultation rates and booking intervals: all refer to a stable, overall situation. There are also studies that defined workload in terms of actual length of a consultation or the number of patients during surgery sessions. However, GPs' reactions to workload might differ, depending on whether workload refers to a busy practice (overall workload) or a busy day (situational workload). Some reactions structurally affect workload, while others are only helpful to managing to survive the day and shift work to the future. Therefore, in our research both aspects were analysed simultaneously. In *Chapter 5* the daily differences in GPs' workload were studied. It was shown that, in general, the workload of GPs was not stable over time. The amount of fluctuation in daily workload differed between GPs and is determined by four variables. The result that a high percentage of young children and low-educated patients on the lists was related to a larger number of fluctuations in GP's workload was explained by the fact that these groups of patients have more emergency calls or out-of-hours contacts. Running a free-flow consultation hour, and doing home deliveries also led to larger daily differences in GPs' workload.

Furthermore in earlier research, workload and allocation of time were often not analytically separated. It is important to do so because allocation of time is the mechanism that can explain why and when (under which circumstances) effects of workload on the content or quality of care can be expected. In our theoretical model, presented in *Chapter 2*, we elaborated this idea.

Allocation of time can be regarded as a series of choices made by GPs to cope with a given amount of workload. GPs with higher workload can work more hours in direct patient care by working more hours in total or by cutting back time spent on other practice activities, such as practice administration, meetings with colleagues or continuing medical education. Another important coping mechanism for workload in general practice is the reduction of the length of consultations. Three possibilities can be used: avoiding time-consuming interventions and doing less time-consuming interventions, spending less time per intervention, and postponing work to the future. The actual choice of coping strategies can differ between GPs. Some GPs are probably more likely to opt for a reduction of the length of consultations, while others are more likely to increase the

number of hours spent in direct patient care. Moreover, the choice of shorter consultations might also depend on the type of patient and the health problem that is presented.

To formulate hypotheses on these coping choices, a model of GPs as goal-oriented or rational, in the restricted senses of bounded rationality, people are our starting point. According to our model, GPs have two ultimate goals: physical well-being and social approval. Other goals can be regarded as instruments for achieving these ultimate goals. Income and leisure time are considered instrumental goals for physical well-being. Providing appropriate care to patients, accessibility of services (shorter waiting time for patients) and time spent on other professional activities can result in social approval from patients and colleagues. There are good reasons for viewing providing appropriate care as the most important goal for GPs.

The opportunities to realize these goals are determined by the available resources and the constraints related to the choice situation. They are situated at three levels: the health care system, the GP and his practice, and the consultation. At a general level (structural conditions), rules and regulations of the health care system and the medical profession can influence the decision room of GPs. The availability of other care providers is another restriction at this general level: e.g. when a GP wants to refer a patient, there have to be specialists or hospitals to refer to. With respect to the content and quality of care, it is important to stress that clearly defined professional rules or standards of care determine the GPs' choices to a large extent. The second level of restrictions refers to the GP and the practice. GPs in single-handed practice are more dependent on their patients for receiving social approval, whereas GPs in partnerships or group practice receive social approval from their colleagues. Realization of the GPs' goals is of course also related to their personal resources, such as knowledge, skills and their personal circumstances. A third level contains restrictions relating to an actual consultation between GP and patient. For some health problems the course of action of the GP is quite determined, while for others there is a wide range of possible actions. Patient characteristics, such as education or type of insurance, can also affect opportunities of GPs to reach their goals in a particular consultation. Workload is one of the restrictions that influences GPs' behaviour. It is situated at two of the levels discussed above. At the second level, as a fixed characteristic of the practice and at the third level, as a characteristic of the particular

consultation: workload at the moment of consultation (situational aspect). In *Chapter 2*, these ideas are applied to formulate hypotheses on GPs' choices of strategies to cope with a high workload. In this way, we have identified the conditions that might influence the strength of the three relations mentioned above.

In *Chapter 1*, methodological problems and shortcomings of earlier research were discussed. Research is often limited to a rather small part of the GPs' daily work, e.g. a particular intervention or the treatment of a particular disease. This does not seem sufficient to derive conclusions about the consequences of workload on a more general level. Another problem is that in most studies it was not possible to take other relevant determinants of the activities of GPs into account. It is clear that the actual relation between workload and content or quality of care can be established only when characteristics of GPs, their practice, the patient and the presented health problem are included in the analyses. Finally, the measurements of quality of care are a point of discussion. Indirect indicators such as the number and types of prescriptions or referrals are used, assuming that higher prescribing or referral rates indicate a lower quality of care. However, indirect measures do not take into account whether the intervention was appropriate in relation to the presented health problem. *Chapter 3* gives an outline of our research strategy and shows how we have tried to solve the shortcomings mentioned above. Our data set was obtained from the Dutch national survey of general practice. The data collection of this large-scale research project was conducted by the Netherlands Institute of Primary Health Care (NIVEL) between April 1987 and March 1988. Central to this survey is a three-month recording of substantial information on all patient contacts of the participating GPs (and their trainees, locums and assistants). In this book, data of the 159 GPs who worked at least 0.5 WTE in the practice were studied.

Additionally, for all practices a register was set up containing important background information on all patients on the list (patient census). Data on GP-characteristics were gathered by mailed questionnaires. Out of the 159 GPs, 149 kept a detailed diary covering 24 hours a day during one week. This diary provided information on the weekly working hours of the GPs and the allocation of these hours between different activities.

As mentioned, workload in this study was expressed as the number of consultations handled by the GPs themselves. An overall workload score was calculated for each GP

and a daily workload score for each working day of a GP. In these scores office consultations, home visits and telephone consultations were differently weighted.

Content of care was defined as the percentage of specific interventions in the *office* consultations of the GP. These percentages were calculated both on a daily basis and as averages per GP. The interventions were grouped into ten categories: physical examination, practice-based diagnostics, out-of-office diagnostics, the decision to 'wait and see', counselling, technical medical interventions, drug prescription, referral to specialist care, referral to primary care, and follow-up.

Quality of care was measured by a set of 33 indicators for appropriate medical care in general practice. These indicators were derived from 12 professional standards of care formulated by the Dutch College of General Practitioners (NHG). Because these standards have been published after the data collection, a group of GPs has judged whether they are representative of the quality of care in 1987-1988. Per GP and working day the percentage of deviations from these indicators were calculated. Next to the total set of indicators, four subsets were studied that cover different aspects of the work of GP: diagnostics, pharmaceutical therapy (prescription of drugs), referral and follow-up.

Two main kinds of analyses were used to test the hypotheses. When data were available only for each GP, linear regression analyses were performed. When information was available at both levels (GP/practice and working day) multilevel analyses were used.

The research questions, formulated at the end of *Chapter 1*, will be used to summarize the results of our study. The topic of the first set of research questions is the relation between workload and the allocation of time.

1a. Is the workload of general practitioners related to their allocation of time (working hours in patient care and other practice activities, length of consultations)?

The analyses in *Chapter 4* showed that there is a relatively strong relation between the overall workload of GPs and the number of hours spent on direct patient care. Furthermore, GPs with a high workload spent less time on continuing medical education. With regard to the other practice-based activities no negative relation to workload was found. The number of working hours in direct patient care is, however, not fully determined by GP's workload. This means that other coping mechanisms can occur too.

In *Chapter 6* we found that high workload also led to shorter consultations with individual patients. Both aspects of workload, overall and daily workload, had their independent influence. This means that, in general, the consultations are shorter on busy days and they are also shorter when a GP has a busy practice.

1b. Do GPs differ in the way they cope with workload with respect to the allocation of time?

1c. How can these differences be explained?

It was expected that certain GPs would react differently to their workload, in terms of their allocation of time, than others. This is related to the remuneration system (a fixed salary versus working independently and the type of insurance of the patient), the age and gender of the GPs, the type of practice they work in (single-handed versus partnership), and whether they have a trainee in their practice. The results in *Chapter 4* showed that only one aspect influences the relation between workload and the number of hours spent on direct patient care. This relation was stronger when GPs had a higher percentage of privately insured patients on their lists. This is a result of the remuneration system. Privately insured patients pay a fee per consultation, while GPs receive a capitation fee for their publicly insured patients. Other research showed that different payment systems can lead to differences in the allocation of time in general practice. The division of time between work and leisure is determined by institutional arrangements in contracts, the relation between income and working hours, and the GPs' anticipation of the patients' reactions. In capitation systems the total number of hours spent on direct patient care will be relatively unaffected by a higher workload. A higher workload is typically managed by seeing more patients in the same period of time because there is no direct relation between working hours and income. In fee-for-service systems, a higher workload leads to a larger number of hours worked in direct patient care because there is a direct relation between workload and income. Furthermore, it is important to realize that when patients pay separate fees for each consultation, it is easier to switch GPs or go directly to a medical specialist. This kind of competition indicates that the GPs must also beware of possible loss of income in the future. Therefore, they are more likely to take the patient's wishes into account. GPs will be less likely to cut back the time spent on each individual patient. As a consequence, the relation between workload and the number of hours

worked is stronger in a fee-for-service system than in a capitation system. We assumed that GPs with a higher percentage of privately insured patients on their list are more likely to react as in a fee-for-service system, and this idea was confirmed in the results of the analyses in *Chapter 4*. However, in *Chapter 6*, we did not find that the relation between workload and length of consultations is influenced by the type of insurance of the patient.

With regard to the length of consultation, characteristics of the patient and the health problem were also included because they were expected to influence the effect of workload. The type of problem (psychosocial or not), its severity and the GP's uncertainty about the diagnosis, and the educational level of the patients, were mentioned in this respect. The multilevel analyses presented in *Chapter 6* showed some statistically significant results. Firstly, the negative relations between the two aspects of workload and length of consultations were stronger in partnerships than in single-handed practices. This was explained by the assumption that in the latter GPs are more dependent on their patients as a source of their social approval. This means that they will be more likely to take patients' wishes into account. Patients' dissatisfaction may have a stronger impact on their social approval than in partnerships. Secondly, there was a stronger negative relation between daily workload and the length of consultations when more psychosocial problems were presented during a working day, when the GP was less uncertain about the diagnoses, when less severe health problems were presented and when the average educational level of the patients consulting was higher. These aspects were all identified as conditions that can influence the decision room for the GP. This means that non-medical aspects such as workload play a more important role in the decisions of the GP when the decision room is larger. In contrast to the hypotheses, this freedom of choice coincides with longer consultations when patients present more uncertain health problems and in low-educated patients. However, the finding that high workload is related to shorter consultations when psychosocial or less severe problems are presented confirms our expectations.

The second research question was about the relation between workload and the content of care.

2a. *Is the workload of general practitioners related to their choices of interventions within consultations (the content of their care)?*

In Chapter 6, it was studied to what extent ten aspects of the content of care are related to the overall and daily workload. With regard to daily workload only a main effect on one aspect of the content of care was found. On busy days, GPs less often order diagnostic tests in external laboratories. Overall workload is related to three aspects of the content of care. Busy GPs do fewer technical medical interventions, such as injections and minor surgery, prescribe drugs more often, and have higher referral rates to other primary care providers (mainly physiotherapists) than less busy GPs.

Furthermore, under special conditions that will be discussed below, a higher daily workload was related to less physical examination, less counselling, more wait and see, and more follow-up appointments, and a higher overall workload coincided with higher referral rates to specialist care.

2b. *Is there a differential relation of overall workload and daily workload of GPs with the content of their care?*

This study showed that the daily fluctuations in workload are less important to the work of GPs than overall workload. Probably, GPs working in busy practices have developed coping mechanisms for their high workload that have become a kind of permanent working style.

As mentioned, it was expected that the two aspects of workload lead to different choice of interventions within the consultations. The most important difference is that a high workload on a particular day can be solved by postponing work to the future, while this is not an adequate choice for GPs with a high overall workload, because their practice is always busy. The three effects of overall workload are in line with this idea: technical medical interventions are regarded as highly directly time consuming, and for a prescription the opposite is assumed, but both do not clearly determine the time consumption in the near future. Although the direct time consumption of a referral is unclear, the chance of a return visit, meaning a higher time consumption in the near future, is lower. Only when the specific conditions are taken into account, the findings show that daily workload is related to other aspects of the content of care than overall workload. For daily workload, negative relations were found with more directly time-

consuming activities (physical examination and counselling). Two relations indicate that activities are postponed (wait and see and making follow-up appointments).

2c. *Do GPs differ in the way they cope with workload with respect to content of care and do characteristics of the patients and their health problems affect the way in which GPs cope with their workload?*

2d. *How can these differences be explained?*

The multilevel analyses presented in *Chapter 6* indicated a number of special conditions that influence the strength of the relation between workload and some of the aspects of the content of care. These are all conditions related to patient- and health problem-characteristics; no GP- or practice-characteristics mentioned in the hypotheses influenced the strength of the relation. This does not mean that the GPs do not differ in their reaction to workload but that these different reactions cannot be explained by our theoretical considerations.

Although only a few conditions determined the strength of the relation between workload and specific aspects of the content of care, most of them are related to the amount of decision room that GPs have in their consultations. When relatively more psychosocial or less severe problems are presented, when the GP is less certain about the diagnosis, and when the educational level of the patients is lower, GPs have more freedom in the choice of treatment. In this circumstance, workload becomes more important. The result that the negative relation between overall workload and the percentage of technical medical interventions is stronger when the GP is more certain about the diagnosis is not as expected. Also the result that busy GPs more often refer patients to specialist care on working days with a lower educational level of the patients consulting was opposite to our expectations. The other findings were as expected. The positive relation between overall workload and the referral rates to other primary care providers is stronger when the GP is less certain of the diagnoses. Only in combination with a higher percentage of psychosocial problems do GPs record fewer consultations including physical examination and counselling on a busy working day. The combination of high daily workload and fewer severe problems presented means that the GP decides more often to wait and see how the problem develops. Furthermore, more follow-up appointments are made on busy working days with a higher level of uncertainty of the diagnoses.

We also expected that consequences for the personal income and social approval of the GP could explain different reactions to workload in specific circumstances. We predicted differences in GPs with a fixed salary and GPs working independently, GPs working in single-handed practices and partnerships, and differences related to the type of insurance of the patient. Only with regard to this latter aspect are two relevant results found. On working days with more privately insured patients, the negative relation between daily workload and requests for external laboratory tests was stronger. However, taking differences in the type of remuneration into account, the opposite was expected. Because privately insured patients pay the GP a fee for each consultation, it was expected that daily workload is more likely to be coped with by ordering more out-of-office diagnostics because an extra consultation to discuss the results of the external tests means a higher income. Also, the finding that busy GPs have higher referral rates to primary care when relatively more privately insured patients consult is not as expected. A referral decreases the chance of a return visit. It is, however, possible that GPs restrict the number of return visits for privately insured patients because they have to pay for each consultation. This decision might be enforced by the patient himself.

The third set of research questions focus on the effect of workload on the quality of care.

3a. Is quality of care negatively related to GPs' workload?

In *Chapter 7* the relation between GPs' workload and quality of care was studied. Quality of care is restricted to the professional perspective. This can differ from that of other actors involved such as patients, policy makers or financiers. Because of limitations in the available data set, it was possible to assess the appropriateness of the GPs' treatment only in a restricted number of consultations. In this research no evidence is found that the workload of GPs strongly affects the quality of care. However, the relatively large correlations and coefficients of overall workload in the multilevel analyses, although not statistically significant, are an indication that quality of care is not completely unaffected by GPs' workload.

3b. Can this relation be explained by aspects of the allocation of time?

As explained in *Chapter 2*, quality of care was not regarded as a choice of a GP, but as a

result of GPs' reactions to their workload in terms of the allocation of time. High workload is coped with by working more hours in direct patient care, fewer hours in continuing medical education, and shorter consultations. These three aspects might have a negative impact on the quality of care. Quality of care might be influenced by the fact that longer working hours affect concentration, which can lead to less appropriate care. Spending less time on continuing medical education (CME) might influence the knowledge and skills of the GP. Reducing the consultation length might determine the possibility of exploring the patients' problems and considering alternative treatment possibilities. In *Chapter 7* one relation was found. GPs who worked more hours in direct patient care were more likely to deviate from the indicators of appropriate care (as a measure of the quality of care). With regard to pharmaceutical therapy, this effect was statistically significant.

On the whole, we can say that we have managed to overcome some of the shortcomings of earlier studies in the field of GPs' workload. A clear distinction was made between the concepts workload and allocation of time. Allocation of time is regarded as a mechanism for coping with a given amount of workload. Furthermore, workload is divided into two aspects that are often mixed up: structural or fixed GP-/practice-characteristics and a situational aspect that is not stable for a GP. This is the first study in which the influence of both aspects on the content and quality of care is analysed simultaneously. Only a comprehensive data set like the Dutch national survey of general practice provides sufficient information for these analyses, especially when other characteristics of practices, GPs, patients and presented health problems need to be taken into account. While most other studies are restricted to a small part of the daily work of GPs, we were able to include the work of 159 GPs during a period of three months. Finally, in spite of important restrictions, a more appropriate measure of quality of care is used than in most other studies. The actual care of GPs is confronted with indicators for appropriate care defined by professionals. In other studies often indirect indicators, such as referral or prescription rates, are used.

8.2 Conclusion

As in previous research on the relation between GPs' workload and content and quality of care, only weak relations were found in our study. However, we can now explain why relations that seem to be obvious from a 'common sense' point of view cannot be established in empirical studies. High workload coincides only weakly with shorter consultations because there is also a clear positive relation between workload and the number of hours spent in direct patient care. Furthermore, the relation between workload and the content of care is less strong than expected because patient- and health problem-characteristics mainly determine the kind of treatment by the GP. Structural aspects such as workload and remuneration system play a part only in the second instance: when the patient and health problems give the GP more freedom to choose the appropriate treatment.

In general, it can be concluded that the choices of GPs in the care-providing process are mainly determined by the presented health problem and relevant patient-characteristics such as age and gender. Although four main effects of workload were found, we can conclude that it plays a greater role in the decisions when there is more decision room, which indicates that it is medically less clear what needs to be done. This conclusion confirms our behavioural model, which stated that the main goal of a GP is to provide appropriate care to the index patient. Other goals, such as shorter waiting time for other patients, personal income and leisure, and social approval from colleagues, are relevant only when this is possible in relation to the main goal.

8.3 Implications for further research

The difference between workload as structural GP- or practice-characteristics or as a condition of a particular consultation is an important point that needs to be considered in future research. For practical reasons, we were able to study the expected relations only on the level of working days. This might not be specific enough to measure the exact influence of workload as a situational characteristic in the definition of a crowded waiting room. The daily workload is determined afterwards and it is not certain whether the GP is

aware of the total workload on a working day, when the decisions in the consultations are made. The development of faster computers with more memory capacity will make it possible to do the same kind of analyses again but then on three levels: the GP/practice-level, the day-level and the level of each consultation. By means of logistic regression analysis, it will be possible more precisely to determine the effects of the different variables and to test interaction terms than on the aggregated level of the working days as we did in this book. In this way the 'fallacy of the wrong level', which means that a relation on an aggregated level does not necessarily reflect the situation on the lowest level, can be avoided. However, the influence of important determinants of the content of care, such as the type of health problem presented, did not indicate that this occurred in our analyses. Furthermore, this recommendation for further research stresses the importance of a second National survey of general practice because these kind of analyses can be performed only when comprehensive information on a large number of patient contacts (covering a large number of working days), and background information on GPs and patients, is available.

In our study workload was defined as objective measurement of the number of consultations within a certain time frame; the subjective aspects were not taken into consideration. Other research showed that objective and subjective aspects of GP's workload are only weakly related. Therefore, it is interesting to study the influence of for instance feelings of burn-out on the content and quality of care. This might explain why daily workload is less important than overall workload in relation to content and quality of care.

Furthermore, the measurement of the objective aspect of workload was restricted to the number of consultations. Although different weights were given to office consultations, home visits, and telephone calls, we could not define the actual load of a particular consultation. It is, however, possible that consultations with certain groups of patients, such as elderly, chronically ill or demanding patients, are much heavier in terms of workload than consultations with other groups. Further research could explore whether this aspect of workload is more related to content or quality of care than our measure.

An important conclusion of our study is that structural aspects such as workload and type of remuneration mainly influence the behaviour of GPs when they have more decision room in a consultation. In further research this needs to be elaborated. One concrete topic is the introduction of guidelines or standards of care in general practice. More standards

of care mean less decision room and therefore it is expected that besides less interdoctor variation, differences in treatment of for instance publicly and privately insured patients or between low- and high-educated patients will also decrease.

Another concrete topic of further research is the relation between workload, allocation of time and quality of care. We could not provide solid evidence for this relation, but some of our results indicate that aspects of the allocation of time, such as longer working hours, fewer hours spent on continuing medical education and shorter consultation, influence the quality of care. As mentioned, our measure of quality was restricted: many aspects that are also important were not taken into account. Especially the aspects of quality from the patients' perspective need to be elaborated.

Finally, we discuss the measurement of quality of care itself. Although a number of restrictions were mentioned in *Chapter 7*, we showed that it is possible to measure relevant aspects of the quality of care in large data sets such as the national survey of general practice. The standards of care that are formulated by the Dutch College of General Practitioners (NHG) can be used in this respect as long as it is not necessary to include all guidelines from each standard in the assessment. This means that, in the future, more attention must be paid to translating the guidelines into a restricted number of indicators for appropriate care. We want to stress that this also has implications for the collection of data. Information must be gathered to define whether an indicator can be applied in a specific consultation.

We want to stress that this method is useful for assessing quality of care in daily practice and for studying its determinants. For other reasons, for instance as a learning device or instrument for peer review, the standards of the Dutch College of General Practitioners are used to develop more detailed registration methods (compare e.g. Hofstra & Zwaard, 1992). However, here it is problematic that the detailed questions asked, can trigger the GP and this can influence his decisions. In this way, it is no longer possible to determine for instance the influence of workload because the GP is too much aware of the guidelines or indicators used to measure quality of care.

8.4 Policy implications

In this section, we discuss some implications of our results for future policy with regard to general practice in the Netherlands. Although the data were collected ten years ago, they are still relevant. We showed that workload did not change dramatically during these ten years. Moreover, not the absolute level of workload was the main point of study but the relations between workload and content and quality of care. Relations are expected to be relatively stable over time, especially because we controlled for important practice-, GP-, patient- and health problem-characteristics. However, we have to be careful in drawing explicit conclusions because in the field of quality assurance and quality of care, important developments have taken place, such as the further formulation and implementation of the standards of care.

As mentioned, strengthening general practice is regarded as an important tool for increasing efficiency and improving quality of health care. In a number of recent discussion and policy papers (see Section 8.1.) a number of topics for discussion were mentioned in relation to strengthening the GPs' position as gate-keepers in the health care system such as the tasks and responsibilities of GPs, the relation between GPs and specialist care, the practice organization (delegation to practice secretaries, list size), quality policy (for instance GPs' involvement in continuing medical education), and aspects of remuneration. The main conclusion of this study is that the decisions of GPs in the treatment of patients are, to a large extent, determined by medical considerations such as the characteristics of the patients' health problem. This means that consequences of policy measures that influence structural conditions of general practice will often be less spectacular than expected from a common sense point of view. The results of this study indicate, however, that reduction of list size is still an important point to be considered. The average number of patients on the list dropped from 2350 in 1987 to 2300 in 1997 (Groenewegen & Delnoij, 1997). In comparison with other countries, list sizes in the Netherlands are rather large. In the United Kingdom for instance, GPs have a similar position as in the Dutch health care system, but their average list contains fewer than 2000 patients (compare e.g. Fleming, 1993). GPs in busy practices, which is related to list size, have shorter consultations, higher prescription rates and higher referral rates to other primary care providers such as physiotherapists, and do fewer technical medical

interventions. Furthermore, in combination with a lower educational level of patients, they also refer more often to specialist care. These results seem to be in contrast with two important conditions for a strong position as gate-keeper, namely that GPs must be able to treat their patients themselves, as long as possible, and it is also important that patients have confidence in the GP. One of the main aspects of the GPs' work that can be judged by patients is the length of consultations; communicating the message that the GP takes time for the patient. We also found that high overall workload correlates with longer working hours in direct patient care and that this is positively related to the percentage of deviations from the indicators for appropriate care, especially with regard to pharmaceutical therapy. The finding that GPs with a high overall workload reduce time spent on continuing medical education is a point of concern in relation to the quality policy of the profession. This result supports the current regulation that obliges GPs to spend at least 40 hours a year on these kinds of activities as a requirement for re-registration. The question is, however, whether this means that GPs with a high overall workload reduce the time spent on their other activities such as direct patient care, practice administration, meetings with colleagues, or reading medical literature to fulfil this requirement.

The finding that operating a free-flow consultation hour is an important determinant for the amount of fluctuations in daily workload suggests that this needs to be reconsidered. It might facilitate the accessibility of the practice, but GPs are less able to manage or control their daily workload.

Daily workload has less important implications for the content and quality of care than overall workload. But still, one of the effects that have been established in our research can be taken into account in future policy measures to strengthen the position of GPs as gate-keepers. On busy working days, consultations are shorter than on less busy working days, irrespective of the level of overall workload of a GP. As mentioned, this aspect can be very important from the patients' perspective. Daily workload can be managed or reduced by special courses for time management in the daily practice and delegation of tasks or consultations to the practice secretary. The latter point is also mentioned as an instrument for strengthening the position as gate-keeper (see e.g. CTV, 1996). It is important to study how the tasks of GPs might be divided into tasks that can be delegated to the practice secretary and those that have to be done by the GPs themselves.

Another point of discussion is the remuneration system of GPs. According to a number of

the policy documents mentioned in Section 8.1., the fee-for-service system of privately insured patients and the capitation fee of publicly insured patients should converge into one new remuneration system. The basis of this system should be a differentiated capitation fee for all patients on the list of a GP. Our results indicate that this will affect only the strength of the relation between workload and working hours in direct patient care. The strength of the relations between workload and other aspects of the work of GPs, such as the amount of time spent on other practice activities, length of consultations, and content of care, are less likely to change. In most cases no effect of the percentage of privately insured patients is found and the differences that occur could not be explained by the difference in remuneration system.

Furthermore, we want to stress that more attention should be devoted to the treatment of psychosocial problems in general practice. There is a stronger negative relation between daily workload and the length of consultations when more psychosocial problems are presented on a working day. Besides, higher daily workload coincides only with less counselling in combination with a higher percentage of psychosocial problems. This is explained by the fact that the decision room of GPs is larger for these kinds of health problems than for other more somatic health problems. Our findings, therefore, indicate that the treatment of psychosocial problems must be an explicit topic in the basic training and in continuing medical education in order to decrease the decision room of GPs. Also, the development of more standards of care or protocols in this field can decrease the decision room of GPs and might reduce the influence of workload.

Finally, we want to make a general remark on the development of professional standards of care. When more standards are developed and become part of daily practice (through e.g. education and peer review), the decision room of GPs in consultations will decrease. According to our results, this means that structural characteristics such as workload will play a minor role in the treatment by GPs. However, at the same time working according to the standards might be usually more time-consuming, for instance because of the requirement of regular check-ups of the chronically ill (see e.g. de Bakker et al., 1995). This might mean that workload might become more relevant for those consultations with more decision room, for instance when the GPs is less certain about the diagnosis, when low-educated patients consult, and for conditions without clearly defined standards of care.

The number of standards of the Dutch College of General Practitioners has increased substantially over the years. Against this background it is worthwhile studying again the relation between workload and quality of care, should a second national survey of general practice be realized in the near future.

Nederlandse huisartsen hebben een belangrijke centrale positie in het gezondheidszorg-systeem. Bijna de gehele bevolking is ingeschreven bij een huisarts die meestal de eerste arts is die bij gezondheidsproblemen wordt geraadpleegd. Formeel is de huisarts de poortwachter van de gezondheidszorg. Dat houdt in dat de meeste andere gezondheidszorgvoorzieningen alleen toegankelijk zijn na een formeel akkoord (recept of verwijzing) van een huisarts. In een aantal recente beleidsdocumenten zoals *Zorg in het regeerakkoord* (VWS, 1995), *Gezond en Wel* (VWS, 1995), *De wereld verandert en de huisarts verandert mee* (LHV, 1995), *Poortwachter in de Praktijk* (PWH, 1995) en *De huisarts van morgen* (CTV, 1996) wordt deze centrale positie nog eens benadrukt. Versterking van de huisartspraktijk wordt gezien als een belangrijk instrument om de efficiëntie en kwaliteit van de gezondheidszorg te verbeteren. Een belangrijk discussiepunt daarbij is de werkbelasting van huisartsen. Een sterke positie als poortwachter betekent dat huisartsen in staat moeten zijn hun patiënten optimaal te behandelen. Een te hoge werkbelasting kan daarvoor een bedreiging vormen. Dit maakt een studie naar de relatie tussen de werkbelasting van huisartsen en de zorg die zij in de dagelijkse praktijk verlenen relevant. In dit boek worden drie relaties bestudeerd:

- werkbelasting en de verdeling van de beschikbare tijd in de huisartspraktijk (de tijd die aan verschillende werkzaamheden in de praktijk wordt besteed en de consultduur);
- werkbelasting en de inhoud van zorg (de activiteiten binnen een consult);
- werkbelasting en de kwaliteit van zorg (de mate waarin wordt afgeweken van professionele indicatoren voor adequate zorg).

Aan de term werkbelasting kunnen zowel objectieve als subjectieve elementen worden onderscheiden. In dit onderzoek is werkbelasting gedefinieerd in objectieve termen van het aantal consulten dat een huisarts, gedurende een bepaalde tijdsperiode, heeft afgehandeld. Dit betekent dat subjectieve aspecten, zoals 'burnout' en persoonlijk ervaren werkdruk niet zijn meegenomen.

In *Hoofdstuk 1* is de bestaande onderzoeksliteratuur met betrekking tot de bovengenoemde relaties besproken. Hieruit komen tegenstrijdige resultaten en interpretaties naar voren. Deze zijn voor een deel terug te voeren tot verschillen in de definitie en operationalisatie van het begrip werkbelasting. In bepaalde studies wordt werkbelasting geconceptualiseerd in termen van praktijkgrootte, consultatie-ratio's en geplande tijd tussen de afspraken. Er zijn ook studies waarin werkbelasting wordt opgevat als de duur van een contact of het aantal patiënten dat de huisarts tijdens een spreekuur bezoekt. Het kan echter nogal uitmaken voor de manier waarop huisartsen met hun werkbelasting omgaan of er sprake is van een constante werkdruk ('de huisarts heeft een drukke praktijk') of dat het op een bepaalde dag of tijdens een bepaald spreekuur een keertje druk is. In *Hoofdstuk 5* zijn de verschillen in de dagelijkse werkbelasting van huisartsen nader geanalyseerd. Daaruit blijkt dat werkbelasting niet zonder meer stabiel is in de tijd. De mate waarin de werkbelasting per dag fluctueert verschilt echter tussen huisartsen. Het wordt bepaald door een viertal variabelen. Bij huisartsen met een hoger percentage jonge kinderen (0-4) en lager opgeleide patiënten in hun praktijk zijn grote verschillen gevonden in de dagelijkse werkbelasting. Dit komt omdat deze groepen patiënten, volgens eerder onderzoek, vaker buiten de kantooruren contact opnemen met de huisarts. Ook het hebben van een inloopsprekuur en het doen van bevellingen leiden tot een grotere variatie in de dagelijkse werkbelasting van de huisarts.

Er wordt in eerder onderzoek vaak geen analytisch onderscheid gemaakt tussen de werkbelasting en de allocatie van de beschikbare tijd. Het is echter wel belangrijk dit te doen omdat allocatie van tijd het verklaringsmechanisme is dat aangeeft waarom en wanneer (dat wil zeggen onder welke omstandigheden) een effect van werkbelasting op de inhoud en kwaliteit van zorg kan worden verwacht. Dit idee is verder uitgewerkt in een theoretisch model dat is gepresenteerd in *Hoofdstuk 2*. Allocatie van tijd wordt opgevat als een serie keuzes die de huisarts maakt om met een bepaalde mate van werkbelasting om te gaan. Drukkere huisartsen kunnen er voor kiezen om meer tijd te besteden aan directe patiëntenzorg. Dit kan door in het totaal meer uren te werken of minder uren te besteden aan andere werkzaamheden in de praktijk zoals praktijkadministratie, overleg en bij- en nascholing. Een andere optie is om de consultduur te verminderen door interventies die veel tijd kosten in een consult te vermijden, vaker te kiezen voor interventies die minder tijd kosten, minder tijd per verrichting te besteden en/of bepaalde behandelingen

uit te stellen. De feitelijke keuze kan tussen huisartsen verschillen. Sommige huisartsen zullen eerder geneigd zijn om meer uren te werken. Andere zullen eerder kiezen voor beperking van de duur van de consulten. Deze beslissing zal ook afhankelijk zijn van kenmerken van de patiënt en het soort gezondheidsprobleem dat in een consult wordt gepresenteerd.

Met behulp van een algemeen keuzemodel waarin huisartsen worden opgevat als doelgerichte of rationele mensen, zijn hypothesen over de bovenstaande keuzes geformuleerd. Volgens dit model hebben huisartsen twee ultieme doelen: fysiek welbevinden en sociale waardering. Andere doelen worden beschouwd als instrumenten om deze ultieme doelen te realiseren. Inkomen en vrije tijd leiden tot fysiek welzijn. Het verlenen van adequate zorg, de toegankelijkheid van de zorg (in dit geval beperkte wachttijd), en het besteden van tijd aan andere professionele werkzaamheden kunnen resulteren in sociale waardering van zowel patiënten als collega's. Het verlenen van adequate zorg kan worden opgevat als het belangrijkste instrumentele doel van de huisarts.

De mogelijkheden om deze doelen te realiseren worden bepaald door de beschikbare hulpbronnen en de restricties in een bepaalde keuzesituatie. Hierbij is een onderscheid gemaakt tussen drie niveaus. Op een zeer algemeen niveau kunnen wettelijke regelingen die verankerd zijn in het gezondheidszorgsysteem en (in)formele regels binnen de medische professie de keuzes van huisartsen beperken. Met betrekking tot de inhoud en kwaliteit van zorg is het belangrijk dat duidelijk gedefinieerde professionele regels, richtlijnen of standaarden, de keuzes van huisartsen in belangrijke mate kunnen bepalen. Op het tweede niveau, de huisarts en zijn praktijk, is ook een aantal restricties te noemen. Solo-werkende huisartsen zijn bijvoorbeeld voor hun sociale waardering meer aangewezen op hun patiënten, terwijl in duo- of groepspraktijken de collega's in dit verband belangrijk zijn. De mogelijkheden om de genoemde doelen te realiseren zijn natuurlijk ook gerelateerd aan persoonlijke hulpbronnen zoals kennis, ervaring en vaardigheden en de persoonlijke omstandigheden van de huisarts. Ten derde zijn restricties ten tijde van het feitelijk contact tussen huisarts en patiënt onderscheiden. Voor een aantal gezondheidsproblemen geldt dat de zorg die moet worden verleend duidelijk is gedefinieerd, terwijl er bij andere gezondheidsproblemen veel meer behandelmogelijkheden zijn. Bepaalde patiëntkenmerken zoals opleidingsniveau of de soort verzekering (ziekenfonds of particulier) kunnen ook van invloed zijn op de mogelijkheden van een huisarts om zijn doelen in een

consult te bereiken. In de onderhavige studie is werkbelasting opgevat als een restrictie, zowel op het tweede niveau (als een kenmerk van de huisarts of praktijk) als op het derde niveau (als situationeel kenmerk tijdens een specifiek consult). In *Hoofdstuk 2* zijn deze ideeën verder uitgewerkt in concrete hypothesen.

Hoofdstuk 3 behandelt de onderzoeksopzet van de onderhavige studie. De gebruikte gegevens zijn afkomstig van de nationale studie van ziekte en verrichtingen in de huisartspraktijk. Deze studie is, tussen april 1987 en maart 1988, door het Nederlands instituut voor onderzoek van de gezondheidszorg (NIVEL) uitgevoerd. In deze studie hebben de deelnemende huisartsen gedurende drie maanden substantiële informatie geregistreerd van al hun consulten met patiënten. In dit boek zijn alleen de gegevens gebruikt van 159 huisartsen die tenminste voor 50% in de praktijk werkten. Er is ook per praktijk een register opgezet met achtergrondgegevens van alle ingeschreven patiënten (praktijk-census). Achtergrondgegevens van huisartsen zijn verzameld via een schriftelijke enquête. Van de 159 huisartsen hebben er 149, gedurende een gehele week, een gedetailleerd dagboek bijgehouden. Op basis hiervan konden het aantal werkuren per week en de verdeling daarvan over verschillende werkzaamheden worden berekend.

Zoals vermeld, wordt werkbelasting in de onderhavige studie uitgedrukt in het aantal consulten dat door de huisarts zelf is afgehandeld. Er is een totale en een dagelijkse werkbelastingsscore berekend. Hierbij hebben consultaties in de praktijk, visites en telefonische consulten ieder een ander gewicht gekregen.

Inhoud van zorg is gedefinieerd als het percentage consulten waarin een bepaalde interventie is geregistreerd door de huisarts. Deze percentages zijn ook zowel per huisarts als per werkdag berekend. De interventies zijn in 10 categorieën samengevat: lichamelijk onderzoek, diagnostisch onderzoek in de praktijk, diagnostisch onderzoek buiten de praktijk, 'afwachten', counselling, medische technische interventies, voorschrijven van geneesmiddelen, verwijzing naar tweede lijn, verwijzing naar eerstelijnsvoorziening (meestal fysiotherapeut), en maken van vervolgafspraak.

De kwaliteit van zorg is gemeten met behulp van een set van 33 indicatoren voor adequate zorg in de huisartspraktijk. Deze indicatoren zijn afgeleid van 12 professionele standaarden die door het Nederlands Huisartsen Genootschap (NHG) zijn opgesteld. Aangezien deze standaarden na de dataverzameling zijn gepubliceerd heeft de bege-

leidingscommissie van huisartsen beoordeeld in hoeverre deze indicatoren representatief waren voor de kwaliteit van zorg in 1987/1988. Per huisarts en werkdag is het percentage afwijkingen van deze indicatoren berekend. Naast de totale set van 33 indicatoren zijn vier subsets bestudeerd die verschillende aspecten van het werk van de huisarts omvatten, namelijk diagnostiek, voorschrijfgedrag, verwijzingen en het maken van vervolgfafspraken in het kader van follow-up en continuïteit van zorg.

Voor het toetsen van de hypothesen zijn twee analysemethoden gebruikt. Indien alleen op het huisartsniveau gegevens beschikbaar waren, zijn lineaire regressie-analyses uitgevoerd. Wanneer informatie beschikbaar is op zowel het huisarts- als het dagniveau, is gebruik gemaakt van multiniveau analyses.

Aan het einde van *Hoofdstuk 1* zijn de concrete onderzoeksvragen geformuleerd. Deze worden nu gebruikt om de resultaten van de onderhavige studie kort samen te vatten. Het onderwerp van de eerste vragen is de relatie tussen werkbelasting en de verdeling van de beschikbare tijd.

Ia. Hoe hangt de werkbelasting van huisartsen samen met de allocatie van tijd in de praktijk?

De analyses die in *Hoofdstuk 4* zijn gepresenteerd tonen aan dat er een relatief sterke relatie is tussen de totale werkbelasting van de huisartsen en het aantal uren dat aan directe patiëntenzorg wordt besteed. Verder bleek dat huisartsen met een hoge werklast minder tijd besteden aan bij- en nascholing in vergelijking met huisartsen met een lage werkbelasting. Met betrekking tot andere werkzaamheden in de praktijk werd geen verschil gevonden.

Het aantal uren in directe patiëntenzorg wordt echter niet volledig door de werkbelasting van huisartsen bepaald. Dit betekent dat ook andere manieren voor komen om met een bepaalde hoeveelheid werkbelasting om te gaan. In *Hoofdstuk 6* is bijvoorbeeld gevonden dat een hogere werkbelasting samenhangt met kortere consulten met individuele patiënten. Zowel de totale werkbelasting als de dagelijkse werkbelasting hadden hun onafhankelijke invloed. Dat betekent dat, in het algemeen, consulten op drukke dagen korter zijn en extra kort wanneer de huisarts een drukke praktijk heeft.

Ib. Verschillen huisartsen in de manier waarop zij met hun werkbelasting omgaan?

Ic. Hoe kunnen deze verschillen worden verklaard?

We verwachtten dat bepaalde huisartsen op een andere manier op een gegeven hoeveelheid werkbelasting reageren, in termen van hun allocatie van tijd, dan andere huisartsen. Dit zou gerelateerd zijn aan het honoreringssysteem (in loondienst of vrijgevestigd aan de ene kant en de verzekeringswijze van de patiënt aan de andere kant), de leeftijd en het geslacht van de huisarts, de soort praktijk (solo of samenwerkend), en of men een huisarts in opleiding in de praktijk begeleidde. De resultaten in *Hoofdstuk 4* tonen aan dat slechts één aspect van invloed is. Wanneer huisartsen relatief meer particulier verzekerden in hun praktijk hebben is de relatie tussen werkbelasting en het aantal uren besteed aan directe patiëntenzorg sterker. Dit heeft te maken met het verschil in het honoreringssysteem van ziekenfonds- en particulier-verzekerden. Particulieren betalen de huisarts per consult, terwijl hij een abonnementshonorarium krijgt voor zijn ziekenfondsverzekerden. Uit de literatuur is bekend dat (huis)artsen hun tijd onder verschillende honoreringssystemen anders indelen. Daarbij wordt er van uitgegaan dat de verdeling van werktijd en vrije tijd bepaald wordt door contractuele overeenkomsten, de relatie tussen werktijd en inkomen, en de anticipatie van huisartsen op mogelijke reacties van patiënten. In een abonnements-systeem wordt een hogere werkbelasting opgevangen door een groter aantal patiënten in eenzelfde hoeveelheid tijd te behandelen, omdat er geen directe relatie is tussen de werkuren en de honorering. In een systeem waarin per verrichting of per consult wordt betaald is er een directer relatie tussen werktijd en inkomen. Daarom wordt een sterkere relatie verwacht tussen werkbelasting en de hoeveelheid tijd die aan directe patiëntenzorg wordt besteed. Daarbij speelt ook dat patiënten in een dergelijk systeem makkelijker van huisarts kunnen wisselen of rechtstreeks een medisch specialist kunnen bezoeken. Dit soort competitie indiceert dat de huisartsen zich bewust moeten zijn van een mogelijk verlies aan inkomen in de toekomst. Zij houden daarom mogelijk meer rekening met de wensen van de patiënten. Vandaar dat verwacht wordt dat huisartsen minder snel geneigd zullen zijn om de tijd te beperken die per individuele patiënt wordt besteed. Dit betekent in het algemeen dat de positieve relatie tussen werkbelasting en het aantal uren in directe patiëntenzorg sterker zal zijn in een 'fee-for-service'-systeem dan in een gesalarieerd of abonnements-systeem. Uitgangspunt is dat huisartsen met een hogere percentage particulier verzekerden in hun praktijk eerder geneigd zullen zijn om met hun werkbelasting om te

gaan zoals hierboven is beschreven met betrekking tot het 'fee-for-service'-systeem. Dit idee is in *Hoofdstuk 4* bevestigd. Echter in *Hoofdstuk 6* wordt niet gevonden dat de relatie tussen werkbelasting en de consultduur beïnvloed wordt door het type honorering. Dit wijst er op dat huisartsen zich mogelijk niet in ieder contact bewust zijn van de verzekeringsvorm van de patiënt.

Met betrekking tot de consultduur is ook gekeken in hoeverre kenmerken van patiënten en de gepresenteerde gezondheidsproblemen bepaalden hoe sterk de relatie met werkbelasting is. Daarbij ging het om het soort probleem (psychosociaal of niet), de gepercipieerd ernst en de onzekerheid van de huisarts omtrent de diagnose, en het opleidingsniveau van de patiënt. De multiniveau-analyses in *Hoofdstuk 6* laten een aantal statistisch significante resultaten zien. Ten eerste bleek dat de negatieve relatie tussen werkbelasting en consultduur sterker was in duo- of groepspraktijken vergeleken met solo-praktijken. Dit wordt verklaard door de assumptie dat solo-werkende huisartsen meer afhankelijk zijn van hun patiënten als bron van sociale waardering. Dit betekent dat zij meer rekening zullen houden met de wensen van hun patiënten en dat ontevredenheid van patiënten een sterkere invloed zal hebben op hun sociale waardering dan in duo- of groepspraktijken. Ten tweede is er een sterke negatieve relatie gevonden tussen de dagelijkse werkbelasting en de consultduur op een dag, wanneer er meer psychosociale klachten werden gepresenteerd, de huisarts de ernst van de klachten lager heeft ingeschat, hij minder zeker was van de diagnoses en het gemiddelde opleidingsniveau van de patiënten hoger was. Deze kenmerken van het gepresenteerde gezondheidsproblemen en de patiënten zijn allemaal geïdentificeerd als condities die de handelings- of keuzevrijheid van de huisarts in een consult vergroten. Dit betekent dat niet-medische aspecten, zoals werkbelasting, een belangrijkere rol kunnen spelen. In tegenstelling tot de hypothesen, leidde deze grotere keuzevrijheid tot een positieve relatie tussen werkbelasting en duur van de consulten wanneer de huisartsen onzekerder waren over de diagnoses en wanneer relatief meer lager opgeleide patiënten de huisarts consulteerden. Het resultaat dat werkbelasting sterker gerelateerd is aan kortere consulten wanneer er relatief meer psychosociale en minder ernstige klachten worden gepresenteerd is in overeenstemming met de hypothesen.

De tweede onderzoeksvraag heeft betrekking op de relatie tussen werkbelasting en de inhoud van de verleende zorg.

2a. *Hoe hangt de werkbelasting van huisartsen samen met de zorg die wordt verleend?*

In *Hoofdstuk 6* is nagegaan in hoeverre de tien soorten interventies die zijn onderscheiden gerelateerd zijn aan de totale en dagelijkse werkbelasting van de huisartsen. Met betrekking tot de dagelijkse werkbelasting is slechts één hoofdeffect gevonden: op drukke dagen vragen huisartsen minder vaak diagnostische tests bij externe laboratoria aan. Daarnaast bleek, onder specifieke omstandigheden die hieronder worden besproken, een hogere dagelijkse werkbelasting gerelateerd te zijn aan minder lichamelijk onderzoek, minder counselling, meer afwachten en meer vervolgafspraken.

In het algemeen hing de totale werkbelasting samen met drie aspecten van de verleende zorg. Drukke huisartsen doen minder medisch technische verrichtingen zoals het geven van injecties en kleine chirurgie, schrijven vaker een geneesmiddel voor en hebben een hoger verwijscijfer naar andere eerstelijnsvoorzieningen (met name de fysiotherapeut) dan huisartsen in minder drukke praktijken. Tevens gold dat een hogere totale werkbelasting, alleen onder specifieke omstandigheden, samenhang met hogere verwijscijfers naar de tweede lijn.

2b. *Is er een verschil tussen de samenhang van de totale en dagelijkse werkbelasting van huisartsen en de inhoud van de zorg?*

Deze studie laat zien dat de dagelijkse fluctuaties in werkbelasting minder invloed hebben op het handelen van de huisarts dan zijn totale werkbelasting. Waarschijnlijk hebben huisartsen die in een drukke praktijk werken een bepaalde werkstijl ontwikkeld die minder wordt beïnvloed door de dagelijkse werkdruk.

Zoals vermeld werd verwacht dat de twee aspecten van werkbelasting tot verschillende manieren van omgaan met werkbelasting zullen leiden. Er moet een onderscheid worden gemaakt tussen twee aspecten van de tijdsbesteding: de hoeveelheid tijd die een interventie direct in een bepaald consult kost en de verwachte hoeveelheid tijd die een interventie mogelijk in de toekomst met zich meebrengt. Hogere werkbelasting zal ertoe leiden dat een huisarts minder vaak interventies kiest die veel tijd kosten en vaker kiest voor opties die relatief minder tijd kosten. Een belangrijk verschil is dat een hogere werkbelasting op een bepaalde dag kan worden opgelost door bepaalde werkzaamheden uit te stellen, terwijl dit voor huisartsen die het altijd druk hebben een minder voor de hand liggende oplossing lijkt te zijn. De drie gevonden algemene relaties met de totale werkbelasting

lijken hiermee in overeenstemming. Medisch technische verrichtingen kosten direct tijd in een consult. Met betrekking tot het voorschrijven van geneesmiddelen is het tegenovergestelde verondersteld. De tijdsbesteding in de toekomst zijn bij beiden onduidelijk. Wat betreft de verwijzingen naar andere eerstelijnsvoorzieningen kon niet worden aangeven hoeveel tijd dit direct in een consult kost maar er werd wel een geringere tijdsbesteding in de toekomst verwacht omdat de kans op een vervolcontact lager zou zijn na een verwijzing. Alleen onder bepaalde omstandigheden, bleek de dagelijkse werkbelasting van huisartsen gerelateerd te zijn aan andere aspecten van de verleende zorg dan de totale werkbelasting. In overeenstemming met de verwachtingen hing een hogere dagelijkse werkbelasting in bepaalde gevallen samen met minder verrichtingen die direct tijd kosten in een consult (lichamelijk onderzoek en counselling) en meer uitstelgedrag (vaker afwachten of vervolgafspraken maken). Dit betekent echter wel dat uitstelgedrag ten gevolge van werkbelasting, in het algemeen, slechts in beperkte mate voorkomt.

2c. *Verschildt de relatie tussen werkbelasting en de inhoud van de verleende zorg tussen huisartsen en wordt deze relatie beïnvloed door kenmerken van patiënten en de gezondheidsproblemen die zij presenteren?*

2d. *Hoe kunnen deze verschillen worden verklaard?*

De multiniveau analyses die in *Hoofdstuk 6* zijn gepresenteerd geven zicht op een aantal speciale condities die de sterkte van het verband tussen de werkbelasting en enkele aspecten van de inhoud van de verleende zorg beïnvloeden. Opmerkelijk is dat dit allemaal kenmerken zijn van de patiënten en/of hun gezondheidsproblemen: de onderzochte huisarts- en praktijkkenmerken hadden geen invloed. Dit betekent echter niet dat de manier waarop met werkbelasting wordt omgegaan niet verschilt tussen huisartsen maar dat deze verschillen niet gerelateerd waren aan de kenmerken die theoretisch van belang worden geacht.

Hoewel slechts een paar condities van invloed waren op de sterkte van het verband tussen werkbelasting en aspecten van de inhoud van zorg, valt op dat de meeste te maken hadden met de mate van beslissingsvrijheid die de huisarts in een consult heeft. Meer vrijheid van keuze werd verwacht bij psychosociale klachten, minder ernstige problemen, wanneer de huisarts minder zeker is van de diagnose en wanneer het opleidingsniveau van de patiënten lager is. Zoals genoemd, betekent een grotere mate van handelingsvrijheid dat

niet-medische aspecten zoals werkbelasting een (grotere) rol kunnen spelen bij het handelen van de huisarts. De negatieve relatie tussen de totale werkbelasting en percentage medisch technische interventies was sterk wanneer de huisarts zekerder is over de diagnoses, terwijl dit bij een grotere mate van onzekerheid werd verwacht. Ook het gegeven dat de totale werkbelasting alleen een positieve relatie met de hoeveelheid verwijzingen naar de tweede lijn heeft wanneer het opleidingsniveau van de bezoekende patiënten lager is, komt niet overeen met de verwachtingen. De bevinding dat de positieve relatie tussen totale werkbelasting en de verwijzingen naar de andere eerstelijnsvoorzieningen sterker is wanneer de huisarts minder zeker was van de diagnoses was wel in lijn van de verwachtingen. Ook in overeenstemming met de voorspelling was dat alleen wanneer meer psychosociale klachten werden gepresenteerd, dagelijkse werkbelasting gerelateerd was aan minder lichamelijk onderzoek en counselling. De combinatie van een hoge dagelijkse werkbelasting en een minder ernstig gepercipieerde klachten betekende dat de huisarts vaker afwacht. Vervolgafspraken werden vaker gemaakt op drukke werkdagen met een relatief grote mate van onzekerheid over de diagnoses.

Ook werd verwacht dat de manier waarop werkbelasting samenhangt met de verleende zorg wordt beïnvloed door de mogelijke gevolgen van deze beslissingen voor het inkomen en de sociale waardering van de huisarts. Verschillen zijn voorspeld tussen huisartsen in loondienst en vrijgevestigde huisartsen. Tevens werd er een invloed verwacht van de verzekeringsvorm van de patiënt. Alleen met betrekking tot het laatste aspect zijn twee significante resultaten gevonden. In tegenstelling tot de verwachtingen was de negatieve relatie tussen dagelijkse werkbelasting en het aanvragen van externe diagnostiek sterker naarmate meer particulier verzekerden de huisarts bezochten. Aangezien particulier verzekerden de huisarts per consult betalen werd verwacht dat de huisarts eerder geneigd zou zijn om een vervolgcontact te indiceren, bijvoorbeeld om de resultaten van het diagnostisch onderzoek te bespreken. Ook de bevinding dat de positieve relatie tussen totale werkbelasting en de verwijscijfers naar de andere eerstelijnsvoorzieningen sterker is wanneer meer particulier verzekerden de huisarts consulteren is niet in overeenstemming met deze verwachtingen. Een verwijzing betekent namelijk dat er een kleinere kans is op de vervolgafpraak. Het is echter mogelijk dat de huisarts vanwege de kosten voor de patiënt vervolgafspraken bij particulier verzekerden beperkt, al dan niet onder druk van de patiënt zelf.

De derde onderzoeksvraag is gericht op de relatie tussen werkbelasting en de kwaliteit van de verleende zorg.

3a. Hangt de kwaliteit van zorg negatief samen met de werkbelasting van de huisarts?

In *Hoofdstuk 7* is de relatie tussen werkbelasting en kwaliteit van zorg bestudeerd. Kwaliteit wordt beperkt tot het perspectief van de medische professie. Dit kan afwijken van dat van andere belanghebbenden zoals patiënten, verzekeraars of beleidmakers. In dit onderzoek is geen duidelijk negatief effect van werkbelasting op de kwaliteit van zorg kunnen aantonen. Er zijn echter wel indicaties dat kwaliteit van zorg niet volledig los staat van werkbelasting.

3b. In hoeverre kan deze relatie worden verklaard met behulp van keuzes in de allocatie van tijd van huisartsen?

Kwaliteit van zorg wordt niet beschouwd als een bewuste keuze van huisartsen, maar als een gevolg van de manier waarop zij hun tijd verdelen, gegeven een bepaalde hoeveelheid werkbelasting. Hogere werkbelasting betekent meer werkuren, minder tijd voor bij- en nascholing en kortere consulten. Deze drie aspecten kunnen negatieve gevolgen hebben voor de kwaliteit van zorg. In *Hoofdstuk 7* wordt dit op één punt bevestigd. Huisartsen die meer uren aan directe patiëntenzorg besteedden weken vaker af van de indicatoren voor adequate huisartsenzorg (de gebruikte kwaliteitsmaat). Wanneer alleen de indicatoren met betrekking tot het voorschrijven van geneesmiddelen in ogenschouw worden genomen, was deze relatie statistisch significant. Er waren ook enkele indicaties dat andere aspecten van de allocatie van tijd gerelateerd waren aan de kwaliteitsmaat, maar aangezien de gevonden relaties niet statistisch significant waren is afdoende bewijs is alleen met betrekking tot het aantal werkuren geleverd.

Conclusie

In overeenstemming met het onderhavig onderzoek zijn ook in eerdere onderzoeken naar de relatie tussen werkbelasting van huisartsen en de inhoud en kwaliteit van hun zorg zijn vaak slechts zwakke relaties gevonden. Door middel van het theoretisch model kan nu

echter worden verklaard waarom bepaalde 'common sense'-gedachten omtrent deze relaties niet in empirische onderzoeken worden bevestigd. Hogere werkbelasting hangt slechts in geringe mate samen met kortere consulten omdat er ook een duidelijke positieve relatie is tussen werkbelasting en het aantal werkuren in directe patiëntenzorg. Daarnaast is de relatie tussen werkbelasting en de inhoud van de verleende zorg waarschijnlijk minder sterk als wel wordt verwacht omdat vooral relevante patiëntkenmerken en de gepresenteerde gezondheidsproblemen het handelen van de huisarts bepalen. Structurele kenmerken zoals werkbelasting en honoreringssysteem spelen vaak in tweede instantie pas een rol: vooral als de patiënt en het gezondheidsprobleem dit toelaat. In het algemeen kan worden geconcludeerd dat het handelen van huisartsen in consulten voor een belangrijk deel worden bepaald door het gepresenteerde gezondheidsprobleem en relevante patiëntkenmerken zoals leeftijd en geslacht. Hoewel er een viertal hoofdeffecten van werkbelasting is gevonden is te stellen dat meer structurele aspecten zoals werkbelasting en honoreringssysteem een belangrijkere rol in de beslissingen van huisartsen spelen wanneer er meer beslissingsvrijheid in een consult is. Deze conclusie bevestigt het uitgangspunt dat het belangrijkste doel van een huisarts is om zo goed mogelijke zorg te leveren aan de patiënt die hem consulteert. Andere doelen zoals kortere wachttijden voor andere patiënten, inkomen, vrije tijd en sociale waardering van collega's zijn alleen relevant wanneer hun realisatie het hoofddoel niet te sterk negatief beïnvloedt.

Implicaties voor verder onderzoek

De betekenis van de dagelijkse werkbelasting op de inhoud en kwaliteit van zorg is een belangrijk aspect voor toekomstig onderzoek op dit gebied. Vanwege praktische beperkingen konden, in het onderhavig onderzoek, alleen de verwachte relaties op het niveau van werkdagen worden bestudeerd. Dit is mogelijk niet voldoende specifiek om de feitelijke gevolgen van werkbelasting als situationeel kenmerk, in termen van een volle wachtkamer, vast te stellen. De dagelijkse werkbelasting is pas achteraf bepaald. Het is niet zeker of de huisarts zich bewust was van de totale dagelijkse werkbelasting op het moment waarop hij beslissingen in een bepaald consult moest nemen. De ontwikkeling van snellere computers met meer geheugen zal het in de toekomst mogelijk maken om

dezelfde soort analyses uit te voeren op het niveau van ieder afzonderlijk consult. Door middel van logistische regressie zal het dan mogelijk zijn om preciezer de effecten vast te stellen dan op het geaggregeerde dagniveau zoals in dit onderzoek is gedaan. Daarmee wordt ook het probleem opgelost dat een effect op een geaggreerd niveau een andere betekenis kan hebben dan op het lagere niveau.

Werkbelasting was in deze studie beperkt tot objectieve aspecten. Subjectieve elementen zoals gevoelens van stress en 'burnout' zijn niet meegenomen. Uit onderzoek blijkt echter dat deze twee aspecten slechts zwak met elkaar samenhangen. Het is dan ook interessant om de invloed van subjectieve aspecten op de inhoud en kwaliteit van zorg in de toekomst te bestuderen. Daarnaast was de werkbelastingsmaat beperkt tot het aantal contacten dat door de huisarts is afgehandeld. Hoewel er gewogen is voor consultaties in de praktijk, visites en telefonische consulten kon de feitelijke druk van een bepaald consult onvoldoende worden vastgesteld. Het is waarschijnlijk dat contacten met bepaalde groepen patiënten zoals ouderen, chronisch zieken of veeleisende patiënten zwaarder zijn in termen van werkbelasting dan contacten met andere groepen. Toekomstig onderzoek moet nagaan in hoeverre dit een effect heeft op de inhoud en kwaliteit van zorg.

Een probleem bij het uitwerken van de hypothesen omtrent werkbelasting en de tijdsbesteding in een bepaald consult was dat er geen geschikte gegevens beschikbaar waren over de tijd die aan bepaalde verrichtingen wordt besteed. Vooral observatie-onderzoek biedt mogelijkheden om na te gaan of de veronderstellingen met betrekking tot de tijd die bepaalde handelingen in een consult kosten juist waren.

Een belangrijke bevinding van het onderhavig onderzoek die verder dient te worden onderzocht is dat structurele kenmerken zoals werkbelasting vooral het gedrag van huisartsen beïnvloeden wanneer er voldoende keuzevrijheid in een consult is. Een concreet onderwerp daarbij is in hoeverre de ontwikkeling en verspreiding van de NHG-standaarden ertoe hebben geleid dat die keuzevrijheid is beperkt en dat daardoor de verschillen tussen huisartsen en de behandeling van verschillende groepen patiënten zijn afgenomen.

Een ander concreet onderwerp voor nader onderzoek is de relatie tussen werkbelasting, allocatie van tijd en kwaliteit van zorg. Hoewel geen afdoende bewijs kon worden geleverd, wijzen de resultaten er wel op dat de manier waarop huisartsen de beschikbare tijd verdelen gerelateerd is aan de kwaliteit van zorg. Zoals gezegd, is kwaliteit in dit

onderzoek alleen bekeken vanuit een professioneel medisch perspectief. Het lijkt van belang om ook andere perspectieven zoals het dat van de patiënten nader te analyseren. Dergelijk onderzoek kan mogelijk ook meer inzicht geven op de juistheid van sommige assumpties in dit onderzoek met betrekking tot sociale waardering van patiënten.

Tenslotte dient nader onderzoek gedaan te worden naar de methode die in dit onderzoek is ontwikkeld om de kwaliteit van zorg in beeld te brengen. Ondanks enkele kanttekeningen, bleek dat het mogelijk is om bepaalde relevante aspecten van de kwaliteit van zorg te meten via omvangrijke, breed opgezette dataverzameling zoals in de nationale studie. De NHG-standaarden kunnen worden gebruikt om indicatoren voor adequate huisartsenzorg op te stellen. Het is niet noodzakelijk dat alle richtlijnen uit iedere standaard bij de vaststelling van de kwaliteit van zorg worden betrokken. Dit betekent dat in de toekomst meer aandacht moet worden besteed aan de vertaling van de richtlijnen in een beperkt aantal indicatoren dat in onderzoek kan worden gebruikt. Een dergelijke, globale methode is vooral van belang om de determinanten van de kwaliteit van zorg in grootschalige onderzoeken te bestuderen. Voor andere toepassingen van de NHG-standaarden, bijvoorbeeld in intercollegiale toetsing of in de opleiding, zijn meer gedetailleerde methoden nodig (zie bijvoorbeeld Hofstra & Zwaard, 1992).

Implicaties voor het beleid

Hoewel de gegevens die in dit onderzoek zijn gebruikt 10 jaar geleden zijn verzameld, kunnen uit de resultaten enkele implicaties voor het beleid ten aanzien van de positie van de huisarts in de Nederlandse gezondheidszorg worden afgeleid. Daarbij moet wel rekening worden gehouden met belangrijke ontwikkelingen in de huisartsenzorg zoals de verdere publikatie en implementatie van de NHG-standaarden.

Zoals in het begin van deze samenvatting is gesteld wordt het versterken van de poortwachter-positie van de huisarts gezien als een belangrijk instrument om de efficiëntie en kwaliteit van de Nederlandse gezondheidszorg te verbeteren. Maatregelen die daartoe moeten leiden zijn onder andere betere afspraken over de taken en verantwoordelijkheden van huisartsen, aandacht voor de relatie tussen huisarts en specialist, verbetering van de praktijkorganisatie (delegatie naar praktijkassistentes, praktijkgrootte), verder invullen van het kwaliteitsbeleid (bijvoorbeeld de verplichte deelname van huisartsen aan na- en

bijcholingsactiviteiten en het standaardenbeleid) en veranderingen in het honoreringssysteem. Op basis van de resultaten van de onderhavige studie kan een aantal van de voorgestelde maatregelen nog eens kritisch worden besproken.

De onderhavige studie biedt belangrijke argumenten voor verdere praktijkverkleining. De afgelopen 10 jaar is het gemiddeld aantal patiënten per huisarts gedaald van 2350 naar 2300 (Groenewegen & Delnoij, 1997). Dit is echter in vergelijking met een land als Engeland, waar huisartsen vergelijkbare positie hebben, erg hoog. Daar bevat de gemiddelde praktijk ongeveer 2000 patiënten (Fleming, 1993). Het bleek dat totale werkbelasting, die gerelateerd is aan praktijkgrootte, in het algemeen samenhangt met kortere consulten, hogere voorschrijf- en verwijscijfers naar andere eerstelijnsvoorzieningen, en zelf minder medisch technische verrichtingen doen. Verder bleek dat, wanneer relatief lager opgeleiden de huisarts consulteerden, huisartsen in drukke praktijken eerder geneigd waren om te verwijzen naar de tweede lijn. Deze resultaten lijken in tegenspraak met een belangrijke conditie voor een sterke positie als poortwachter, namelijk dat huisarts zoveel mogelijk hun patiënten zelf behandelen en ze zo beperkt mogelijk verwijzen naar andere zorgaanbieders. Tevens is geconstateerd dat huisartsen met een hogere totale werkbelasting meer uren aan directe patiëntenzorg besteden. Dit hangt weer samen met een hoger aantal afwijkingen van de indicatoren voor adequate huisartsenzorg. Ook de bevinding dat hogere werkbelasting samengaat met minder tijd die aan bij- en nascholing wordt besteed is hierbij van belang. Dit resultaat onderstreept het belang van de huidige regel dat de huisarts verplicht is gesteld om minimaal 40 uren per jaar aan dit soort activiteiten te besteden in verband met zijn herregistratie.

Hoewel dagelijkse werkbelasting minder belangrijke implicaties heeft voor de inhoud en kwaliteit van zorg kan met sommige bevindingen mogelijk rekening worden gehouden bij het formuleren van maatregelen om de positie van de huisarts te versterken. Het bleek dat consultaties op drukke dagen veel korter waren dan op minder drukke dagen, los van de totale werkbelasting van de huisarts. Zoals gesteld is dit aspect waarschijnlijk van groot belang voor de patiënten omdat zij beter in staat zijn om te beoordelen of men voldoende tijd in een consult had dan de vraag of de juiste behandeling is verricht. Versterking van de positie als poortwachter houdt ook in dat patiënten vertrouwen hebben in de huisarts dat die hen goed behandelt. De dagelijkse werkbelasting kan worden gereguleerd door het

invoeren van afspraakspreekuren in plaats van inloopspreekuren. Ook delegatie van taken en consulten naar de praktijkassistenten kan hiervoor een instrument zijn.

Een ander punt van discussie is de honorering van huisartsen. Er zijn ideeën om de betaling per consult (door particulier verzekerden) en het abonnementshonorarium (voor ziekenfondspatiënten) te laten integreren in een nieuw honoreringssysteem. De basis van een dergelijk systeem zou een gedifferentieerd abonnementshonorarium moeten zijn voor elke patiënt die in een praktijk is ingeschreven. Volgens de resultaten zal deze verandering, er alleen toe leiden dat de positieve relatie tussen werkbelasting en het aantal uren in directe patiëntenzorg zwakker wordt. De relaties tussen werkbelasting aan de ene kant en andere werkzaamheden in de praktijk, de consultduur en de inhoud van zorg aan de andere kant zullen nauwelijks veranderen. In de meeste gevallen is er geen effect van het percentage particulier verzekerden gevonden.

Vanuit meer medisch-inhoudelijk is de behandeling van psychosociale problemen in de huisartspraktijk relevant. Er is een sterkere negatieve relatie tussen de dagelijkse werkbelasting aan de ene kant en de duur van de consulten en het aantal consulten waarin counselling-activiteiten zijn geregistreerd, wanneer relatief meer psychosociale klachten worden gepresenteerd. Dit heeft te maken met het feit dat de keuzevrijheid van huisartsen bij dergelijke klachten groter is. Dit betekent dat de behandeling van psychosociale problematiek een expliciet onderwerp dient te zijn in de opleiding en na-en bijscholing om deze keuzevrijheid te beperken. Ook de ontwikkeling en implementatie van standaarden op dit gebied kan ertoe bijdragen dat de beslissingsruimte wordt beperkt. Daardoor kan de invloed van werkbelasting verminderen.

Tenslotte nog een algemene opmerking over de ontwikkeling en implementatie van de NHG-standaarden. Zoals gesteld zal dit de keuzevrijheid van huisartsen in afzonderlijke consulten enigszins beperken waardoor structurele omstandigheden een kleinere rol kunnen spelen bij het handelen van de huisarts. Hierbij moet echter ook worden gerealiseerd dat het werken volgens standaarden waarschijnlijk meer tijd kost, bijvoorbeeld omdat regelmatige vervolgafspraken en check-ups bij chronische patiënten worden benadrukt (zie onder andere de Bakker e.a., 1995). Dit betekent dat werkbelasting mogelijk een grotere rol gaat spelen in consulten waar de huisarts meer handelingsvrijheid heeft, bijvoorbeeld als er meer onzekerheid over de diagnose is of bij gezondheidsproblemen waar geen duidelijke standaarden of richtlijnen zijn gedefinieerd. In de afgelopen

jaren is het aantal NHG-standaarden substantieel toegenomen. Tegen deze achtergrond is het van belang om ook in een nieuwe studie de relatie tussen werkbelasting en inhoud en kwaliteit van zorg nader te bestuderen.

De belangrijkste conclusie van de onderhavige studie is echter dat structurele kenmerken een beperkte invloed hebben op het handelen van huisartsen. Dat betekent dat beleid dat primair gericht is op deze structurele aspecten waarschijnlijk minder spectaculaire effecten zal hebben dan op basis van 'common sense'-gedachten kan worden verwacht.

Appendix 1. Complete results of multilevel analyses of Chapter 6

Table 6.7 Results of multilevel analysis on average length of consultation per working day

	B	SE B	Beta
Random part			
level 2	2.43	0.28	
level 1	1.48	0.02	
Fixed part			
cons	12.19	0.95	
<i>Workload</i>			
Daily workload	-0.02	0.01	-0.09*
Overall workload	-0.17	0.04	-0.35**
Interaction daily and overall workload	0.00	0.00	0.00
<i>Patients</i>			
Mean age	0.01	0.00	0.05**
% female	0.45	0.12	0.03**
Mean education ¹	-0.44	0.07	-0.05**
% publicly insured	-0.69	0.12	-0.05**
<i>Health problems</i>			
% new	0.07	0.13	0.00
% acute	-0.55	0.21	-0.03**
% chronic	-0.04	0.22	-0.00
% psychosocial	3.53	0.29	0.11**
Mean severity ¹	-0.09	0.08	-0.01
Mean uncertainty	0.15	0.07	0.02*
<i>GP/Practice</i>			
Age	-0.01	0.02	-0.04
Gender (female)	-0.51	0.40	-0.07
Fixed salary	-0.14	0.38	-0.02
Working in partnership	0.36	0.28	0.08
Delegation to practice secretary	-0.03	1.04	-0.00
Urbanization (rural)			
mixed	-1.87	0.58	-0.41**
suburban	-2.33	0.57	-0.51**
urban	-2.17	0.59	-0.37**
<i>Interactions</i>			
Daily workload with:			
- % publicly insured	0.01	0.01	0.02
- working in partnership	-0.01	0.00	-0.02*
- % psychosocial problems	-0.07	0.02	-0.02**
- mean uncertainty	0.00	0.01	0.00
- mean severity ¹	0.00	0.00	0.00
- mean level of education ¹	0.01	0.01	0.01
Overall workload with:			
- % publicly insured	0.05	0.03	0.07
- working in partnership	-0.12	0.06	-0.15*
- % psychosocial problems	-0.04	0.05	-0.00
- mean uncertainty	0.05	0.01	0.03**
- mean severity ¹	-0.03	0.01	-0.03**
- mean level of education ¹	0.05	0.01	0.03*

Significance: * p < 0.05; ** p < 0.01

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.1.

Table 6.10a Results of multilevel analysis on percentage of physical examinations per working day

	B	SE B	Beta
Random part			
level 2	63.38	7.33	
level 1	93.11	1.50	
Fixed part			
cons	65.56	4.95	
<i>Workload</i>			
Daily workload	-0.02	0.02	-0.01
Overall workload	0.14	0.19	0.05
Interaction daily and overall workload	0.00	0.00	0.01
<i>Patients</i>			
Mean age	-0.21	0.02	-0.11**
% female	-2.82	0.52	-0.03**
Mean education ¹	0.01	0.54	0.00
% publicly insured	-2.26	0.95	-0.03*
<i>Health problems</i>			
% new	13.19	1.00	0.13**
% acute	19.94	1.70	0.18**
% chronic	19.44	1.77	0.16**
% psychosocial	-27.49	2.27	-0.14**
Mean severity ¹	1.76	0.61	0.05**
Mean uncertainty	0.28	0.52	0.01
<i>GP/Practice</i>			
Age	-0.00	0.09	-0.00
Gender (female)	0.99	2.09	0.02
Fixed salary	0.12	1.98	0.00
Single-handed practice	-0.84	1.46	-0.03
Delegation to practice secretary	15.46	5.39	0.15**
Urbanization (rural)			
mixed	3.75	3.00	0.13
suburban	3.03	2.93	0.11
urban	3.18	3.05	0.09
<i>Interactions</i>			
Daily workload with:			
- single-handed practice	0.01	0.03	0.00
- % psychosocial problems	-0.37	0.18	-0.02*
- mean uncertainty	-0.00	0.04	-0.00
- mean severity ¹	0.04	0.04	0.01
- mean level of education ¹	-0.08	0.05	-0.01
Overall workload with:			
- single-handed practice	-0.04	0.29	-0.01
- % psychosocial problems	0.27	0.38	0.01
- mean uncertainty	-0.02	0.11	-0.00
- mean severity ¹	-0.12	0.12	-0.02
- mean level of education ¹	0.02	0.12	0.00

Significance: * p < 0.05; ** p < 0.01

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Table 6.10b Results of multilevel analysis on the percentage of practice-based diagnostics per working day

	B	SE B	Beta
Random part			
level 2	7.97	0.98	
level 1	33.96	0.55	
Fixed part			
cons	5.60	1.86	
<i>Workload</i>			
Daily workload	0.06	0.04	0.07
Overall workload	-0.17	0.11	-0.12
Interaction daily and overall workload	-0.00	0.04	-0.02
<i>Patients</i>			
Mean age	0.01	0.01	0.01
% female	3.29	0.57	0.06**
Mean education ¹	-1.05	0.33	-0.04**
% privately insured	0.65	0.58	0.01
<i>Health problems</i>			
% new	-2.09	0.60	-0.04**
% acute	-14.56	1.02	-0.27**
% chronic	-15.05	1.07	-0.26**
% psychosocial	-16.57	1.37	-0.17**
Mean severity ¹	0.48	0.35	0.02
Mean uncertainty	1.86	0.30	0.09**
<i>GP/Practice</i>			
Age	0.05	0.03	0.06
Gender (female)	-1.83	0.77	-0.08*
Working independently	0.28	0.78	0.01
Single-handed practice	-0.86	0.53	-0.06
Delegation to practice secretary	3.41	1.97	0.07
Urbanization (rural)			
mixed	1.96	1.11	0.14
suburban	0.82	1.10	0.06
urban	0.71	1.13	0.04
<i>Interactions</i>			
Daily workload with:			
- % privately insured	0.08	0.05	0.07
- single-handed practice	-0.01	0.02	-0.01
- working independently	0.03	0.02	0.01
- % psychosocial problems	-0.14	0.11	-0.01
- mean uncertainty	0.01	0.03	0.01
- mean severity ¹	0.02	0.02	0.01
- mean level of education ¹	-0.02	0.03	-0.01
Overall workload with:			
- % privately insured	-0.15	0.12	-0.07
- single-handed practice	0.15	0.11	0.06
- working independently	-0.01	0.15	-0.00
- % psychosocial problems	-0.02	0.23	-0.00
- mean uncertainty	0.06	0.07	0.01
- mean severity ¹	0.06	0.07	0.02
- mean level of education ¹	-0.00	0.07	-0.00

Significance: * p < 0.05; ** p < 0.01

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Table 6.10c Results of multilevel analysis on the percentage of out-of-office diagnostics per working day

	B	SE B	Beta
Random part			
level 2	5.54	0.70	
level 1	34.03	0.55	
Fixed part			
cons	11.55	1.60	
<i>Workload</i>			
Daily workload	-0.08	0.04	-0.11*
Overall workload	0.01	0.10	0.01
Interaction daily and overall workload	0.00	0.00	0.01
<i>Patients</i>			
Mean age	0.00	0.01	0.00
% female	1.00	0.57	0.02
Mean education ¹	-0.83	0.33	-0.03*
% privately insured	2.08	0.57	0.05**
<i>Health problems</i>			
% new	-0.70	0.60	-0.01
% acute	-3.60	1.02	-0.07**
% chronic	-3.12	1.06	-0.06**
% psychosocial	-2.90	1.36	-0.03*
Mean severity ¹	-0.35	0.33	-0.02
Mean uncertainty	4.83	0.30	0.24**
<i>GP/Practice</i>			
Age	-0.02	0.03	-0.02
Gender (female)	-1.20	0.66	-0.06
Working independently	-0.26	0.67	-0.01
Single-handed practice	-0.47	0.46	-0.04
Delegation to practice secretary	1.11	1.68	0.02
Urbanization (rural)			
mixed	-1.41	0.95	-0.11
suburban	-1.23	0.93	-0.09
urban	-0.89	0.96	-0.05
<i>Interactions</i>			
Daily workload with:			
- % privately insured	-0.10	0.05	-0.09*
- single-handed practice	0.01	0.02	0.01
- working independently	-0.01	0.02	-0.00
- % psychosocial problems	-0.11	0.11	-0.01
- mean uncertainty	0.03	0.03	0.01
- mean severity ¹	0.01	0.02	0.01
- mean level of education ¹	-0.01	0.03	-0.00
Overall workload with:			
- % privately insured	0.09	0.12	0.04
- single-handed practice	0.04	0.09	0.02
- working independently	0.23	0.13	0.06
- % psychosocial problems	-0.24	0.23	-0.01
- mean uncertainty	0.01	0.07	0.00
- mean severity ¹	-0.01	0.06	-0.00
- mean level of education ¹	-0.12	0.07	-0.02

Significance: * p < 0.05; ** p < 0.01

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Table 6.10d Results of multilevel analysis on the percentage of wait and see per working day

	B	SE B	Beta
Random part			
level 2	14.70	1.73	
level 1	31.50	0.51	
Fixed part			
cons	4.45	2.44	
<i>Workload</i>			
Daily workload	0.03	0.03	0.04
Overall workload	-0.16	0.12	-0.10
Interaction daily and overall workload	0.00	0.00	0.00
<i>Patients</i>			
Mean age	-0.04	0.01	-0.04**
% female	-0.90	0.55	-0.02
Mean education ¹	0.19	0.32	0.01
% privately insured	-0.13	0.56	-0.00
<i>Health problems</i>			
% new	1.92	0.58	0.04**
% acute	3.34	0.99	0.06**
% chronic	0.94	1.03	0.02
% psychosocial	1.12	1.32	0.01
Mean severity ¹	0.99	0.35	0.05**
Mean uncertainty	1.38	0.30	0.06**
<i>GP/Practice</i>			
Age	-0.07	0.04	-0.08
Gender (female)	2.02	1.01	0.09*
Working independently	-0.81	1.04	-0.04
Single-handed practice	-0.53	0.71	-0.04
Delegation to practice secretary	-0.49	2.61	-0.01
Urbanization (rural)			
mixed	2.43	1.48	0.17
suburban	2.21	1.45	0.15
urban	2.44	1.49	0.13
<i>Interactions</i>			
Daily workload with:			
- % privately insured	0.05	0.05	0.04
- single-handed practice	-0.01	0.02	-0.01
- working independently	-0.02	0.02	-0.01
- % psychosocial problems	-0.04	0.11	-0.00
- mean uncertainty	-0.03	0.02	-0.01
- mean severity ¹	0.04	0.02	0.02*
- mean level of education ¹	0.02	0.03	0.01
Overall workload with:			
- % privately insured	0.02	0.12	0.05
- single-handed practice	0.14	0.14	0.06
- working independently	0.03	0.19	0.01
- % psychosocial problems	0.02	0.22	0.00
- mean uncertainty	0.11	0.07	0.02
- mean severity ¹	-0.00	0.07	-0.00
- mean level of education ¹	-0.02	0.07	-0.00

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Table 6.10e Results of multilevel analysis on percentage of counselling and advice per working day

	B	SE B	Beta
Random part			
level 2	520.90	58.75	
level 1	136.90	2.20	
Fixed part			
cons	83.14	13.88	
<i>Workload</i>			
Daily workload	-0.03	0.02	-0.01
Overall workload	0.45	0.52	-0.08
Interaction daily and overall workload	0.01	0.00	0.01
<i>Patients</i>			
Mean age	-0.17	0.03	-0.05**
% female	-1.06	1.15	-0.01
Mean education ¹	-1.39	0.66	-0.01
% publicly insured	0.25	1.16	0.00
<i>Health problems</i>			
% new	6.74	1.22	0.03
% acute	18.00	2.07	0.08**
% chronic	13.59	2.16	0.06**
% psychosocial	38.07	2.76	0.10**
Mean severity ¹	1.11	0.77	0.01
Mean uncertainty ¹	0.17	0.63	0.00
<i>GP/Practice</i>			
Age	-0.73	0.25	-0.20**
Gender (female)	9.11	5.88	0.10
Fixed salary	0.81	5.58	0.01
single-handed practice	-1.78	4.12	-0.03
Delegation to practice secretary	28.89	15.20	0.14
Urbanization (rural)			
mixed	-4.19	8.45	-0.07
suburban	-10.42	8.27	-0.19
urban	-6.22	8.62	-0.09
<i>Interactions</i>			
Daily workload with:			
- single-handed practice	-0.05	0.03	-0.01
- % psychosocial problems	-0.47	0.22	-0.01 [*]
- mean uncertainty	-0.02	0.05	-0.00
- mean severity ¹	0.01	0.04	0.00
- mean level of education ¹	0.03	0.06	0.00
Overall workload with:			
- single-handed practice	1.25	0.81	0.13
- % psychosocial problems	0.12	0.46	0.00
- mean uncertainty	-0.00	0.14	-0.00
- mean severity ¹	-0.22	0.15	-0.02
- mean level of education ¹	-0.15	0.14	-0.01

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Table 6.10f Results of multilevel analysis on percentage of technical medical interventions per working day

	B	SE B	Beta
Random part			
level 2	10.42	0.28	
level 1	45.73	0.74	
Fixed part			
cons	4.62	2.11	
<i>Workload</i>			
Daily workload	0.01	0.01	0.01
Overall workload	-0.21	0.08	-0.12**
Interaction daily and overall workload	-0.00	0.00	-0.01
<i>Patients</i>			
Mean age	-0.03	0.01	-0.03**
% female	-2.66	0.66	-0.04**
Mean education ¹	-0.26	0.38	-0.01
% publicly insured	-0.74	0.65	-0.01
<i>Health problems</i>			
% new	-1.20	0.70	-0.02
% acute	0.43	1.19	0.01
% chronic	2.06	1.24	0.03
% psychosocial	-6.56	1.58	-0.06**
Mean severity ¹	0.10	0.40	0.00
Mean uncertainty	-3.13	0.35	-0.13**
<i>GP/Practice</i>			
Age	-0.01	0.04	-0.01
Gender (female)	0.67	0.88	0.03
Fixed salary	-0.42	0.83	-0.02
Single-handed practice	1.17	0.61	0.07
Delegation to practice secretary	0.75	2.25	0.01
Urbanization (rural)			
mixed	6.32	1.26	0.39**
suburban			
urban	3.80	1.28	0.19**
<i>Interactions</i>			
Daily workload with:			
- single-handed practice	0.01	0.02	0.01
- % psychosocial problems	-0.08	0.13	-0.01
- mean uncertainty	0.03	0.03	0.01
- mean severity ¹	-0.01	0.02	-0.00
- mean level of education ¹	-0.04	0.03	-0.01
Overall workload with:			
- single-handed practice	0.01	0.12	0.00
- % psychosocial problems	0.04	0.26	0.00
- mean uncertainty	0.17	0.08	0.03*
- mean severity ¹	0.09	0.08	0.02
- mean level of education ¹	-0.03	0.08	-0.00

Significance: * p < 0.05; ** p < 0.01

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Table 6.10g Results of multilevel analysis on percentage of prescription of drugs per working day

	B	SE B	Beta
Random part			
level 2	43.27	5.16	
level 1	128.50	2.07	
Fixed part			
cons	39.06	4.20	
<i>Workload</i>			
Daily workload	0.01	0.02	0.00
Overall workload	0.45	0.16	0.15**
Interaction daily and overall workload	0.00	0.00	0.00
<i>Patients</i>			
Mean age	0.03	0.03	0.01
% female	6.42	1.15	0.06**
Mean education ¹	0.38	0.64	0.01
% publicly insured	4.35	1.10	0.05**
<i>Health problems</i>			
% new	5.91	1.18	0.06**
% acute	21.51	1.99	0.20**
% chronic	16.34	2.08	0.14**
% psychosocial	4.70	2.66	0.02
Mean severity ¹	0.33	0.69	-0.08**
Mean uncertainty	-3.65	0.60	-0.08**
<i>GP/Practice</i>			
Age	0.13	0.08	0.07
Gender (female)	1.72	1.76	0.04
Fixed salary	2.24	1.66	0.05
Single-handed practice	2.61	1.23	0.09*
Delegation to practice secretary	-8.08	4.52	-0.08
Urbanization (rural)			
mixed	-2.70	2.53	-0.09
suburban	-2.57	2.47	-0.09
urban	0.67	2.57	0.02
<i>Interactions</i>			
Daily workload with:			
- single-handed practice	-0.02	0.03	-0.01
- % psychosocial problems	0.19	0.21	0.01
- mean uncertainty	0.08	0.05	0.02
- mean severity ¹	-0.05	0.04	-0.01
- mean level of education ¹	-0.02	0.06	-0.00
Overall workload with:			
- single-handed practice	-0.08	0.24	-0.02
- % psychosocial problems	0.43	0.44	0.01
- mean uncertainty	-0.14	0.13	-0.01
- mean severity ¹	-0.03	0.14	-0.00
- mean level of education ¹	-0.01	0.14	-0.00

Significance: * p < 0.05; ** p < 0.01

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Table 6.10h Results of multilevel analysis on the percentage of referrals to specialist care per working day

	B	SE B	Beta
Random part			
level 2	2.81	0.37	
level 1	25.35	0.41	
Fixed part			
cons	2.21	1.18	
<i>Workload</i>			
Daily workload	-0.01	0.01	-0.01
Overall workload	-0.07	0.08	-0.06
Interaction daily and overall workload	0.00	0.00	0.00
<i>Patients</i>			
Mean age	-0.05	0.01	-0.07**
% female	-0.95	0.49	-0.02
Mean education ¹	-0.56	0.28	-0.03
% publicly insured	0.13	0.48	0.00
<i>Health problems</i>			
% new	-1.39	0.52	-0.03**
% acute	1.41	0.88	-0.03
% chronic	4.22	0.91	0.09**
% psychosocial	-3.57	1.15	-0.05**
Mean severity ¹	-1.14	0.27	-0.07**
Mean uncertainty	2.67	0.25	0.16**
<i>GP/Practice</i>			
Age	0.09	0.02	0.13**
Gender (female)	-0.08	0.48	-0.00
Fixed salary	0.78	0.49	0.05
Single-handed practice	0.29	0.33	0.03
Delegation to practice secretary	0.84	1.23	0.02
Urbanization (rural)			
mixed	-0.93	0.70	-0.08
suburban	-1.08	0.69	-0.10
urban	-0.64	0.70	-0.05
<i>Interactions</i>			
Overall workload with:			
- % publicly insured	0.12	0.10	0.07
- single-handed practice	-0.01	0.07	-0.01
- fixed salary	0.00	0.09	0.00
- % psychosocial problems	0.14	0.19	0.01
- mean uncertainty	-0.05	0.06	-0.01
- mean severity ¹	-0.04	0.05	-0.01
- mean level of education ¹	0.16	0.06	0.04**

Significance: * p < 0.05; ** p < 0.01

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Table 6.10i Results of multilevel analysis on the percentage of referrals to primary care per working day

	B	SE B	Beta
Random part			
level 2	1.36	0.19	
level 1	17.82	0.29	
Fixed part			
cons	5.08	0.86	
<i>Workload</i>			
Daily workload	-0.01	0.01	-0.01
Overall workload	0.12	0.06	0.12*
Interaction daily and overall workload	0.00	0.00	0.01
<i>Patients</i>			
Mean age	-0.02	0.01	-0.03*
% female	-0.95	0.41	-0.03*
Mean education	0.94	0.23	0.06
% publicly insured	0.40	0.40	0.01
<i>Health problems</i>			
% new	0.00	0.43	0.00
% acute	0.78	0.73	0.02
% chronic	2.10	0.76	0.06*
% psychosocial	-1.03	0.96	-0.02
Mean severity ¹	-0.98	0.22	-0.08**
Mean uncertainty	0.48	0.21	0.04*
<i>GP/Practice</i>			
Age	-0.00	0.01	-0.01
Gender (female)	0.00	0.35	0.00
Fixed salary	0.39	0.35	0.03
single-handed practice	-0.76	0.24	-0.08**
Delegation to practice secretary	-0.17	0.88	-0.01
Urbanization (rural)			
mixed	-1.13	0.51	-0.12*
suburban	-1.04	0.50	-0.11*
urban	-0.69	0.51	-0.06
<i>Interactions</i>			
Overall workload with:			
- % publicly insured	-0.19	0.09	-0.14*
- single-handed practice	0.01	0.05	0.01
- fixed salary	0.06	0.07	0.02
- % psychosocial problems	0.04	0.16	0.00
- mean uncertainty	0.08	0.04	0.03*
- mean severity ¹	-0.00	0.04	-0.00
- mean level of education ¹	0.01	0.05	0.00

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Table 6.10j Results of multilevel analysis on the percentage of follow-up appointments per working day

	B	SE B	Beta
Random part			
level 2	62.09	7.16	
level 1	101.90	1.64	
Fixed part			
cons	13.09	4.96	
<i>Workload</i>			
Daily workload	0.01	0.06	0.01
Overall workload	-0.20	0.24	-0.06
Interaction daily and overall workload	0.00	0.00	0.01
<i>Patients</i>			
Mean age	0.13	0.02	0.07**
% female	2.14	0.99	0.02*
Mean education	-0.83	0.57	-0.02
% privately insured	1.07	1.02	0.01
<i>Health problems</i>			
% new	-21.23	1.05	-0.20**
% acute	-18.91	1.78	-0.17**
% chronic	-4.65	1.86	-0.04**
% psychosocial	-7.59	2.38	-0.04**
Mean severity ¹	-2.73	0.64	-0.07**
Mean uncertainty	-1.17	0.54	-0.03*
<i>GP/Practice</i>			
Age	0.31	0.09	0.16**
Gender (female)	-1.43	2.07	-0.03
Working independently	-0.63	2.12	-0.01
Single-handed practice	0.77	1.44	0.03
Delegation to practice secretary	7.91	1.44	0.03
Urbanization (rural)			
mixed	6.56	3.01	0.22*
suburban	1.12	2.96	0.04
urban	-0.40	3.04	-0.01
<i>Interactions</i>			
Daily workload with:			
- % privately insured	0.05	0.09	0.02
- single-handed practice	-0.02	0.03	-0.01
- working independently	0.05	0.04	0.01
- % psychosocial problems	-0.12	0.19	-0.01
- mean uncertainty	0.10	0.04	0.02*
- mean severity ¹	0.07	0.04	0.01
- mean level of education ¹	-0.04	0.05	-0.01
Overall workload with:			
- % privately insured	-0.07	0.22	-0.02
- single-handed practice	0.07	0.22	0.02
- working independently	0.29	0.40	0.03
- % psychosocial problems	-0.45	0.39	-0.01
- mean uncertainty	0.02	0.12	0.00
- mean severity ¹	0.15	0.13	0.02
- mean level of education ¹	0.06	0.12	0.01

Significance: * $p < 0.05$; ** $p < 0.01$

¹These variables were recoded: a high score means less severe or lower education. In this way they were formulated in the same direction as in the empirical expectations of Table 6.3.

Appendix 2.

Indicators for appropriateness of care provided by GPs, derived from 12 professional standards of care formulated by the Dutch College of General Practitioners (NHG)¹

¹ Detailed information on the discussed NHG-standards is available from Rutten & Thomas (1993)

Standard M01: TYPE II DIABETES MELLITUS (NIDDM)

Definition²

Patients (≥ 35 years) with a consultation with ICPC-code T90 (diabetes mellitus) as main diagnosis or diabetes as underlying disease, without prescription for insulin or injection material in the registration period.

Indicators³

1. Diagnostics and treatment should not be based on urine-glucose measurement.
2. Pharmaceutical therapy should be started with tolbutamide⁴.
3. A follow-up appointment should be made within a period of three months.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
1	- patients as defined above - ICPC-code T90 as main diagnosis - glucose measurement recorded	1435	45.9
2	- patients as defined above - ICPC-code T90 as main diagnosis - new episodes of illness ⁵ - prescription recorded	122	62.3
3	- patients as defined above - ICPC-code T90 as main diagnosis	1725	23.8

References

Cromme, P.V.M., Mulder, J.D., Rutten, G.E.H.M., Zuidweg, J., Thomas, S. (1989). NHG-standaard Diabetes mellitus type II. *Huisarts en Wetenschap*, 32, 13, 509-512.

Konings, G.P.J.M., Velden, J. van der, Hutten, J.B.F., Grol, R. (1993). *Het controle- en therapiebeleid van de huisarts bij type II diabetes voor het verschijnen van de NHG-standaard: de nationale studie als voormeting*. In: Velden, J. van der, Hutten, J., Bijl, D., Brandenburg, B., Hofstra, M., Grol, R. NHG-standaarden en kwaliteit van zorg in de huisartspraktijk: eind-rapport. Utrecht/Nijmegen:NHG/NIVEL/WOK.

² Operationalization as used in the National Survey of General Practice

³ Indicators selected for this study.

⁴ ATC-code: A10BB03

⁵ A new episode of illness means that the illness or health problem has been recognized for the first time in the registration period

Standard M04: SPRAINED ANKLE

Definition

ICPC-code L77 (sprains/strains ankle(s)).

Indicators

- 4. Only upon suspicion of a fracture is an X-ray indicated.
- 5. A referral is not indicated.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
4	- ICPC-code L77 as main diagnosis	1473	9.4
5	- ICPC-code L77 as main diagnosis - No suspicion of a fracture (L73)	1426	2.9

References

Bosch, W.J.H.M. van den, Coumans, R.H.M., Verkerk, S., Weert, H. van, Sips, A.J.B.I. (1989). NHG-standaard Enkeldistorsie. *Huisarts en Wetenschap*, 32, 13, 523-526.

Grol, R., Claessens, A.A.M.C., Velden, J. van der, Heerdink, H. (1991). Kwaliteit van zorg bij enkeldistorsie: invoering van een standaard. *Huisarts en Wetenschap*, 34, 1, 30-34.

Definitions

Acute Painful Frequent Micturition-syndrome (APFM): the following ICPC-codes are selected: L05 (complaints flank), U01 (dysuria), U02 (frequent/urgent urination), U05.9 (other urination problems), U06 (haematuria), U07 (other complaints urine), U13 (complaints bladder), U14 (complaints kidney), U29 (other complaints urinary tract), U70 (acute pyelonephritis), U71 (cystitis), U72 (non-specific urethritis), W70 (urinary tract infections pregnancy).

Uncomplicated urinary tract infection: new episodes of illness with ICPC-code U71 (cystitis), U72 (un-specified urethritis) or W70 (urinary tract infection in pregnancy) as main diagnosis and no underlying diseases recorded.

Indicators

6. A nitrite test should be used as first diagnostic tool when complaints from the APFM-syndrome are presented⁶.
7. Pharmaceutical therapy depends on gender, age and pregnancy⁷:
Children 0-5: amoxicillin
Children 6-12: trimethoprim
Men > 12: amoxicillin or trimethoprim
Women > 12 (not pregnant): trimethoprim, sulfamethizol or nitrofurantoin
Pregnant women: amoxicillin
8. A follow-up appointment is indicated only when complaints do not disappear, when the complaints relapse, for pregnant women, children between 0 and 12 and men older than 12.
9. A referral of a patient with uncomplicated urinary tract infection is not indicated.

⁶ It is not in line with the guideline to perform a sediment test only

⁷ ATC-codes: amoxicillin (J01CA04), trimethoprim (J01E/J03BA), sulfamethizol (J03AA03), nitrofurantoin (G04AC01)

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
6	- APFM-complaints recorded - first consultations	1455	55.9
7	- uncomplicated urinary tract infection as main diagnosis - prescription recorded	1026	32.9
8	- Uncomplicated urinary tract infection as main diagnosis	1482	55.3
9	- Uncomplicated urinary tract infection as main diagnosis	1482	1.7

References

Balen, F.A.M. van, Baselier, P.J.A.M., Pienbroek, E. van, Winkens, R.A.G. (1989). NHG-standaard Urineweginfecties. *Huisarts en Wetenschap*, 32, 13, 527-531.

Hutten, J.B.F., Velden, J. van der, Winkens, R., Bijl, D., Grol, R.P.T.M. (1993). *Diagnostiek en behandeling van ongecompliceerde urineweginfecties in de huisartspraktijk*. In: Velden, J. van der, Hutten, J., Bijl, D., Brandenburg, B., Hofstra, M., Grol, R. NHG-standaarden en kwaliteit van zorg in de huisartspraktijk: eind-rapport. Utrecht/Nijmegen: NHG/NIVEL/WOK.

Standard M09: ACUTE OTITIS MEDIA

Definition

ICPC-code H71 (acute otitis media) as main diagnosis and no suspicion of otitis externa (H70).

Indicators

10. No antibiotics should be given to a child older than 6 months, within a time frame of 24 hours, unless there are special circumstances.
11. When an antibiotic is prescribed, amoxicillin is first choice and, if contraindicated, erythromycin⁸
12. Prescription of lidocaine eardrops is not indicated.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
10	- acute otitis media as main diagnosis. - children older than 6 months. - first consultations. - no underlying diseases recorded.	1184	12.5
11	- acute otitis media as main diagnosis. - prescription of an antibiotic recorded.	520	24.2
12	- acute otitis as main diagnosis.	2273	15.0

References

Appelman, C.L.M., Bossen, P.C., Dunk, J.H.M., Lisdonk, E.H. van de, Melker, R.A. de, Weert, H.C.P.M. van. (1990). NHG-standaard Otitis media acuta. *Huisarts en Wetenschap*, 33, 6, 242-245.

Bohnen, A., Bruijnzeels, M.A., Velden, J. van der, Wouden, J.C. van der. (1992). Otitis media acuta: incidentie en beleid. *Huisarts en Wetenschap*, 35, 3, 134-136.

Bijl, D., Hutten, J.B.F., Sixma, H., Velden, J. van der, Grol, R.P.T.M. (1993). *Acute otitis media in Dutch general practice: keep your ear to the ground*. In: Velden, J. van der, Hutten, J., Bijl, D., Brandenburg, B., Hofstra, M., Grol, R. NHG-standaarden en kwaliteit van zorg in de huisartspraktijk: eind-rapport. Utrecht/Nijmegen: NHG/NIVEL/-WOK.

⁸ ATC-codes: J01CA04 and J01FA01

Kuyvenhoven, M.M., Melker, R.A. de, Velden, J. van der. (1993). Prescription of antibiotics and prescribers' characteristics. A study into prescription of antibiotics in upper respiratory tract infections in general practice. *Family Practice*, 10, 3, 366-370.

Melker, R.A. de, Velden, J. van der, Kuyvenhoven, M.M. (1995). House calls for respiratory tract infection: family medicine pure and simple?. *Family Practice*, 12, 3, 294-298.

Standard M11: ACUTE SORE THROAT

Definition

ICPC-codes R72.1 (scarlet fever), R72.9 (streptoc. infection throat) or R76 (acute tonsillitis) as main diagnosis, except relapses.

Indicators

13. When an antibiotic is prescribed feneticillin or fenoxymethylpenicillin is first choice; if the patient is sensitive to penicillin, erythromycin⁹.
14. Follow-up appointment is not indicated.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
13	- acute sore throat as main diagnosis - prescription of an antibiotic recorded	922	39.6
14	- acute sore throat as main diagnosis	1422	8.0

References

- Balder, F.A., Dagnelie, C.F., Jong, L.J. de, Kootte, H. (1990). NHG-standaard Acute keelpijn. *Huisarts en Wetenschap*, 33, 8, 323-326.
- Hofstra, M., Hutten, J.B.F., Dagnelie, C.F., Velden, J. van der, Grol, R.P.T.M. (1993). *Sore throat: not necessarily antibiotics*. In: Velden, J. van der, Hutten, J., Bijl, D., Brandenburg, B., Hofstra, M., Grol, R. NHG-standaarden en kwaliteit van zorg in de huisartspraktijk: eind-rapport. Utrecht/Nijmegen: NHG/NIVEL/WOK.

⁹ ATC-codes: J01HA05, J01HA02 and J01FA01.

Definition

Patients (≥ 40 years) with a consultation with ICPC-code K92.1 (Intermittent Claudication) as diagnosis or K92.9 (peripheral vascular disease) or K91.0 (atherosclerosis, ecl. heart/brain) as diagnosis in combination with at least one of the following ICPC-codes: L14 (leg/thigh complaint), L15 (knee complaint), L16 (ankle complaint), L17 (foot/toe complaint).

Indicators

15. The use of vasodilators (cyclandelate, isoxsuprine, xantinolniconate)¹⁰ is not recommended.
16. After each consultation a follow-up appointment should be made, unless the GP refers the patient.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
15	- pav as main diagnosis - new episodes of illness - prescription recorded	138	11.6
16	- pav as main diagnosis - no referral recorded	314	48.3

References

Bonsema, K., Boutens, E.J., Kaiser, V., Stoffers, H.E.J.H. (1990). NHG-standaard Perifeer arterieel vaatlijden. *Huisarts en Wetenschap*, 33, 11, 440-446.

Hofstra, M., Hutten, J.B.F., Kaiser, V., Stoffers, H.E.J.H., Velden, J. van der, Grol, R.P.T.M. (1993). *Perifeer arterieel vaatlijden in de huisartspraktijk. Een onderzoek over feitelijk handelen met behulp van gegevens uit de Nationale Studie*. In: Velden, J. van der, Hutten, J., Bijl, D., Brandenburg, B., Hofstra, M., Grol, R. NHG-standaarden en kwaliteit van zorg in de huisartspraktijk: eind-rapport. Utrecht/Nijmegen: NHG/NIVEL/WOK.

¹⁰ ATC-codes: C04AX01, C04AA01, C04AD01

Definition

ICPC-code S96 (acne vulgaris) as main diagnosis.

Indicators

17. Topical antibiotics such as clindamycin and erythromycin should be prescribed only for a restricted period of three months.
18. Preparations containing resorcinol, sulphur, hexachlorophene and some other compounds (such as Lotio Kummerfeldi) should not be prescribed¹¹.
19. When an oral antibiotic is prescribed, tetracycline is first choice, except in the case of pregnancy.
20. A referral is not indicated.
21. After each consultation, a follow-up appointment should be made.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
17	- ICPC-code S96 as main diagnosis - prescription of topical antibiotics recorded	35	34.3
18	- ICPC-code S96 as main diagnosis - prescription recorded	879	15.5
19	- ICPC-code S96 as main diagnosis - prescription of oral antibiotics recorded - no pregnancy recorded	218	7.8
20	- ICPC-code S96 as main diagnosis	1037	5.3
21	- ICPC-code S96 as main diagnosis	1037	69.6

References

Blom, J.J., Brouwer, A., Bruinsma, M., Dewachter, J., Klaassen, E.J., Mesker, P.J.R. (1991). NHG-standaard Acne vulgaris. *Huisarts en Wetenschap*, 34, 4, 183-188.

Brandenburg, B.J., Hutten, J.B.F., Velden, K. van der, Grol, R.P.T.M. (1991). Acne vulgaris in de huisartspraktijk: een vergelijking met de NHG-standaard. *Huisarts en Wetenschap*, 34, 12, 535-539.

¹¹ ATC-codes: D10AX02, D10AF01 and some specific codes

Definition

Patients (> 18 years) with a consultation with ICPC-code K86 (uncomplicated hypertension) as main diagnosis, except pregnant women and new episodes of illness in patients above 80.

Indicators

22. Pharmaceutical therapy should be started with diuretics or beta-blockers¹².

23. After each consultation, a follow-up appointment should be made.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
22	- patients as defined above - hypertension as main diagnosis - new episodes of illness - prescription recorded	454	28.6
23	- patients as defined above - hypertension as main diagnosis	12301	15.4

References

Binsbergen, J.J. van, Grundmeyer, H.G.J.M., Hoogen, J.P.H. van den, Kruidijk, M. van, Prins, A., Ree, J.W. van, Thomas, S. (1991). NHG-standaard Hypertensie. *Huisarts en Wetenschap*, 34, 8, 389-395.

Velden, J. van der, Hutten, J.B.F., Grol, R.P.T.M. (1993). *Verhoogde bloeddruk en hypertensie in de huisartspraktijk: een eerste verkenning vanuit de nationale studie*. In: Velden, J. van der, Hutten, J., Bijl, D., Brandenburg B, Hofstra M, Grol R. NHG-standaarden en kwaliteit van zorg in de huisartspraktijk: eind-rapport. Utrecht/Nijmegen: NHG/NIVEL/WOK.

¹² ATC-codes: C03 and C07

Definition

Patients (> 18 years) with a consultation with ICPC-code N89 (migraine) as main diagnosis.

Indicator

24. Pharmaceutical therapy of attacks should start with paracetamol, NSAID or anti-emeticum¹³

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
24	- ICPC-code N89 as main diagnosis - new episodes of illness - prescription for the treatment of attacks recorded	481	49.7

References

Bartelink, M.E.L., Duijn, N.P., Knuistingh Neven, A., Ongering, J.E.P., Oosterhuis, W.V., Post, D. (1991). NHG-standaard Migraine. *Huisarts en Wetenschap*, 34, 11, 504-508.

Donker, G., Hutten, J., Bijl, D., Flierman, H., Velden, J. van der. (1992). *Hoofdbrekens en kopzorgen: epidemiologie en handelen van patiënt en huisarts bij migraine en andere vormen van hoofdpijn*. Utrecht: NIVEL.

Bijl, D., Hutten, J.B.F., Grol, R.P.T.M., Velden, J. van der. (1994). Hoofdpijn, migraine en spanningshoofdpijn in de huisarts. *Huisarts en Wetenschap*, 37, 3, 142-148.

Bijl, D. (1994). Migraine en andere hoofdpijnen in de huisartspraktijk. *Hoofdzaken*, 2, 10-11.

Bijl, D. Hoofdbrekens en kopzorgen. (1994). *Hoofdzaken*, 3, 12-13.

¹³ ATC-codes: N02BE, N02BA, A03FA, N02CA

Definition

Patients whose serum cholesterol was tested.
 ICPC-code T93 (lipid metabolism disorder) as diagnosis.

Indicators

25. Serum cholesterol is measured only in persons between 18 and 65 years of age, for reasons of case finding.
26. No pharmaceutical therapy should be started in the three-month registration period in new episodes of hypercholesterolaemia.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
25	- consultations in which a serum cholesterol test was requested/performed - first consultations	411	14.1
26	- ICPC-code T93 as main diagnosis - new episodes of illness	86	23.3

References

Binsbergen, J.J. van, Brouwer, A., Drenth, B.B. van, Haverkort, A.F.M., Prins, A.,
 Weijden, T. van der. (1991). NHG-standaard Cholesterol. *Huisarts en Wetenschap*, 34, 12, 551-557.

Weijden, T. van der, Hutten, J.B.F., Brandenburg, B.J., Grol, R.P.T.M., Velden, J. van der. (1994). Cholesterol management in Dutch general practice: a comparison with the national guidelines. *Scandinavian Journal of Primary Health Care*, 14, 281-288.

Definition

Children (<12 years) with one consultation with ICPC-code R96 (asthma), R91.1 (chronic bronchitis) or R91.2 (COPD) as main diagnosis.

Indicators

27. No antibiotics are indicated for children without a secondary infection.
 28. For children over 4 years medication by inhaler should be prescribed.
 29. In maintenance therapy, follow-up appointments should be made every three months.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
27	- asthma as main diagnosis - no secondary infections recorded	431	23.9
28	- asthma as main diagnosis - age > 3 years	180	51.7
29	- asthma as main diagnosis - maintenance therapy recorded	230	62.2

References

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Definition

Patients (≥ 12 years with a consultation with one of the following ICPC-codes as main diagnosis; R91.1 (chronic bronchitis), R91.2 (COPD), R96.0 (asthma) and R78.0 (acute bronchitis) in combination with asthma/COPD as underlying disease.

Indicators

30. Prescription of oral salbutamol, terbutaline or corticosteroids¹⁴ should always be combined with pharmaceutical therapy with an inhaler.
31. Beta-sympathicomimetics should not be used more than twice a day.
32. When the GP decides to prescribe an antibiotic, amoxicillin, doxycycline or co-trimoxazol is indicated¹⁵.
33. A follow-up appointment should be made every three months.

Results

Indicator	Selection-criteria for consultations	Total	Percentage deviations
30	- asthma/COPD as main diagnosis - new episodes of illness	332	26.8
31	- asthma/COPD as main diagnosis - prescription of Beta-sympathicomimetics recorded	220	70.0
32	- asthma/COPD as main diagnosis - prescription of antibiotics recorded	961	16.8
33	- asthma/COPD as main diagnosis	3052	64.7

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¹⁴ ATC-codes: R03AC02 and R03CC03, R03AC03 and R03CC03, R03BA and H02A/H02B

¹⁵ ATC-codes: J01CA04, J01AA02, J03BA01

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