General Practice

1987 and 2001

changes in morbidity and interventions

The research described in this thesis is carried out at NIVEL, Netherlands Institute for Health Services Research. Most chapters were based on data collected within the framework of the first and second National Survey of General Practice, which was mainly sponsored by the Dutch Ministry of Health, Welfare and Sport

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General Practice
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Findings from the two Dutch National Surveys of General Practice

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Medische Wetenschappen

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Foreword

Having been working as a general practitioner since 1980, I observed that the way I was supposed to run my practice and the way I was practising medicine, changed considerably over time. These changes were brought about partly by a personal evolution, partly by changes in the composition and attitude of the practice population, and partly by measures imposed from outside: i.e. by own professional organisations, by health care insurers and by the government. Obviously, my personal development as a GP can't be isolated from changes advocated by my professional organisations and by being myself a Dutch citizen influenced by societal developments.

During my working life in general practice two National Surveys of General Practice were performed: the first and second National Survey of General Practice, conducted in 1987 and 2001 respectively (NS1 and NS2). These two studies were designed to obtain information on the health status and the health care use of the Dutch population and on the role of general practice in the Dutch health care system.

Because my career as a GP included the period 1987 to 2001, I wondered to which degree the changes I perceived in my daily work were a reflection of the changes felt by the Dutch population and the Dutch GPs .

The two National Surveys enabled me to study the changes that occurred in the population and in general practice between 1987 and 2001, and to set off these changes against my own experience.

Many authors before me, used data from the NS1 and NS2 to write reports and theses about a wealth of themes. Where applicable, I made gratefully use of their findings.

I am indebted to NIVEL (Prof.Dr.J van der Zee) and the Department of General Practice of the University Medical Centre St Radboud from Nijmegen (Prof Dr.W.J.H.M van den Bosch) , that I was granted the opportunity to write this thesis at the end of my medical career.

With this thesis I hope to cast light on the medical an societal changes that affected general practice between 1987 and 2001 and to describe the consequences these changes exerted on morbidity patterns and on the interventions performed by GPs.

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Part 1 Introduction

Chapter 1

General introduction

1.1 Introduction

This thesis aims to describe changes in frequency and nature of health problems presented to Dutch general practice between 1987 and 2001, changes in the reactions of general practitioners (GPs) on the presented health problems, and to relate these changes to changes in the characteristics of the population and of general practice.

To achieve this aim, we have made use of the data of the first and second Dutch National Survey of General Practice conducted in 1987[1] and 2001[2] respectively (NS1 and NS2).
Central in these surveys was the morbidity presented to GPs and their subsequent interventions, in combination with detailed demographic information about the practice population and information about GPs.
Broadly speaking, the purpose of the two surveys was to gain insight, on a national scale, into the presentation of health problems* in general practice, in the actions of general practitioners (GPs) and in factors that influence the presentation of health problems as well as the diverse reactions of GPs to presented health problems[1].

In the Netherlands, general practice is a suitable setting for collecting data about health and the use of health services of the population, because general practice is the entry-point into the health care system for most health problems. The majority of the health problems is managed exclusively in general practice. It is accessible to all and close to the community [1-2]. Because almost all non-institutionalised Dutch citizens are registered with a GP, the important epidemiological criterion that the whole population at risk should be covered is met.

Collecting data about morbidity is not a goal in itself, but the acquired knowledge about changes in morbidity patterns and the subsequent interventions in general practice are important for several reasons; firstly it is essential information for the development of general practice as a scientific discipline; secondly it is indispensable for the vocational training and post-graduate education; thirdly it is requisite for health care planning; and finally

* Health problems include all diseases, symptoms and reasons for consultation that are dealt with by general practitioners.

documenting the morbidity patterns of 1987 and 2001 provides us with a historical portrait of these eras.

However, data about presented health problems to GPs alone does not provide us with reliable incidence and prevalence rates of the population. Problems presented to general practice form only a fraction of the health problems occurring in the population. For this reason health interviews were included in the NS1 and NS2, in which detailed questions were asked about health status, in order to obtain insight into the relation between the health problems occurring in the population and the presentation of health problems in general practice [4].

1.2 Changes between 1987 and 2001

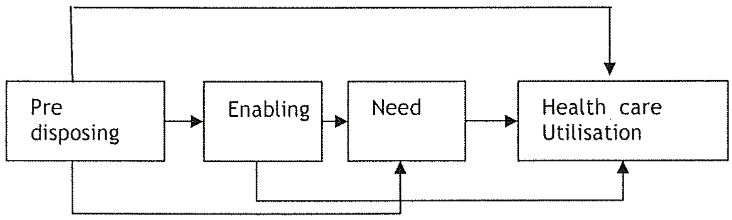
Between 1987 and 2001 changes occurred potentially affecting the presented health problems and the reactions of GPs to these health problems. The population grew older, the proportion of people with a non-western background increased, the general educational level increased as did prosperity, and people became better informed and turned into more demanding consumers. The prevalence of numerous chronic conditions rose as a result of the ageing population.
Medical technology made rapid progressions. Also, the composition of GP population was changing: the profession feminised and the average age of GPs increased. More GPs worked part-time. The post-graduate vocational training was extended from one year to two years in 1988 and to three years in 1994.
The organisation of general practice has changed: the number of single-handed working GPs decreased. Moreover, the experienced increase of workload facilitated delegation of tasks to practice assistants and the introduction of practice nurses in general practice. In 1987, computers had not made their entrance in general practice; in 2001 virtually all GPs used computers to store information in electronic patient records.
The work of the GPs was influenced by the development of National Practice Guidelines and new legislation. Since 1989, the Dutch College of General Practitioners (NHG) has been publishing practice guidelines on a range of health problems; these NHG guidelines contributed to the further professionalization of general practice. In 1995, the Medical Treatment Agreements Act (WGBO) came into force; besides stipulating that a patient has

the right to inspect his medical record, it obliged doctors to give the patient complete and explicit information about the treatment, including expected side effects and possible alternatives.
Furthermore, changes in the health care system between 1987 and 2001 affected the work of GPs. The budget system for financing specialist care shifted work from specialists to GPs, the shorter length of stay in hospitals had the same effect.
At the end of 2001, the supply-led approach of the government led to a waiting list for operations; at the end of 2001 there were 160,000 patients waiting for their operation, of whom almost one third had been waiting longer than three months, while the sector's own targets were to treat 80% of patients within one month. At the same time, in 2001, a shortage of GPs came to light.
It is plausible that all these changes between 1987 and 2001 influenced the frequency and nature of health problems presented to general practice and the reactions of GPs.

1.3 Study concept

The profile of morbidity presented to GPs is a result of a complex process that takes place before the patient decides to see a doctor and is also affected by the position of GPs in the health care system. Differences in help-seeking behaviour are influenced by a number of background characteristics.
In studying the use of health care services the theoretical framework developed and elaborated by Andersen and Newman is often used [5-6] (figure 1). This model was originally intended to analyse equity in the use of services: it was meant for studying differences in the use of health care services that could not be explained by "need" factors. Over time the application of the model has increasingly shifted towards an explanatory model of health care use. Van der Zee pointed out that the framework originally was not meant as a causal model for the explanation of the use of health care services, but as a model for detecting inequalities in the distribution of health services and that the transformation to a causal model has its limitations [7] .

Figure 1.1 The Andersen model



The model is characterised by three categories of variables: predisposing, enabling and need variables. It is useful because it provides a framework for relating differences in frequency and nature of presented health problems to a number of specific background characteristics.

Predisposing factors

Predisposing factors contain two main groups: demographic factors and behavioural factors representing the propensity to use health care.

The demographic characteristics are determinants like age, sex, ethnicity, education, occupation, marital status and social support.

The behavioural factors form a heterogeneous group: they refer broadly to everything that might predispose a person to use health care. They include lifestyle factors, psychosocial and sociocultural factors. Lifestyle characteristics are mainly smoking habits, use of alcohol and body weight. Psychosocial and sociocultural factors include beliefs about health and illness and attitudes towards health care. These factors lay the foundation for illness behaviour and help-seeking behaviour.

Enabling factors

Even though individuals may be predisposed to use health services, some means must be available for them to do so. Enabling factors reflect the resources that make it possible to use health care services. They are necessary but not sufficient conditions. Enabling factors are often expressed in terms of the availability of health care facilities in the community and economic characteristics of the individual.

The availability of health care services includes aspects like geographical distance and waiting list. Economic characteristics include factors like income and health insurance.

Need factors
Need is considered a principal determinant, which initiates the decision-making process regarding whether or not care will be sought. The judgment about need will usually be made by the individual himself, but can be influenced by his social environment (family, friends). Need factors reflect deficits in the health status and are the most immediate cause of health services utilisation.
This is especially applicable with respect to first contact general practitioner care as this usually reflects the patient's own action in the help-seeking process. Once a patient has presented a problem to the general practitioner, need as evaluated by a professional may be considered as a factor explaining differences in the nature and amount of treatment.
In this thesis we will address two indicators of need. In chapter 6 we will focus on self-rated health, in part 2 of this book we will explore the newly presented health problems to GPs, as evaluated by the GP.

The predisposing factors will be dealt with in chapter 2, in chapter 3 the enabling factors will be discussed

1.4 Why use data from General practice for studying morbidity?

As stated before, in the Netherlands general practice is a suitable setting for collecting data about health and use of health services of the population [2]. GPs in the Netherlands have a central position in the health system, which is based on four principles: *listing, medical record keeping, gatekeeping and family-orientation*.
Listing means that almost the entire non-institutionalised population is registered with a GP. This means that health problems presented in general practice can be related to the "population at risk" and its characteristics (age, sex).
Medical record keeping means that the complete medical records of listed patients are maintained by the GP, including their medical history, chronic diseases, risk factors, medication use and involvement of other health professionals including hospitalisations. It is customary that other health professionals report their findings about patients to the GP of the patient.
Gatekeeping means that medical specialists are only accessible after referral

by a GP in case of publicly insured patients; in case of privately insured patients, patients will only get reimbursement when they are referred by a GP. This was the case both in 1987 and 2001. With the exception of serious emergency cases and part of sexually transmitted diseases (STDs), health problems will first be presented to the GP.
Family oriented means that usually all members of a family or household are registered with the same GP. The family is an important epidemiological setting. Family members share the same housing, living circumstances, food, risk factors (family and hereditary) and socioeconomic level. Moreover, the family is an important social setting which strongly influences health care-seeking behaviour [8-10]. Although the patient is the primary focus of medical care, the family is often the most important social context that must be understood and considered when delivering health care.

In conclusion one can say that general practice in the Netherlands gives a unique opportunity to relate morbidity and health care use to characteristics of patients and families.

1.5 Research questions

In this thesis we describe and explain changes that took place over the period 1987 and 2001 guided by the following research questions:

1. Which health problems were presented to GPs in 1987 and 2001 and what where the differences between 1987 and 2001 and to what extent were the differences in presented health problems related to changes in patient and general practice characteristics?
2. What was the nature and volume of interventions (minor surgery, prescribing drugs, referrals) in 1987 and 2001, what were the differences between 1987 and 2001 and to what extent related the differences in interventions between 1987 and 2001 to changes in patient and general practice characteristics?

1.6 Outline of this thesis

We divide this thesis in four Parts. The main body is found in Part two and Part three. In Part two we address the changes in the incidence of health problems presented to GPs in 1987 and 2001; in Part three we describe the changes in interventions by GPs on the presented health problems in 1987 and 2001.

Part one explores the differences, that occurred between 1987 and 2001 within the population and within general practice; these differences form the background against which the changes in presented health problems and interventions are considered. They constitute the disposing, enabling and need factors of the Andersen model.

Throughout this whole thesis, we will systematically relate the changes in presented health problems and interventions between 1987 and 2001 to the following background variables: sex, socioeconomic status and age.

In Part 4 we present the general discussion and the summary of this thesis.

The data presented in this thesis are mainly based on data collected within the framework of the first and second Dutch National Survey of General Practice (NS1 and NS2) conducted in 1987 and 2001.

In the rest of this paragraph we will introduce the chapters of thesis.

PART one comprises the first six chapters of this thesis.

In *chapter two,* changes in the population between 1987 and 2001 are described on the basis of the predisposing factors as stated by Andersen. We investigated changes in the demographic composition in the population, changes in lifestyle and changes in patients' expectation of GP care. We place these changes in a societal context.

We studied changes in the following demographic characteristics: age, ethnic origin, household composition and the several aspects of socioeconomic status (education, occupation, income and employment status).

In addition, we describe changes in behavioural factors which are relevant as predisposing factors for health care utilisation. We examine two types of behavioural factors: life style factors and patients'attitudes towards health care. We studied the following life style factors: smoking, alcohol consumption and body weight.

Patients' attitude regarding general practitioner care were explored by means of the Nijmeegse Questionnary, which measures the expectations of patients regarding GP care for minor ailments.

In *chapter three* we start with an overview of the most utilised socioeconomic indicators used in studies for comparing health differences based on socioeconomic inequities. In this thesis we have chosen occupation as socioeconomic indicator.
Subsequently, we studied the composition of the lowest socioeconomic group in 1987 and 2001. When comparing health differences of groups with equal socioeconomic status (SES) over two time periods, the sociodemographic composition of such a SES group is considered to be constant. However, when the two periods are sufficiently spaced in time, sociodemographic changes may have occurred. This is an important issue because changes in composition may affect health outcomes and health perspectives of the lowest SES group.

In *chapter four* we explore the need factors of the Andersen model by looking at the self-rated health in relation to sex, age and socioeconomic status in the Netherlands in 1987 and 2001 and explain the changes.
Self-rated health (SRH) is widely used for measuring the health of a population. With a single question people rate their overall health on a scale from excellent to very poor. This has been shown to be a useful and economic tool in population surveys. SRH is a predictor for a person's health status and utilisation of health care services. Studying changes over time in health disparities is a way to better understand the factors contributing to health inequalities. At the end of this chapter we discussed the found differences in SRH between 1987 and 2001 in the light of the following categories derived from the Black report:artefact explanations; theories of selection; causation; cultural and behavioural explanations [11].

In *chapter five* we studied changes in the field of general practice, which took place between 1987 and 2001. These changes relate to the enabling factors of the Andersen model.
The following developments were considered:
- Changes in the age and sex composition of GP population between 1987 and 2001
- Changes on the organisational level (type of practice) between 1987 and 2001
- Changes in the Workload of GPs in 1987 and 2001
- Changes in the organisation of daily work in 1987 and 2001

- Changes on the professional level such as postgraduate training and Continuing Medical Education (CME); the emergence of the NHG guidelines; the introduction of the Medical Treatment Agreement Act in 1995; The entrance of computer in practice.

Subsequently, patient satisfaction with GP care in 1987 and 2001 was compared.

In *chapter six* we describe the background, aim and design of the first and the second Dutch National Survey of General Practice (NS1 and NS2) and discuss their similarities and differences. In particular, we address methodological consequences.
The two most important differences between NS1 and NS2 were a three months registration period in the NS1 versus a twelve month registration period in the NS2 and central coding of consultations in the NS1 versus peripheral coding in the NS2. We will discuss the consequences of these differences for the comparison of the data of 1987 and 2001.

In ***PART two*** (chapter 7 to 12) we compare incidence rates between 1987 and 2001 and study the incidence rates on five levels of aggregation:
- overall level i.e. all new health problems;
- level of ICPC rubrics i.e symptom codes vs. disease codes;
- level of organ systems (ICPC chapters) ;
- on cluster level (a cluster is a collection of ICPC codes, which form together a meaningful unit for research);
- on disease level.

In each chapter we relate the changes in incidence rates between 1987 and 2001 to age, sex and socioeconomic status .

In *chapter 7 w*e present the incidence rates of 1987 and 2001 on the three highest levels of aggregation: i.e overall level, level of ICPC rubrics, and finally on the level of of organ systems.

In *chapter 8* we present the incidence rates of the cluster “infectious diseases”. We start the chapter with the overall incidence rate of infectious diseases. Subsequently, we present incidence rates on the following subclusters, which we composed within the cluster infectious diseases:
- Respiratory tract infections;
- Skin infections;

- Gastrointestinal infections;
- Infections of the eyes;
- Urinary tract infections.

In *chapter 9* the incidence rates of health problems related to the musculoskeletal system in 1987 and 2001 are explored. We distinguished the following subclusters:
- dorsopathies;
- health problems related to the upper extremities;
- health problems related to repetitive stress injury;
- health problems related to the lower extremities.

In *chapter 10* we described the incidence rates of the carpal tunnel syndrome in general practice in 1987 and 2001 and studied the role of occupational ad non-occupational factors in the occurrence of carpal tunnel syndrome.

In *chapter 11* the incidence rates of injuries were investigated. In addition to the overall incidence rate of injuries in 1987 and 2001, we studied the rates of fractures and and "sprains, strains and luxations".

In *chapter 12* we deal with the incidence rates of psychosocial problems in 1987 and 2001. Within this cluster we distinguish the following subclusters:
- anxiety;
- depression;
- psychoses;
- sexual problems;
- substance abuse;
- behavioural problems;
- sleep disturbances.

In addition we determined the incidence rates of ten common medical unexplained physical symptoms in 1987 and 2001.

In ***PART three*** (chapter 13 to 20) we explore the interventions performed by GPs. We compare the rates in 1987 and 2001 of minor surgery, prescriptions and referrals to secondary care and relate changes in these rates to age, sex and socioeconomic status.

In *chapter 13* we define interventions as any procedure carried out by GPs in reaction to a presented health problem. We divide interventions in two main categories: diagnostic and therapeutic interventions. Diagnostic interventions comprise history taking, physical examination, and additional investigations. Therapeutic interventions are subdivided into:

- Education, advice and counselling
- Medical technical interventions (e.g. minor surgery)
- Prescribing drugs
- Referrals to other primary and secondary care health professionals

In this thesis we will not present empirical information about the diagnostic process, because of the very limited data available about diagnostic interventions in 2001. Instead we will focus on the therapeutic interventions. Because we have no reliable information about “education, advice and counselling”, we restricted ourselves to changes in the rates of minor surgery, prescriptions and referrals to secondary care in 1987 and 2001.

In *chapter 14* we give an introduction into drug prescribing in general practice in 1987 and 2001. We discuss three aspects of the prescribing process: prescribing as intervention, choice of medication, and the organisational aspects of prescribing.
In *chapter 15* we concentrate on the total volume in prescriptions of GPs in 1987 and 2001. We express this as the the mean number of prescriptions per patient in relation to sex, age and SES in 1987 and 2001.
In *chapter 16, 17 and 18* we study the differences between 1987 and 2001 in the treatment of hypertension, coronary heart disease and heart failure respectively.
In *chapter 19* we examine the prescription of antidepressant medication in 1987 and 2001. We study various aspects of the treatment with antidepressant. We look at the number of prescriptions per 1000 patients and we analyse which antidepressant drug classes are involved in the prescribing. Finally, we determine the prescription rate in patients diagnosed with one of the depressive disorders or one of the anxiety states.
In chapter 20 we describe the new referrals of GPs to medical specialists and provide quantitative information about these referrals to the various specialties.

In PART four, we summarise and discuss the results of the studies described in this thesis.

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Chapter 2

Changes in the Dutch population between 1987 and 2001

2.1 Introduction

In this chapter we focus on changes in the population that took place between 1987 and 2001. These are changes in the "*predisposing*" factors of the Andersen model. As stated previously, the predisposing factors are composed of *demographic* characteristics and of *behavioural* characteristics.

We will discuss changes in the following *demographic* characteristics:
- age
- ethnic origin
- socioeconomic status: education
- socioeconomic status: occupation
- socioeconomic status: employment status
- socioeconomic status: income
- household composition.

In addition, we describe changes in some *behavioural* factors which are relevant as predisposing factors for health care utilisation.
The following characteristics will be discussed:
- life style
- patients' attitudes towards the management of minor ailments.

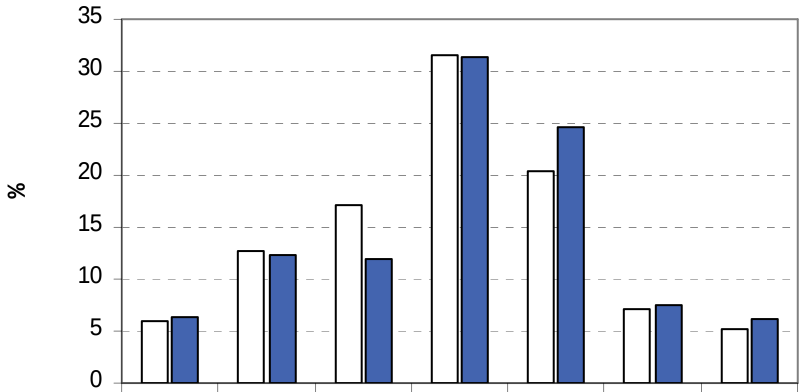
For describing the demographic, psychosocial and sociocultural changes, we have used data from existing sources (mainly Statistics Netherlands), as well as data from the first and second National Survey of General Practice (NS1 and NS2).

2.2 Demographic changes

2.2.1 Age structure of population

In 1987, the population in the Netherlands added up to approximately 14.6 million, in 2001 this was approximately 16 million. The population had grown by 0.6% per annum since 1987 (roughly 100,000 people per year), a consequence of both the birth surplus and the migration surplus.
The age structure of the Dutch population changed between 1987 and 2001. The proportion of the population aged 65 years and older increased from 12.4% to 13.6%, and the group of 75 years and older from 5.2% to 6.1% (figure 1). The share of the age group 45-64 increased from 20.3% in 1987 to 24.7% in 2001, whereas during the same period the share of the age group 15 to 24 dropped from 17.1% to 11.8%.

Figure 2.1 Proportional distribution of age groups in 1987 and 2001 of the Dutch population (Statistics Netherlands)



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
□ 1987	6.0	12.8	17.1	31.5	20.3	7.2	5.2
■ 2001	6.3	12.4	11.8	31.3	24.7	7.5	6.1

2.2.2 Ethnic origin

Between 1987 and 2001 the Dutch population increased with more than one million people, more than half of this growth being caused by immigration of people of non-Western origin. In the nineties more than 300,000 non-Western immigrants came to the Netherlands (first generation). Furthermore, more than 250,000 children with at least one non-Western parent were born (second generation). Immigrants are classified according to the definitions of Statistics Netherlands.*

Table 2.1 Dutch population in 1987 and 2001 by ethnic origin; absolute numbers and percentages

	1987		**2001**	
	x 1000	%	x 1000	%
Native	12,703	86.9	13,117	82.0
Non-Western immigrant	727	5.0	1,483	9.3
Western immigrant	1185	8.1	1,387	8.7
Total population	14,615	100.0	15,987	100.0

Source: Statistics Netherlands

The group of non-Western immigrants is on average young compared with the native population. In 2001, 40% of the non-Western immigrants was younger than 20 years.
In the period 1987 to 2001 the ageing of the population was to some extent counteracted by the influx of young immigrants.

2.2.3 Socioeconomic status: occupation

The most utilized socioeconomic indicators are occupation, level of education

* The population with a foreign background is defined by Statistics Netherlands in two steps, by specifying a *first* and a *second* generation. The *first generation* consists of persons who were born abroad and have at least one parent who was also born abroad. The *second generation* consists of persons who were born in the Netherlands and have at least one parent who was born abroad. The remaining persons are classified as native. This definition implies that every person who has at least one foreign-born parent is considered to have a foreign background.

and income. We have used occupation as main indicator for socioeconomic status (SES). These three dimensions of SES are strongly interrelated and complementary, but not interchangeable.[1] To describe the changes in occupation we will use data from the NS1 and NS2.

Box 2.1 Operationalisation of occupation as an indicator of socioeconomic status in the NS1 and NS2

Occupation was used as the socioeconomic indicator. Participants were asked to fill in their last occupation (see chapter 6). This has the advantage that also persons were included, who were actually unemployed, retired or disabled. The registered occupation was coded according to the Standard Classification of Occupations (SBC92 of Statistics Netherlands [2], which is strongly related to the international Standard Classification of Occupation (ISCO88) [3]. Respondents were classified according to their occupation into three SES groups: lowest, middle and highest. The ***highest SES*** group included the managerial and professional occupations; the ***middle SES*** group included the small employers, own account workers and intermediate occupations (clerical, administrative, sales workers with no involvement in general planning or supervision); the ***lowest SES*** group people included lower supervisory and technical occupations, and (semi) routine occupations. When information about occupation was missing, we resorted to the person with the highest occupational level of the household; was this information also not available, the educational level was used as an indicator of socioeconomic status (see paragraph 2.4). In the 1987 survey 68.9% of the respondents could be classified in one of the three SES groups according to their occupation, 21.4% according the highest occupational level of the household and 9.7% according to the highest educational level; in the 2001 survey 57.5% was classified according to occupation, 27.3% according to the highest occupational level of the household and 15.2% according to the highest educational level.

The proportion of persons belonging to the lowest and middle SES decreased, the proportion of persons in the highest SES group increased steeply from 16.5 to 28.8%.

Table 2.2 Socioeconomic status in 1987 and 2001; percentages

	1987	**2001**
	N=261,691	N=296,243
	%	%
Lowest	34.9	29.5
Middle	48.6	42.4
Highest	16.5	28.8

Source:NS1 and NS2

In chapter 3 we further explored the changes in the composition of the lowest SES group that occurred between 1987 and 2001.

2.2.4 Socioeconomic status: education

Education is one of the key factors among the predisposing factors, both because of its impact on the labour market (another predisposing factor) and income position (enabling factor), and because of its influence on knowledge about diseases, help-seeking behaviour and opinions and values. For describing the changes in the educational level between 1987 and 2001, we used data from the NS1 and NS2, and from Statistics Netherlands.

Box 2.2 Classification of educational level in NS1 and NS2

We divided the educational level in three classes on the basis of self-reported highest level of education

- In the lowest class reside all persons with (pre) primary education,
- in the middle class all persons with secondary education, and
- in the higher class all persons with tertiary education (higher professional/ vocational education (HBO) and University courses (WO)

Educational level in the population

The educational level at which students leave full-time education has been increasing gradually for many years, but this increase accelerated in the second half of the 1990s. Not only is the proportion of graduates of higher professional and university education increasing, but more young people are also leaving full-time education with at least an initial vocational qualification. Higher professional education (HBO) has enjoyed a particular increase in student numbers. In 1990, 24% of students in the relevant age group entered higher professional education; by 2000 this had risen to 38% (source: Statistics Netherlands).

Educational level in 1987 and 2001

In table 2.3 we present data about educational level of our study populations in 1987 and 2001. The education level of the population became higher. The proportion of persons with primary education declined from 27% in 1987 to 17% in 2001 and the proportion of persons with the highest qualifications rose from 11% to 21%. The group of persons with secondary education remained stable.

Table 2.3 Education level in 1987 and 2001 for persons ≥ 18 years old; percentages

	1987 N=200,815 %	**2001** N=224,126 %	**2001-1987** difference
Not (yet)	1.2	1.6	0.4
Primary education	27.0	17.0	-10.0
Secondary education	60.5	60.5	0.0
Tertiary education	11.3	20.9	9.6
Total	100.0	100.0	

Source:NS1 and NS2

2.2.5 Socioeconomic status: employment status

There was a rise in labour market participation between 1987 and 2001 (table 2.4). In our study populations the proportion of persons with a paid job increased from 46.8% in 1987 to 53.2% in 2001. Out of the employed people 92% worked as employee and 8% was self-employed (not in table). Of all persons with a paid job in 1987 63% was male and 37% female, against 59% and 41% in 2001.

Table 2.4 Employment status in 1987 and 2001 for persons ≥ 18 years old; percentages

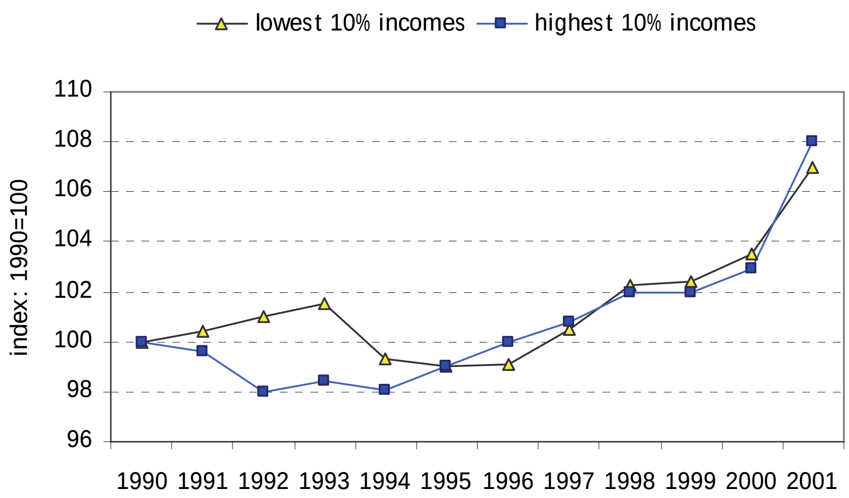
	1987	**2001**
	N=211548	N=224987
	%	%
pupil/student	6.5	6.7
paid job	46.8	53.2
unemployed	3.3	1.8
disabled	3.9	5.0
housewife/man	18.0	18.4
retired	21.1	14.9

Source: NS1 and NS2

2.2.6 Socioeconomic status: income

The increased employment rate translated into a positive trend for household income. The household *disposable income* remained virtually unchanged in the period 1990-1994, but thereafter it rose steadily up to 2000, when it was almost 6% higher than in 1990. Strikingly, the rise in purchasing power in 2001 was twice that of the entire preceding period, more than 10% higher than in 1990. This leap can be ascribed to the reduction in tax and social insurance contributions following the tax reforms introduced in 2001.

Figure 2.2 Trend in disposable income by income group and earner type, 1990-2001 (index: 1990 = 100)



Source: Statistics Netherlands

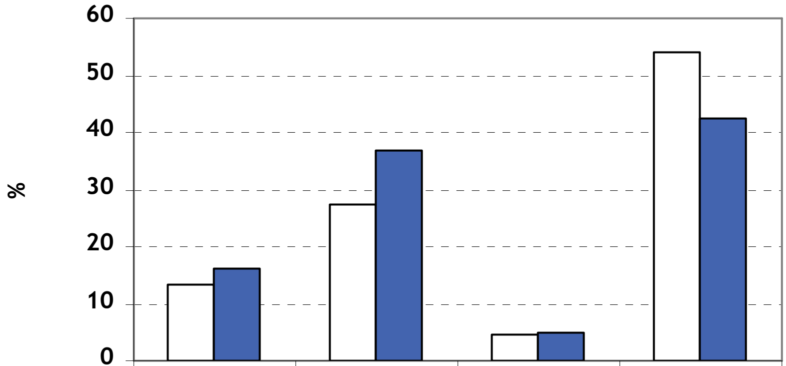
While the degree of income inequality remained virtually stable in the Netherlands in the 1990s, the amount of *poverty* declined after 1995 according to the two most used indicators: the low-income threshold and the social policy minimum.[*] In the period 1987-2001 poverty fell according to both criteria.[4]

[*] Two criteria are used for measuring poverty: the low-income threshold and the social policy minimum. The low-income threshold is an inflation-proof sum which is derived from the social assistance norm for a single person in 1979. The social policy minimum is set 5% higher than the guaranteed minimum income which is used for social assistance, old age pensions and child benefit.

2.2.7 Household composition

Households are defined by Statistics Netherlands as a group of people living in one accommodation who provide for their own housing and daily needs or whose housing and daily needs are provided for by others.
According to Statistics Netherlands the number of households has grown from 5,8 million in 1987 to 6,9 million in 2001, a proportional increase of 18%.
According to the NS1 and NS2 surveys the proportion of people living alone increased from 13.5% to 16.0% between 1987 and 2001. The proportion of couples living with children decreased with more than 10%, whereas the proportion of couples without children increased nearly with 10%.

Figure 2.3 Household composition in 1987 (N=217,256) and 2001 (N=210,882) for persons ≥ 18 years; percentages



	single household	couple	single parent family	couple with children
□ 1987	13.5	27.5	4.4	53.9
■ 2001	16.0	36.7	4.9	42.4

Source: NS1 and NS2

2.3 Behavioural changes

In this section changes in the psychosocial and sociocultural components of Andersen's predisposing factors will be described.

This section deals with the following subjects: lifestyle factors (smoking , alcohol consumption, obesity) and patients' expectations regarding added value of GP care for minor ailments.

2.3.1 Life Style factors

Smoking

Smoking is a major determinant of disease and mortality in the Netherlands and a major cause of the stagnating extension in life expectancy among women. Almost 15% of all deaths are caused by smoking. [5]

In 1987, 38.9% of the population of 12 years and older were smoking, against 29.5% in 2001 (table 5). [6] The percentage of smokers went down by 24% ($p<0.001$), this trend was about the same for men and women.

Both in 1987 and 2001 the proportion of smokers was higher among men than women ($P<0.001$). The percentage ex-smokers increased from 23.3% in 1987 to 33.1% in 2001.

The decrease in smoking between 1987 and 2001 was about similar for the three educational levels.

Table 2.5 Number of smokers among persons of ≥ 12 years in 1987 (N=11280) and 2001 (N=10571) by sex [6]; percentages

	1987	**2001**	***2001/1987***
	%	%	*ratio*
all	38.9	29.5	**0.76**
male	44.7	34.1	**0.76**
female	33.3	25.7	**0.77**
Female/male ratio	**0.74**	**0.75**	

Bold $p<0.05$ Source:NS1 and NS2- health interview survey

Alcohol consumption

We have used quantity and frequency measures when comparing alcohol consumption in 1987 and 2001. Excessive alcohol consumption was defined differently for men and women, because women have a higher sensitivity for alcohol.

- For males we speak of excessive alcohol consumption when a person reported to use more than 21 units (glasses) a week;
- For females we speak of excessive alcohol consumption when a person reported to use more than 14 units a week [7] .

Between 1987 and 2001 excessive alcohol consumption decreased both in males and females in all three educational levels.

Contrary to other life style factors, the relation between excessive drinking and educational level is weak or non-existent in men and reversed in women. Both in 1987 and 2001 the higher the educational attainment of women, the higher the proportion of women reporting excessive drinking: the difference in excessive drinking between the lowest and the highest educational level was approximately a factor three in 2001 (table 2.6).

Table 2.6 Excessive alcohol consumption in 1987 (N=6314) and 2001 (N=8923) among persons ≥ 25 years by sex and educational level [6]

	1987 N=6,314		**2001** N=8,923		***2001/1987 ratio***	
	male	female	male	female	*Males*	*Females*
	%	%	%	%		
lowest education	16.1	5.4	9.9	3.5	***0.61***	***0.65***
middle education	16.0	8.5	13.2	6.2	***0.83***	***0.73***
highest education	15.5	13.3	11.6	10.7	***0.75***	***0.80***
lowest/highest ratio	*1.04*	***0.41***	*0.85*	***0.33***		

Bold $p<0.05$ Source:NS1 and NS2- health interview survey

Obesity

We have used Body Mass Index (BMI) as an indicator for obesity.* Obesity is defined as a BMI equal of higher than 30.

The proportion of persons with obesity was in 2001 almost twice as high as in 1987. Obesity occurred more frequently among *women* than among *men* both in 1987 and 2001, although the difference between the sexes in 2001 was less than in 1987.

The proportion of persons with obesity increased between 1987 and 2001 for persons of all educational levels, however, the proportional increase was most outspoken for persons of the highest educational level. Whereas the obesity rate was 6.5 times higher in persons of the lowest educational level compared to persons of the highest educational level in 1987, this gap was reduced to 3.3 in 2001.

* BMI= weight in kilograms/ (length in meters)^2

Table 2.7 Obesity in 1987 and 2001 among persons >= 18 years by sex and educational level; percentage

	1987	2001	2001/1987
	N=10,440	N=9,463	
	%	%	ratio
all	6.0	10.8	**1.80**
male	4.6	8.9	**1.93**
female	7.4	12.3	**1.66**
Female/male	***1.61***	***1.38***	
lowest education	11.1	19.0	**1.71**
middle education	5.5	11.6	**2.11**
highest education	1.7	5.8	**3.41**
lowest/highest	***6.53***	***3.28***	

Bold p<0.05 Source:NS1 and NS2- health interview survey

Our figures are in agreement with the data of Statistics Netherlands. According to these data the proportion of persons with obesity doubled between 1980 and 2000. The proportional increase was slightly higher for males than for females.

2.3.2 Patients' expectations of GP care for minor ailments

Symptoms are a daily part of most people's lives and many people with illness do not consult their doctor. In fact, problems for which people seek medical care only represent a small percentage of the total illness experienced. Several studies show that on average 10-20 percent of all experienced problems are presented to GPs. [8-10]

The decision to consult a GP is not simply based on the presence or absence of medical problems, but is, among other things, based on perceived benefits of the action, including belief in efficacy of the doctor. [11]

In the Netherlands, the past few decades witnessed information campaigns by GPs and policy strategies aimed at actively discouraging consulting the GP for minor ailments; patients were encouraged to employ self-care. Patients' attitudes towards the management of minor ailments influence their help-seeking behaviour.

One might expect that the number of consultations for minor ailments would decrease when patients are better educated. On the other hand, some sources claim that an increased individual focus on health has escalated patients' expectations of health care with a resulting increased demand on GP services.[12] In a British study, many GPs expressed frustration about the workload related to minor ailments.[13]

Cardol et al made use of the Nijmegen Expectation Questionnaire*, which was administered within the framework of the National Surveys in 1987 [14] and in 2001 [15] as part of the health interview, for detecting differences in patients' attitudes towards the management of minor ailments between 1987 and 2001.[16-17]

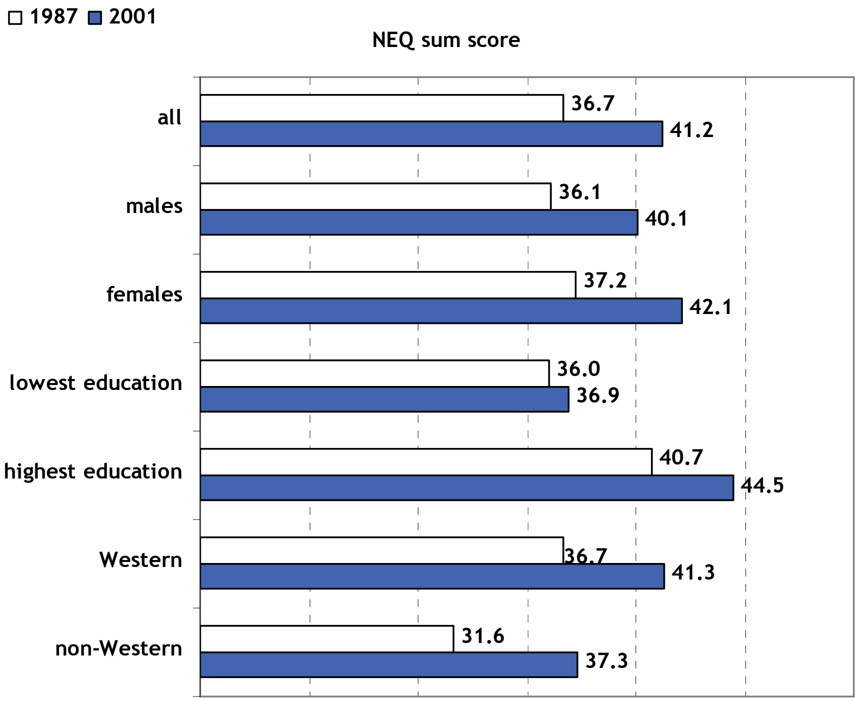
Cardol et al found (figure 2.4) that between 1987 and 2001 patients' beliefs about the benefits of a GP's care compared to self-care for minor ailments were significantly less strong than in 1987.

In 1987 as well as in 2001 a lower education, a non-western background and higher age were related to higher expectations.

The main differences between 1987 and 2001 in the relationship between age and attitudes were seen in older patients; elderly expected greater benefit from a GP's care (data not shown).

* The Nijmegen Expectation Questionnaire is a validated scale developed by Van de Lisdonk , used to assess patients' attitudes towards the management of minor ailments with regard to medical treatment [8]. A higher score denotes lower expectations about benefits of a doctor's care for common health ailments .

Figure 2.4 Mean Nijmegen Expectation Questionnary sum score in 1987 and 2001 by sex, education and ethnic background (higher sum scores indicate lower expectations)



Patients' expectations differed according to type of complaint. For complaints such as diarrhoea, nausea or a flu, almost three-quarters of the population did not expect more from the GP than from self-care.

In conclusion, the expectations of patients regarding GP care for minor ailments were lower in 2001 than in 1987 with the exception of elderly patients, who expected in 2001 more benefit from GPs' care than in 1987.

2.4 Discussion

The population was ageing between 1987 and 2001; the proportion of persons of 65 years and older increased from 12.4% to 13.6% in the Dutch population, the proportional contribution of the age group 45 to 64 years increased by more than 4%, whereas the proportional contribution of the age group 15 to 24 years decreased by more than 5%.
The proportion of non-Western immigrants increased from 5% to 9% of the population.
Socioeconomic status and the educational attainment rose between 1987 and 2001 and more people were employed. The growth in employment rate translated into a positive trend for household income, fewer people lived in poverty.
Fewer people choose to marry or to have children. The proportion of single person households grew from 13% in 1987 to 16% in 2001, the proportion of couples without children increased by nearly 10%.
The proportion of persons who smoked or used excessive alcohol decreased when we compare 2001 to 1987; however, the proportion of persons with obesity almost doubled.
In most life style categories the lowest educational groups scored worse than the higher. Compared to 1987, people were less inclined to consult their GP for minor ailments in 2001.

Societal context

Between 1987 and 2001 several changes took place. Economic prosperity, education and living in a welfare state allowed people more and more to choose between living arrangements, depending on their individual values and preferences.[18] The economical and cultural changes gave rise to a process of individualization and emancipation. Attitudes and behaviour were increasingly based on personal choice and are less dependent on tradition and social connections.[19]
Both men and women became less dependent on marriage and the family for the fulfilment of a variety of needs. Family as a stronghold lost ground: one way in which this has found expression in society has been the rise of alternatives to the nuclear family (i.e. a married couple with children); these include one-parent family, the single-person household, cohabitation without marriage and voluntary childlessness.[20]
Just like demographic changes, individualisation and emancipation might be

associated with changes in the demand for healthcare. In general, the better educated and wealthier are healthier. At the same time, they also become more and more like critical consumers, who want to know what is available on the market. Modern, self-confident patients have ready access to medical knowledge, particularly via the Internet, and therefore expect good comprehensible information from their GP.
Obviously, the above described trends have a much longer history than the period 1987-2001. However, in this period all these trends occurred full-scale.

2.5 Study hypotheses

What do the changes between 1987 and 2001 described in this chapter mean for the use of GP care, which can be used as a proxy for need? Several hypotheses can be formulated.
The ageing of the population will certainly result in higher consultation rates, more chronic diseases and more complex morbidity patterns.
The increase in the number of non-Western immigrants will result in a higher use of GP care, because these groups visit their GP more often than the indigenous population even after adjusting for sociodemographic characteristics and health status [21].
Because obesity is related to higher levels of morbidity, the higher number of patients with obesity will give rise to higher consultation rates.
The expectations of patients regarding GP care for minor ailments were lower in 2001 than in 1987 with the exception of elderly patients, who expected in 2001 greater benefit from GPs' care than in 1987. [16] We expect that the lower expectations will result in lower consulation rates for minor ailments.
Summarised, some changes in the population warrant a higher consultation rate, some a lower consultation rate. Beforehand it is not possible to deduce whether the use of GP care wil increase or decrease.

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Chapter 3

Changes in the Sociodemographic composition of the lowest socioeconomic group over time, 1987-2001

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3.1 Abstract

Background: When comparing health differences of groups with equal socioeconomic status (SES) over time, the sociodemographic composition of such a SES group is considered to be constant. However, when the periods are sufficiently spaced in time, sociodemographic changes may have occurred. The aim of this study is to examine in which respects the sociodemographic composition of lowest SES group changed between 1987 and 2001.

Methods: Our data were derived from the first and second Dutch National Survey of General Practice conducted in 1987 and 2001. In 1987 sociodemographic data from all listed patients (N = 334,007) were obtained by filling out a registration form at the practice (response 78.3%, 261,691 persons), in 2001 these data from all listed patients (385,461) were obtained by postal survey (response 76.9%, 296,243 persons). Participants were primarily classified according to their occupation into three SES groups: lowest, middle and highest.

Results: In comparison with 1987, the lowest SES group decreased in relative size from 34.9% to 29.5%. Within this smaller SES group, the relative contribution of persons with a higher education more than doubled for females and doubled for males. This indicates that the relation between educational level and occupation was less firmly anchored in 2001 than in 1987.
The relative proportion of some disadvantaged groups (divorced, unemployed) increased in the lowest SES group, but the size of this effect was smaller than the increase from higher education. Young people (0–24 years) were proportionally less often represented in the lowest SES group.
Non-Western immigrants contributed in 2001 proportionally less to the lowest SES group than in 1987, because of an intergenerational upward mobility of the second generation.

Conclusion: On balance, the changes in the composition did not result in an accumulation of disadvantaged groups in the lowest SES group. On the contrary, the influx of people with higher educational qualifications between 1987 and 2001 could result in better health outcomes and health perspectives of the lowest SES group

3.2 Background

Before 1980 not much attention was paid to socioeconomic inequities in health. Most believed that the health differences related to socioeconomic differences would decrease by spreading of welfare and by achieving equal accessibility to the health care system for all. This changed in the early 1980's because of the publication of the Black Report in England [1]. Socioeconomic health inequities became a major political and public concern also in the Netherlands with a focus on health education and health care provision in disadvantaged subgroups [2].
When comparing health differences of groups with equal socioeconomic status (SES) over two time periods, the sociodemographic composition of such a SES group is considered to be constant. However, when the two periods are sufficiently spaced in time, sociodemographic changes may have occurred.
The aim of this study is to examine in which respects the sociodemographic composition of lowest SES group changed between 1987 and 2001. This is an important issue because changes in composition may affect health outcomes and health perspectives of the lowest SES group. For the purpose of this study we divided the socioeconomic spectrum in three groups: the lowest, the middle and the highest SES group.
The most utilized socioeconomic indicators are level of education, occupation and income. These three dimensions of SES are strongly related and complementary, but not interchangeable [3]. Each indicator is likely to reflect both common impacts of a general hierarchical ranking in society as well as particular impacts specific to the indicator [4].
A lower socioeconomic status influences health in an unfavourable way through the presence of unhealthy lifestyle factors, unequal access to – and quality of – health care, more material deprivation and a stressful psychosocial environment [5].
Volkers et al. found that a low occupational position was consistently associated with poor health and physician-diagnosed morbidity, which could not be explained by a low educational level [6].
Theoretically a combination of measures for deriving socioeconomic status would be preferable [4], but on practical grounds most often a single item is used for measuring socioeconomic status.
There is no single best indicator of SES suitable for all study aims and applicable at all time points in all settings. The choice of socioeconomic indicator often reflects which data are available rather than any explicit

theorisation of the possible effects of different dimensions of socioeconomic disadvantage [7].
In the US education has been widely used as SES indicator, because educational data are most readily available [8], whereas in Britain occupation social class is the more usual measure [7].

In this paper we chose occupation as SES indicator. We know that between 1987 and 2001 the following changes in sociodemographic composition took place:
- the general educational level in the population increased between 1987 and 2001
- The proportion of non-western immigrants rose between 1987 and 2001 and within the group of non-western immigrants the proportion of persons from the second generation (persons born in the Netherlands but with a at least one parent born outside the Netherlands) grew [9].

Considering these changes, we hypothesise that a higher educational level in the population will lead to better job perspectives and will express itself in a smaller lowest SES group. On the other hand, we expect that the competition on the labour market for higher job categories will be higher, because more people with higher education are available; because of this phenomenon more persons with a higher educational attainment might reside in the lowest SES group. We expect in particular that women are at risk for staying in an occupation-based low SES-group because their job is more likely to be incongruent to their educational level, due to the balancing between family and work.
Younger people might be classified less frequently in the lowest socioeconomic group, because of an increasing educational level.
As far as non-Western immigrants are concerned, we suppose less people will have a low SES, due to an intergenerational upward mobility of the second generation.

We formulated the following research questions.
1 What is the size and direction of changes of the different SES-groups between 1987 and 2001?
2 What is the difference in educational attainment in males and females of the lowest SES group when comparing 1987 with 2001?
3 What is the difference in the composition of the lowest SES-group of other sociodemographic determinants when comparing 1987 with 2001?

3.3 Methods

Study population

In the Netherlands, the entire non-institutionalised population is registered at a general practice. Patients enlisted in the practices participating in the first and second Dutch National Survey of General Practice (NS1 and NS2) were used as our study populations. Data collection for these studies took place in 1987 and 2001; in 103 (161 general practitioners) and 104 (195 general practitioners) practices respectively. In both surveys a representative sample of practices and the Dutch population was used. All patients listed in the participating practices were included creating study populations of 334,007 (NS1) and 385,461 (NS2) persons.

Data collection

Data required for this study were obtained from patient registration forms [10,11]. Sociodemographic data from all listed patients (Table 1) were collected by filling out a registration form via the practice (1987) or at home via the postal survey (2001); ìn 1987 78.3% of these patients responded in a sociodemographic census, in 2001 76.9% of the patients responded (table 3.1). Age and gender did not differ between responders and not-responders.

Table 3.1 Characteristics of total population compared with respondents in 1987 and 2001

	1987		2001	
	All	Respondents	All	Respondents
	N=334,007	N=261,691	N=385,461	N=296,243
	%	%	%	%
SEX				
male	49.5	49.0	48.2	48.8
female	50.5	51.0	51.8	51.2
Age (yrs)				
0–24	36.5	33.0	29.7	29.4
25–64	51.5	55.0	57.1	56.1
65 and older	12.1	12.0	13.2	14.4
Marital status				
unmarried	44.9	41.0	41.3	41
married	47.2	50.8	49.9	50.3
divorced	2.6	2.8	3.3	3.2
widowhood	5.2	5.4	5.5	5.5
Household composition				
single household	10.3	9.7	12.7	12.5
couple	21.1	21.4	29.3	29.4
single parent family	4.9	4.6	5.9	5.8
couple with children	63.8	64.3	52.0	52.3
Employment status				
pupil/student	31.7	28.7	22.8	22.4
paid job	34.4	36.9	44.0	44.3
unemployed	2.4	2.4	1.6	1.6
disabled	13.3	14.4	15.2	15.2
housewife/man	2.9	3.1	4.2	4.2
retired	15.4	14.4	12.2	12.3
Ethnic background				
native	91.9	92.0	87.7	87.8
western immigrant	5.2	5.3	6.2	6.2
non-western immigrant	2.9	2.7	6.1	6.0
SES groups (%)				
Lowest		34.9		29.5
Middle		48.6		42.4
Highest		16.5		28.8

Representativeness was kept in both studies for sex, age, and type of health insurance. Data collection procedures and instruments towards socio-demographic data were identical to ensure good comparability.

Socioeconomic status

Occupation was used as the socioeconomic indicator. Participants were asked to fill in their last occupation instead of their current occupation. This has the advantage that also persons were included, who were unemployed, retired or disabled.

The registered occupation was coded according to the Standard Classification of Occupations (SBC92 of Statistics Netherlands [12]), which is strongly related to the International Standard Classification of Occupation (ISCO88)[13]. participants were classified according to their occupation into three SES groups: lowest, middle and highest.

In the highest SES group the managerial en professional occupations were placed; in the middle SES group the small employers, own account workers and intermediate occupations (clerical, administrative, sales workers with no involvement in general planning or supervision); and in the lowest SES group people in lower supervisory and technical occupations, and (semi) routine occupations.

In 1987 68.9% of the respondents were classified in one of the three SES groups according to their occupation, 21.4% according the highest occupational level of the household and 9.7% according to the highest educational level; in 2001 57.5% was classified according to occupation, 27.3 according to the highest occupational level of the household and 15.2% according to the highest educational level.

Because the educational level was used for assigning the socioeconomic status in a part of the respondents, we excluded in the analysis of the relation between socioeconomic status and educational attainment those persons, whose classification in the lowest SES group was based on educational level. In this way 14,445 respondents were left out in 1987 and 19638 respondents in 2001.

Sociodemographic variables

The following sociodemographic variables were included with between brackets the subdivision in separate socio-demographic subgroups: sex (male-female), age (age groups), marital status (married, unmarried, divorced, widowhood), household composition (couple with children, couple, single household, single parent family), employment status (student, paid job, unemployed, housewife/man, disabled for work, retired), ethnic background (based on the country of birth of the respondent and his/her parents categorized as native, western immigrant, non-western immigrant) and highest completed educational level (low, middle, high), and All data were extracted from the patient registration forms.

Data-analysis

To study changes within the lowest SES group, we determined the distribution in 1987 and 2001 for each sociodemographic category separately across the three SES groups and for all respondents in the population.

For example: in 1987, 33.2 percent of all males were in the lowest SES group, 48.5 percent in the middle SES and 18.3 percent in the highest SES group ; in 2001, 26.3 percent of the males belonged to the lowest SES group (Table 3.2, column 2 and 3). From these figures we computed for males the ratio 2001/1987 (26.3/33.2 = 0.79) of the lowest SES group (column 4). In the same way we calculated the ratio 2001/1987 of the lowest SES group for the whole population (29.5% in 2001, 34.9% in 1987: ratio 0.85). This overall ratio of 0.85 was used as reference since we were interested whether the relative proportion of specific sociodemographic categories increased or decreased compared with the overall change. By dividing the "unadjusted" ratio of males by the reference ratio (0.79/0.85), we found the relative change of the proportion of males within the lowest SES group (0.94). We call this the adjusted ratio (column 5). A ratio value above 1.0 indicates a relative increase and a value lower than 1.0 a relative decrease of the proportion for that specific socio-demographic subgroup.

The consequences of all these changes on the lowest SES group in 2001 is shown in column 6 to 8 of Table 2; the proportional distribution of sociodemographic subgroups within each variable is given for the lowest SES group and for all respondents of the population. This difference is in column 8 expressed as a ratio (low SES/all respondents).

Table 3.2 Change in composition of the lowest SES group 1987–2001*

	2	3	4	5	6	7	8
	Lowest SES		Unadjusted	*Adjusted*	Proportion in popul. of lowest SES	Proportion in popul. of respondents	*Low SES/ All respon dents*
	1987 N=91,302	2001 N=87,525	2001/ 1987	*2001/ 1987 REF*	2001 N=87,525	2001 N=300,929	*2001*
	%	%	*ratio*	*ratio*	%	%	*ratio*
All	34.9	29.5	0.85	*1.00*	100.0	100.0	*1.00*
SEX							
male	33.2	26.3	0.79	*0.94*	43.4	48.8	*0.89*
female	36.5	32.6	0.89	*1.06*	56.6	51.2	*1.11*
Age (yrs)							
0-24y	29.8	19.2	0.65	*0.76*	19.2	29.4	*0.65*
25-64	32.1	30.1	0.94	*1.10*	57.2	56.1	*1.02*
65y a.o	61.8	48.4	0.78	*0.92*	23.7	14.4	*1.64*
Marital status							
unmarried	28.8	22.3	0.77	*0.92*	30.7	41.0	*0.75*
married	36.2	32.2	0.89	*1.05*	54.4	50.3	*1.08*
divorced	36.6	38.9	1.06	*1.26*	4.2	3.2	*1.31*
widowhood	66.4	58.1	0.88	*1.04*	10.7	5.5	*1.95*
Household composition							
couple with children	30.8	22.5	0.73	*0.86*	40.5	52.3	*0.77*
single household	46.3	41.4	0.89	*1.06*	17.8	12.5	*1.42*
couple	40.3	33.6	0.83	*0.99*	33.9	29.4	*1.15*
single parent family	40.0	38.8	0.97	*1.15*	7.8	5.8	*1.34*

Table 3.2 Continued

	2	3	4	5	6	7	8
Employment status							
pupil/student	25.7	15.6	*0.61*	*0.72*	11.7	22.4	*0.52*
paid job	27.9	27.7	*0.99*	*1.17*	41.0	44.3	*0.93*
unemployed	43.8	42.2	*0.96*	*1.14*	2.2	1.6	*1.38*
disabled	55.8	46.3	*0.83*	*0.98*	6.5	4.2	*1.55*
housewife/man	39.5	43.1	*1.09*	*1.29*	21.9	15.2	*1.44*
retired	59.9	40.7	*0.68*	*0.80*	16.7	12.3	*1.36*
Ethnic background							
native	34.0	28.6	*0.84*	*1.00*	85.2	87.8	*0.97*
western immigrant	31.5	28.0	*0.89*	*1.05*	5.9	6.2	*0.95*
non-western immigrant	58.2	44.0	*0.76*	*0.89*	8.9	6.0	*1.48*
Education males	N=34,881	N=32,241			N=32,241	N=126,917	
(not) yet	25.9	15.9	*0.61*	*0.73*	11.4	18.3	*0.63*
low	67.5	43.3	*0.64*	*0.76*	26.0	15.3	*1.70*
middle	22.2	30.8	*1.39*	*1.64*	58.2	48.0	*1.21*
high	3.1	6.1	*1.97*	*2.33*	4.4	18.5	*0.24*
Education females	N=37,345	N=31,863			N=31,863	N=112,475	
(not) yet	26.3	15.0	*0.57*	*0.67*	10.0	19.0	*0.53*
low	71.3	45.9	*0.64*	*0.76*	22.5	13.9	*1.62*
middle	19.3	35.7	*1.85*	*2.19*	63.0	50.0	*1.26*
high	2.9	7.2	*2.50*	*2.96*	4.4	17.1	*0.26*

* Column 2 and 3 the percentage of the lowest SES group in relation to all respondents; Column 4 the ratio 2001/1987 of each sociodemographic subgroup, Column 5 the ratio of each sociodemographic subgroup compared with the overall ratio of 0.85;
Column 6 and 7 the proportional distribution of sociodemographic subgroups within each variable for the lowest SES group and for all respondents; Column 8 the ratio lowest SES group/all respondents (column 6/7)

3.4 Results

Socioeconomic status

The relative size of the SES groups changed during 1987–2001 as shown in table 3.1; the relative size of the lowest SES group decreased from 34.9% to 29.5% of the population; the relative size of the middle SES group declined from 48.6% to 42.4%; the relative size of the highest SES group increased from 16.5 to 28.2%. This shift between the three SES groups is highly statistically significant ($p < 0.001$).

The 2001–1987 ratio of the lowest SES group was 0.85 (29.5/34.9), the ratio of the middle SES group 0.87 and of the highest SES group 1.72. We elaborate further on the results of the lowest SES group.

Lowest SES group in 1987 and 2001

For each sociodemographic subgroup, the proportion with a low SES in 1987 and 2001 are shown in Table 2 in column 2 and 3, whereas column 4 and 5 show the ratio's derived from these columns.

The adjusted ratio in column 5 is an indication for the change of each category between 1987 and 2001 compared with the overall change of 0.85 (used as reference).

Compared with the general trend, the relative proportion of people with the following characteristics *increased* most in the lowest SES group:

- the highest and middle educational group in females (2.96 and 2.19)
- the highest and middle educational group in males (2.33 and 1.64)
- housewife/man (1.29)
- divorced (1.26)

On the other hand, a *decrease* in the relative proportion was seen in

- males and females with not yet accomplished education (0.73 and 0.67)
- males and females with low educational level (0.76 and 0.76)
- student/pupil (0.72)
- age group 0 to 24 years (0.76)
- retired (0.80)
- couple with children (0.86)
- non-western immigrant (0.89)

The effects of these changes on the composition of the lowest SES group in 2001 can be judged in column 6 to 8.

The proportions in column 6 and 7 indicate the differences between the distribution across the sociodemographic categories within the lowest SES

group as compared with the total population.
In the interpretation of our data it is important to make a distinction between the adjusted ratio of a category and the ratio of the lowest group compared with all respondents.
We illustrate this with the figures of the non-western immigrants. With an adjusted ratio of 0.89 their relative contribution to the lowest SES group has gone down between 1987 and 2001, however, in 2001 they are still overrepresented in the lowest SES group (8.9% in lowest SES group, 6.0% in total population)
In the age group 0 to 24 years the adjusted ratio in the lowest SES group was 0.76, at the same time the ratio in 2001 between the lowest SES group and all respondents was 0.65. In the age group 65 years and older these figures were 0.92 and 1.64 respectively, indicating that the relative contribution to the lowest SES group has gone down, but that there is still an overrepresentation of elderly in the lowest SES group.
As for *marital status*, the percentages of the divorced and the widowed in the lowest SES group were disproportionally high. The same applied to single households and single parent families in the category "*household distribution*".
In the category "*employment status*" the unemployed, the disabled, housewife/men and the retired were overrepresented in the lowest SES group.

3.5 Discussion

The aim of the current study was to analyse the changes within the lowest SES group that took place between 1987 and 2001. We hypothesised that the higher educational level might result in a smaller lowest SES group and that proportionally more persons with higher levels of education might reside in the lowest SES group and that this would apply in particularly for women.

Methodological considerations
When using the same instrument over time, differences in the allocation of social class may be caused by societal developments. We chose occupation as SES indicator, because the raw data contained detailed information about the occupation of the respondents, whereas the available information about education was more basic. We had no information about income.
Comparisons of socioeconomic class and inequities in health over time are complicated by issues of measurement and adequacy of data. The cross-

sectional design limits the determination of causal relationships.
A weak point in the current study was that for the allocation of SES we had to resort to the highest SES at household level or to the educational level in 31.1% of the cases in 1987 and 42.5% of the cases in 2001. This applies in particular for the younger age group. The group will on average demonstrate upward social mobility compared to the older cohort (their parents). This means that those who are still at school and do not have an own occupation yet, and who are assigned to the category according to their parents' occupation) will on average have their socioeconomic position underestimated.
We circumvented the problem of mixing socioeconomic status with educational level partly by excluding all respondents whose classification was based on educational level in the analysis of the relation between socioeconomic status and educational level.
In our study, like in most studies, an underestimation of changes is likely, due to an expected underrepresentation of certain less responding subgroups (non-western immigrants, unemployed, elderly), which are more prevalent in the lowest SES group.

Summary of the results and explanation
The higher educational level did result in a smaller lowest SES group; it decreased in relative size from 34.9% to 29.4% between 1987 and 2001. This trend is visible not only in the present study, but all over Europe, although the size differs [14].
In the lowest SES group the proportion of women and men with high education has more than doubled between 1987 and 2001: in females the adjusted ratio was 2.96, in males it was 2.33. In females and males with a medium level of education the adjusted ratio was 2.19 and 1.64 respectively.
This indicates that the relation between educational level and occupation is less firmly anchored in 2001 than in 1987. The most probable explanation is that the increase in the number of persons with higher educational levels is higher than the growth of higher job categories with as consequence that more people with a higher education will end up in lower job categories. The assumption made in the introduction that females in particular were at risk for staying in an occupation-based low SES-group, was confirmed.
Obviously, this applies only for a minority of the higher educated; females with a high educational level represent 17.1% of all female respondents and only 43.4% of the females in the lowest SES group. In males a similar pattern is visible.

The presence of more persons with higher educational qualifications in the lowest SES group may influence the health status of the lowest SES group. A higher educational attainment is associated with lower levels of mortality, morbidity and a higher perceived health compared with a lower educational attainment[15]. Lahelma et al. (2004) demonstrated that inequalities by occupational class were largely explained by education [4]. Snittker et al. demonstrated that those with more education had better health for all levels of income, and that fewer income-based disparities existed among the well educated than among the less well educated [16]. Although we used occupation as socioeconomic indicator, the statistical association between occupation and income is strong enough to assume that Snittkers findings are relevant for our study.

Summarising, the increased proportion of higher educated in the lowest SES group, will most likely diminish the health inequalities between the lowest and higher SES groups, because higher educated persons have better health outcomes as compared with lower educated persons.

The relative proportion of young people in the lowest SES group decreased. This can be deducted from several sociodemographic subgroups. In the first place it can be read from the adjusted ratio in the age-group 0 to 24 years (0.76) But it can also be read from the adjusted ratios of males and females, who have not yet completed their education (0.73 and 0.67 respectively). Finally, the adjusted ratio of 0.72 for pupils and students in the category employment status points in the same direction. Besides the effect of a higher educational level, an additional explanation might be that in 2001 more youngsters were classified according to the head of the household than in 1987.

Another assumption made in the introduction was that proportionally less non-Western immigrants would reside in the lowest SES group when comparing 1987 and 2001, because of the higher educational achievement of the second generation of non-Western immigrants. This assertion proved to be justified, but the effect was limited; the adjusted ratio of non-Western immigrants was 0.89.

Despite the positive finding that the relative size of the lowest SES group decreases, we found that this did not apply to all sociodemographic categories; some categories fared worse, some fared better. Not all changes are important and need comment.

3.6 Conclusion

Between 1987 and 2001a selective shift caused changes within the lowest SES group. What are the consequences of these mutations when comparing socioeconomic groups over time?
The most distinct change was that more persons with a higher educational level populated the lowest SES group. At the same time the relative proportion of some of the disadvantaged groups (divorced, unemployed) increased in the lowest SES group, but the size of this effect was smaller than the increase from higher education.
On balance, the changes in the composition did not result in an accumulation of disadvantaged groups in the lowest SES group. On the contrary, the influx of people with higher educational qualifications between 1987 and 2001 could result in better health outcomes and health perspectives of the lowest SES group.

Abbreviations
NS1: first Dutch National Survey of General Practice
NS2 : second Dutch National Survey of General Practice
SES: socioeconomic stratum

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Chapter 4

Changes in self-rated health between 1987 and 2001 by age, sex and socioeconomic status in the Netherlands

Abstract

Aim: To determine changes in self-rated health (SRH) by comparing data from 1987 and 2001 in the Netherlands.
Design: Analysis of the data of the first and second Dutch National Survey of General Practice conducted in 1987 and 2001
Setting: 103 general practices in 1987 and 104 in 2001 in the Netherlands. Patient and GP populations were representative for the Netherlands.
Subjects: in 1987, 17,342 patients were randomly selected from all practices for a health interview (75% response). In 2001 a questionnaire was sent to all patients (N=385,641), 294,999 responded (76.5%)
Main outcome measures: SRH in relation to sex, age and socioeconomic status (SES).
Results: Overall, there was no difference in "(very)good" self-rated health between 1987 and 2001 (83.7 vs. 83.5%). However, by considering age and sex, and age and SES in combination, we found substantial differences. For both sexes the prevalence of SRH "(very)good" increased in the youngest age group (0 to 14 years) and decreased substantially in the oldest age group (65 years and older); the steepest drop occurred in women from the lowest and middle socioeconomic groups (SRH "(very) good" more than 10% lower).
In the age range 15 to 64 years no clear trend in SRH was seen; males in the age from 45 to 64 years were the only group that fared better.
Conclusions: At first sight health inequalities seem not to have changed much between 1987 and 2001, however, by considering age, sex and SES in combination, we found considerable differences between specific subgroups; notably the SRH category "(very) good" of people of 65 years and older of the lowest and middle SES groups decreased considerably and within this age group the SRH of females was affected most.

4.1 Background

Self-rated health (SRH) is widely used for measuring the health of a population. With a single question people rate their overall health on a scale from excellent to very poor. This has been shown to be a useful and economic tool in population surveys [1]. SRH is a predictor for a person's health status, including mortality [2], functional ability [3], and utilisation of health care services[4,5,6]. It has a stronger association with chronic conditions than acute illnesses [7,8].

Measuring the health of different groups within the population has become an important instrument for health policy in the eighties, and SRH has proved to be suitable for this purpose. Before 1980, most policymakers believed that the health differences caused by socio-economic differences would decrease by achieving equal accessibility to the health care system for all. This opinion changed in the early 1980s after the publication of the Black Report in England [9]. Differences in health between groups became a major political and public concern also in the Netherlands [10].

Older people and lower socioeconomic groups suffer more often from ill health than younger people and people from higher socioeconomic classes [11]. On top of studying health differences between groups, it is for various reasons important to study how health status changes over time within age, sex and socioeconomic status (SES) groups. Firstly, for setting priorities in public health, it is important to know whether health differences are widening or decreasing. Secondly, for evaluating programs aimed at reducing differences in health. Thirdly, studying changes over time in health disparities is a way to better understand the factors contributing to health inequalities.

The aim of this study is, with data from the Dutch National Surveys in 1987 and 2001, to explore changes in health in different age, sex and socioeconomic groups.

We operationalised this in the following way.

1. What is the percentage of people in 1987 and 2001 that rate their health as “good or very good” and how is this related to sociodemographic characteristics?
2. To what extent is the change in self-rated health between 1987 and 2001 related to sociodemographic characteristics?

4.2 Methods

Self-rated health status was measured by a single item question, i.e. "In general would you describe your health as 1) very good, 2) good, 3) fair, 4) poor. 5) very poor" as part of the short form health survey (SF-36) [12]. For the purpose of this analysis we dichotomised the five-point scale into "(very) good" and "fair to very poor"

We used data from the first and second Dutch national surveys of general practice, which were performed by the Netherlands Institute for Health Services Research (NIVEL) in 1987 [13] and 2001 [14]. In the Netherlands, general practices have a fixed patient list, and all non-institutionalised inhabitants are listed in a general practice. Baseline characteristics such as age and gender were derived from practice records. Data required for this study were obtained from questionnaires and interviews.

In 1987, from every participating practice (N=103) 100 patients were selected randomly from the list for a health interview of one and a half hour: SRH was one of the items. In total 17,342 patients were approached, the interview was held with 13,014 patients (75 percent response). The main reasons for non-participation were patients having moved, patients not found at home on several occasions, and refusal. The sample can be considered representative of the Dutch population with regard to age, sex and socio-economic status.

In 2001, a written questionnaire was sent to all patients registered in the participating practices (N=104) at the start of the study (N=385,461) to collect sociodemographic data and data about self-rated health. Data of 294,999 persons were available for analyses, representing a response rate of 76.5%; non-response was not selective for age and sex.

In 1987, we obtained from 13,014 persons a score for SRH, in 2001 from 271,388 persons.

In both surveys the collected data included occupation and highest attained educational level. Socioeconomic status (SES) was based on occupation because it enabled the comparability with occupation based English and Dutch longitudinal registration systems [15,16]. The registered occupation was coded with the Standard Classification of Occupations (SBC92 of Statistics Netherlands) and subsequently classified into three occupational levels : low, middle and high [17]. If patients were retired, unemployed or disabled, the last practiced ocupation was used as an indicator. Housewives or housemen were classified according to the highest social class at household level; the same applied for respondents aged 24 years or younger.

If data on occupation were missing, the highest attained educational level was used as the SES indicator in both studies. In this way, we succeeded in including data from people with an unknown profession in the analyses. In 1987, for 9.7% and in 2001, for14.7% of the respondents educational level was used as the SES indicator.

Analysis

When comparing the differences between 1987 and 2001, the proportions of persons who described their health as “good or very good” in those years were compared. Because we study two different points in time, strictly taken, we should always speak of differences and not speak of increases or decreases. For the sake of the readability, we nevertheless will also use these terms. In addition, we will speak of the prevalence of a “good or very good” health with which we mean the proportion of persons with a SRH “good or very good”.
By standardising the 1987 population to the 2001 population for age, we adjusted for differences in the age composition of the populations of 1987 and 2001.

4.3 Results

SRH in 1987 and 2001 by age, sex and SES

Overall, there was no difference in the self-rated health in 1987 and 2001 (table 1). In 1987 83.7% reported a (very) good health, compared with 83.5% in 2001. Between *males* and *females* the differences in SRH in 1987 were negliglible (difference in SRH=0.1%; P=0.87); in 2001 the difference in SRH “(very) good” between males and females was larger (difference in SRH=2.5;P<0.001)
Age has a strong relation with SRH. With increasing age a continuously smaller proportion of the older age groups consider their health as “(very) good)”. Between 1987 and 2001, we saw different patterns for the various age groups. Below the age of 25 the perceived health improved, just as between 45 and 64 years. From the age of 65 years onwards the prevalence of "good or very good" health declined from 66.8 to 55.8 percent. The gap between 1987 and 2001 for the youngest (0 to 14) and oldest age group (≥ 65 years) became wider (from 27% to 38%).
In persons of the lowest SES group the prevalence of SRH “(very) good” was

lower than in persons of the highest SES group. The difference between these two groups remained stable between 1987 and 2001.

Table 4.1 Prevalence of "(very) good" self-rated health in relation to sex, age and socioeconomic status in 1987 and 2001; percentages

	1987 **N=13,014**	**2001** **N=271,388**	**Difference between 2001 and 1987**
	%	%	%
All	83.7	83.5	-0.2
Sex			
Men	83.8	84.8	1.0
Women	83.7	82.3	*-1.4
Age groups			
0- 14 years	93.8	96.6	**2.8
15-24 years	92.4	93.6	1.1
25-44 years	89.3	87.9	*-1.4
45-64 years	73.5	75.7	*2.2
65 years and older	66.8	58.6	**-8.2
SES			
Low	80.0	79.4	-0.6
Medium	84.8	84.3	-0.5
High	86.9	87.6	0.7

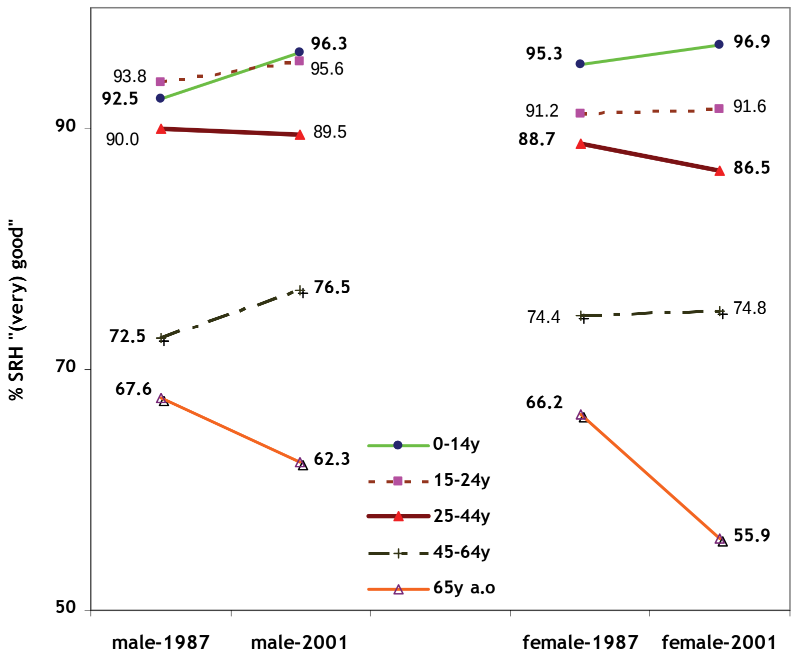
* P<0.01 **p<0.001

SRH in relation to age and sex

In figure 4.1 we show the proportion of persons with a SRH "(very) good" in 1987 and 2001 for different age groups of both sexes. The slopes of the lines are an indication for the changes that occurred between 1987 and 2001.
In *males*, until the age of 25 the proportion of people reporting a (very) good health is higher in 2001 than in 1987; in the age group 25 to 44 it remained stable; in the age group 45 to 64 the proportion SRH "(very) good" increased significantly from 72.5 percent in 1987, to 76.5 percent in 2001; in the age group 65 years and older it decreased from 67.6% to 62.3%.

In *females* of the youngest age group the prevalence rate of (very) good health was slightly higher in 2001 compared with 1987; in the age from 15-24 it was stable; in the age from 25 to 44 years it decreased significantly; in the age from 45 to 64 years it remained stable, whereas in the oldest age group there was a steep decline from 66.2% in 1987 to 55.9% in 2001.
When comparing males with females the most conspicuous finding is that males in the age group 45 to 64 years fared better in 2001, while females remained stable, and that in the oldest group the SRH of women fell far below that of men (55.9% vs. 62.3%).

Figure 4.1 Difference in self-rated health between 1987 and 2001 for sex and age; percentage of patients reporting



Bold figures indicate statistically significant difference P<0.01

SRH in relation to age and SES

In table 4.2 we computed for the three SES groups in each age group the difference between 2001 and 1987 in the prevalence of SRH "(very) good" .
In 2001, a larger proportion of the age group 0 to 14 reported a (very) good health than in 1987 in all three socioeconomic groups (for the lowest SES not significant). In the age groups 15 to 64 years no significant differences were detected between SES groups. In the group 65 years and older there was a diminished proportion SRH "(very) good" for the lowest and middle SES, the highest group showed a non-significant improvement in 2001.

Table 4.2 Difference in self-rated health("(very) good") between 2001 and 1987 in relation to age and SES; percentages

	2001-1987 (% SRH "(very) good")		
	SES		
	lowest	medium	Highest
0-14y	1.2	***3.3**	**2.7**
15-24y	2.2	-1.7	2.5
25-44y	-0.9	-1.2	-1.6
45-64y	1.3	2.1	-0.1
≥65y	**-9.1**	**-9.3**	1.7

* bold p<0.01

Because the most significant changes took place in the age group 65 years and older, we made for this group a further subdivision by adding sex (table 4.3). The prevalence of a SRH "(very) good" decreased significantly between 1987 and 2001 for females of the lower and middle SES, and for males of the middle SES class.

Table 4.3 Self-rated health "(very) good": difference between 2001 and 1987 for people males and females of of 65 years and older of different SES groups; percentages

SES	2001-1987 (% SRH "(very) good")	Signi-ficance
Lowest		
Male	-4.0	NS
Female	-11.8	***
Middle		
Male	-8.6	*
Female	-10.0	**
Highest		
Male	0.2	NS
Female	0.7	NS

NS=not signicant * P<0.05 ** p<0.01 ***p<0.001

4.4 Discussion

Overall there was no difference in the proportion of persons with a SRH "(very) good" (83.7 vs. 83.5%).
However, by considering age and sex, and age and SES in combination, we found substantial differences. For both sexes the prevalence of SRH "good or better" increased in the youngest age group (0 to 14 years) and decreased substantially in the oldest age group (65 years and older); the steepest drop occurred in women of 65 years and older from the lowest and middle socioeconomic groups (the proportion of females with a SRH "(very) good" was more than 10% lower in 2001 compared with 1987.

The literature on trends in socioeconomic inequalities in self-rated health has produced inconsistent results. Some studies state that inequalities in self-rated health between socioeconomic groups have narrowed [18,19], remained about stable [20, 21], or tended to widen [22].
For the Netherlands, only a few studies are published on trends in health inequalities in self-reported health [22-24]. Studying these trends for the Netherlands is interesting, because there was no strong economic recession

like in Finland and Sweden in the early 1990s or a strong increase in income inequalities like in Britain [25,26].

Dalstra et al. determined changes in socioeconomic inequalities in SRH between 1981-1999 in the Netherlands in persons of 18 years and older 21 [23]. She compared the SRH from people with different educational levels and with different income levels. Like us, she found for females in the lowest groups that the prevalence rates of SRH "(very) good" decreased between the two periods 1981-1984 and 1997-1999, whereas for females in the highest groups, there was some improvement in SRH. For males, the same trend was visible, but it did not reach statistical significance.

Why do perceive 65 plus patients of the lowest and middle SES their health in 2001 so much worse than in 1987? In the Black report four categories of possible explanations are mentioned: *artefact explanations, theories of selection, causation, cultural and behavioural explanations*. We will discuss each of these categories. We must keep in mind that our study concerns mainly differences within groups in two time periods. We do not aim to explain differences between groups.

Artefact

The observed changes can be caused by weaknesses of the study method and instruments. The data of 1987 were obtained by a health interview, the data of 2001 by a written questionnaire. In theory, these two different methods could have influenced the outcome. Dalstra et al. described a change in presenting questions on chronic diseases from oral interview to the paper-and-pen method [23]. She remarked that the effect of this change was difficult to evaluate; the inspection of the prevalence rates during these years suggested that the change in method did not have large effects on the reporting of chronic diseases.
In both surveys the non-response was approximately the same (25 percent). In general, non-response is higher among the lower SES and the less healthy [27]. The underrepresentation of the most vulnerable groups means that the established differences between SES groups are most likely underestimated. The steepness of the age-gradient is likely to be even greater because of the exclusion of the institutionalised population, which forms a larger fraction of the population in the oldest age groups.

Selection

The selection mechanism implies that health itself has a direct effect on socioeconomic status instead of socioeconomic status determining health. Ill health is not beneficial for a career. Research from the Netherlands has shown that health selection processes are operative especially with respect to entry and exit from the labour market [28,] However, in our study, in the age from 25 to 64 years no significant changes occurred, so this mechanism seems not plausible in our case.

Causation

The 'causal' effect of socio-economic status on health is largely indirect through a number of specific health determinants which are differentially distributed across socio-economic groups. Theories on causation propose that health inequalities are attributable to the accumulation of hazard exposures due to material and to behavioural factors [29]. Material factors include housing and working conditions. It is not plausible that the quality of housing deteriorated in the study period. Physically heavy work was on average less common in 2001 as compared with 1987. However, data from Statistics Netherlands showed that more people experienced time-pressure and this was an important cause of work-related stress. People of the lower social classes are more vulnerable to work-related stress, because they have less control over workload and time schedules [30].

Wilkinson [31] stated that in developed countries the relative position within a social hierarchy, independent of the standard of living, is the key to understanding the link between health inequalities and SES. Once the basic needs are covered, the psychosocial effects of relative deprivation that causes insecurity, anxiety, isolation and risky behaviour. He argued that this ongoing stress leads to biological processes that are harmful to health.

This hypothesis was supported by the Whitehall study that showed a continuous social gradient in health; within a social (or economic) hierarchy, individuals at a given level in a hierarchy tended to exhibit poorer health than individuals in the next highest level of the hierarchy [32].

The psychosocial explanation has its correlate at the macro level. Income inequality may lead to changes in society by creating a climate of mistrust, reduced cooperation, and decreased propensity to join voluntary organizations. Several authors have variously termed this concept social cohesion, social trust, and social capital. In spite of difficulties with the definitions and measurement of these concepts (see Macinko and Starfield

2001 [33], all suggest a social mechanism that is related to psychosocial stress associated with the status and power differentials caused by income inequalities.

In the Netherlands, the general level of welfare increased between the two study periods, but inequalities in income increased also [34]. Analysis of the "Woningbehoefte Onderzoek (WBO) among 55,403 persons in 1603 areas, demonstrated that in areas where social cohesion was least, the SRH was significantly less even after adjusting for personal SES and average SES of the area. It concerns purely social cohesion as environmental factor [35]. Because the number of deprived areas increased between 1987 and 2001 in the Netherlands, this can have contributed to the decline in SRH "(very) good" in the low SES class.

Cultural and behavioural

Research on trends in health inequalities has concentrated largely on health-related lifestyle behaviours like smoking, drinking, diet, lack of physical exercise and risk taking. In the Netherlands, like in most countries, most of these lifestyle factors are more prevalent among the lower socioeconomic groups. The prevalence of smoking increased during the nineties, especially among women of the lower SES [36]. The harmful effects of smoking manifests usually at older age. That designates smoking as one of the potentially contributing factors that made that fewer women rated their health as "good or very good".

A cultural factor in the decreasing SRH in the elderly could be a changing attitude towards physical disabilities and limitations. The healthy life expectancy increased between 1987 and 2001, but nevertheless more elderly rated their health as less than good. Possibly in 1987, limitations were considered more often as part of the old age, and as such were not affecting the SRH, while in 2001 those same limitations were felt as a more serious breach of daily life.

4.5 Conclusion

The inequalities in SRH between the sexes, the age groups and the socioeconomic groups have become wider in 2001 compared to 1987. The overall percentage blurred the considerable differences between the sexes, age groups and socioeconomic classes. Especially the eldest age group of the lowest and middle SES brought about the increasing socioeconomic gap.
This is a disappointing observation, taking into account the increasing level of welfare, the better material conditions for the retired and the unimpeded accessibility of health care for everyone [37]. It shows how firmly socioeconomic health inequalities are anchored in our society. The causes of the increasing gap could be a relative deprivation as stated by Wilkinson, a loss of social cohesion in deprived areas, or a cultural determined changing attitude towards physical limitations, or a combination of any of these factors [31].

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Chapter 5

Changes in general practice between 1987 and 2001

5.1 Introduction

In this chapter we will describe various developments that occcurred in general practice between 1987 and 2001.
We classified the changes in the following way:

- Changes in the age and sex composition of GP population between 1987 and 2001
- Changes on the organisational level between 1987 and 2001
- The Workload of GPs in 1987 and 2001
- The organisation of the work in 1987 and 2001
- Changes on the professional level
  The development of general practice practice before 1987
  Developments in general practice between 1987 and 2001
  - Postgraduate training and Continuing Medical Education (CME).
  - The NHG guidelines
  - Medical Treatment Agreement Act
  - Entrance of computer in practice
  - Patient satisfaction with GP care

5.2 Changes in the age and sex composition of the GP population between 1987 and 2001

In 1987 36% of the GPs were younger than 40 years; in 2001 this was 18%. Table 5.1 shows how the ageing progressed between 1987 and 2001.
Women were entering general practice: in 1987 11% of all GPs were female, in 2001 this has amounted to 24%. This trend will continue. In 2001 63% of all GP trainees were women.
Female GPs were younger than males: 37% of the females were younger than 40 years in 2001, compared to 12% of the men.

Table 5.1 Dutch General practitioners: numbers, sex and age distribution in 1987 and 2001

	1987	2001
Total number of GPs	6512	7763
<40 years (%)	36	18
40-49 years (%)	35	46
≥ 50 years (%)	29	37
Male	92	74
female	8	26

Source: Huisartsenregistratie nivel [1]

In 2001 7763 GPs worked in the Netherlands, in 1987 6512 GPs were active. But this growth in absolute numbers was partly annulled by the growing number of part-timers.

Shortage of GPs

In 2001 a shortage of GPs became observable.* The reasons for this included a growing number of GPs leaving the profession, a rise in the proportion of female doctors coupled with an increasing desire to work part-time (expressed by both male and female GPs) and a rising demand for care. The *Capaciteitsorgaan* (a body set up by the minister of Public Health, Welfare and Sport to provide advice about future requirements for GPs, specialists and dentists) recommended on the basis of calculations by Nivel that the annual inflow of new GPs should be raised to 670 by as early as 2001 (Capaciteitsorgaan, 2001; Van der Velden & Hingstman, 2001[2]).

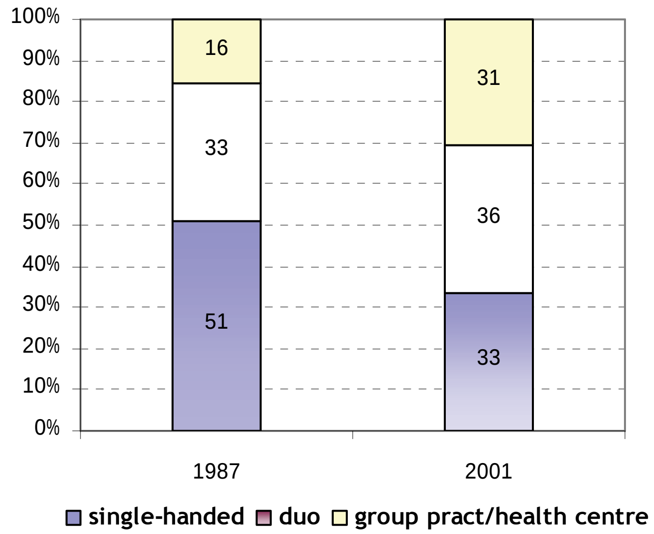
* This situation was largely caused by the long-standing policy of restricting the number of university students admitted to medical training, despite the fact that employment surveys had been indicating for a number of years that shortages could be expected in this field (Capaciteitsorgaan, 2001).

5.3 Changes on the organisational level between 1987 and 2001

In this section we describe changes in the different types of practices. We distinguish between three different types of practice: *single-handed, duo partnerships, and group practices and health centres*.*

The number of GPs working in single-handed practices decreased in favour of group practices (figure 1). Between 1987 and 2001, the proportion of Dutch GPs working single-handed fell from 51% to 33%, whereas the proportion of GPs working in a group practice or health centre rose from 16% to 31%.

Figure 5.1 Number of GPs according to practice model where they are working in 1987 and 2001; percentages (Source: Huisartsenregistratie NIVEL



* In health centres several primary care disciplines are working together in one organisation and under one roof. The primary care disciplines that are minimally required are GPs and Community nurses; frequently also social workers and physiotherapists are involved. In a group practice more than two GPs share the same premises.

The single-handed practice model has lost its appeal to starting GPs. In 2001 62% of the practice seeking GPs had a preference for a group practice, 30% for a duo partnership and solely 2% preferred a single-handed practice [2]. The trend towards larger units in general practice has organisational implications. It makes it easier to implement part-time working. It contributes also to better premises and better diagnostic and therapeutic facilities, because sharing of facilities gives a broader financial basis for investments in equipment and makes its use economically feasible.

5.4 The Workload of GPs in 1987 and 2001

In 2001 there was a widespread dissatisfaction among GPs and this was partly related to the perceived increase in workload in the previous decade. It even led to a strike with as main issue a reduction in workload.
In this section we present data about change in workload of GPs between 1987 and 2001 and how GPs reacted to these changes.
Workload is a complicated concept and is influenced by two groups of factors: demand-related and supply-related factors. Demand-related factors refer to the *objective* workload with the list sizes of GPs and the composition of the practice population as most important determinants. Supply-related factors refer to subjective workload; an important aspect of the *subjective* workload is the job satisfaction a GP experiences.[3]
Objective workload is usually defined in terms of 'the amount of time that certain activities consume or the frequency that certain activities take place.[3]
In this chapter we will use as a measure of workload the number of hours worked per week and split these into the hours spent with patient-related activities and with non-patient related activieties.

Hutten et al (1998) made an thorough study of the influence of workload on various aspects of care in general practice[4] based on data from the NS1. Van den Berg et al extended this to 2001 with data from the NS2 and made comparisons between several aspects of the workload in 1987 and 2001[5-6]; Per full-time equivalent GP the number of enlisted patients rose by 10%, from 2297 in 1987 to 2529 in 2001 (table 5.2).
The number of face-to-face contacts between GPs and patients increased from 3.3 per year in 1987 to 3.9 per year in 2001.
The average length of face-to-face consultations in the surgery was about

similar in 1987 and 2001: 10 minutes.

In spite of the growth in the number of consultations, GPs worked , on average, fewer hours a week; to compare the working hours of 1987 and 2001, it is necessary to take into account that, on average, in 2001 GPs worked fewer full time equivalents (FTEs). Per fulltime equivalent, GPs worked 58.6 hours in 1987 and 53.4 hours in 2001 (this concerns working hours i.e. exclusive the number of hours on duty while not active at work). The proportion of hours spent in direct patient care remained stable at 70%.

Table 5.2 Workload of GPs in 1987 and 2001

	1987 mean	2001 mean	*P*
Consultation rate per listed patient per year[#]	3.6	3.9	*
Average List size per FTE GP	2297	2529	**
Average number of Working hours a week	52.9	44.1	**
Average number of Direct patient-related working hours	37	31	**
Working hours a week per FTE	58.6	53.4	**
Consultation length face-to face contacts (minutes)	9.9	9.8	
Number of working hours per year per patient	1.25	1.05	**

patient-reported face to face contacts Significant * P<0.05 ** P<0.001

FTE= fulltime equivalent Source:NS1 and NS2

5.4.1 Workload and list size

The workload of GPs is determined mainly by their list size and practice composition; more patients generate more consultations and therefore more work. Besides the number of patients on the list, the composition of the practice population is important; the workload will increase as the population includes more patient groups with a high care demand.[3] Healthcare utilization strongly varies between demographic and socioeconomic groups; health care utilisation is most affected by age (table 5.3).

Table 5.3 Average number of face-to face contacts between patient and GP in 1987 and 2001 by age

	1987	2001
0-4 yr	3.8	3.4
5-14 yr	2.2	2.2
15-24 yr	3.1	3.2
25-44 yr	3.6	3.8
45-64 yr	4.1	4.4
≥ 65 yr	4.8	5.5
all	3.6	3.9

Source:NS1 and NS2

Other subgroups with a higher than average health care utilisation include persons from lower socioeconomic groups and non-Western migrants (even when taking into account background characteristics as self-rated health, educational attainment, employment status and urbanisation[7]).
Neither in 1987, nor in 2001 there was a linear relation between workload and list size. With a list size of up to 2000 patients there was a linear increase in weekly number of working hours, above a listsize of 2000 patients the weekly number of working hours remained rather stable.[5]
In 1987 almost all GPs with a list size of 2000 and more patients worked at least 50 hours a week, whereas this was 40 to 50 hours a week in 2001.

5.4.2 Workload and part-time work

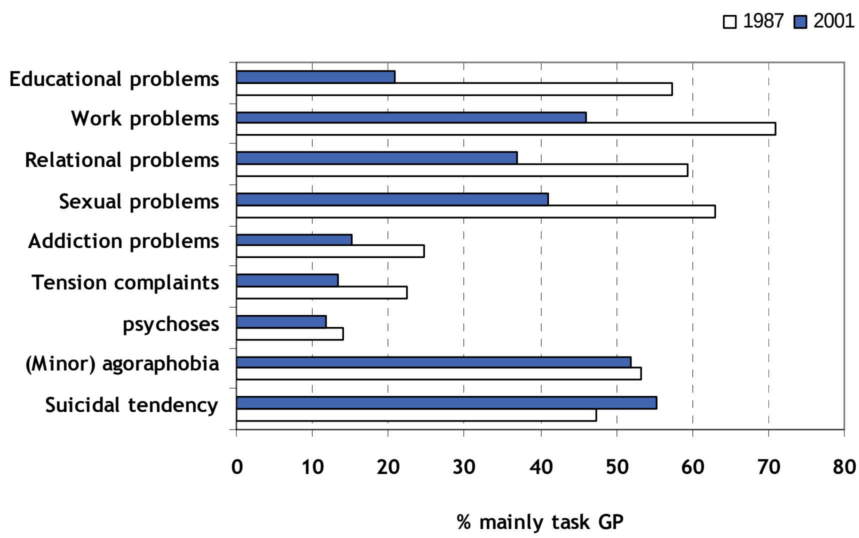
The decrease in working hours between 1987 and 2001 can partly be explained by an increase in part-time working. In 1987 less than 10% of the GPs worked part-time, in 2001 this was 35%.
In 1987 less than 1 in 10 GPs worked less than 40 hours a week, in 2001 this was 44%.
In 1987 six out of 10 GPs worked between 40 and 60 hours a week, whereas in 2001 this was 45%. In 1987 almost a quarter of the GPs worked more than 60 hours against 10% in 2001.[5]
Overall in 2001, the working week of GPs was 5 hours shorter than in 1987 (53.4 hours in 2001 vs. 58.6 hours in 1987 (see table 5.2). As a consequence, the mean number of hours spent on a patient went down from 1.25 hours a year in 1987 to 1.05 hours 2001 hours a year in 2001 (see table 5.2).
When comparing 1987 to 2001, in 2001 GPs worked fewer hours for managing

more patients. This might be an explanation for the higher workload GPs perceived.

5.4.3 Workload and task-orientation

Because it is known that psychosocial problems are time-consuming [8] the task orientation of GPs in 1987and 2001 towards psychosocial problems was compared.

Figure 5.2 Task orientation towards psychosocial care in 1987 (N=153) and 2001(N==187) ;percentages



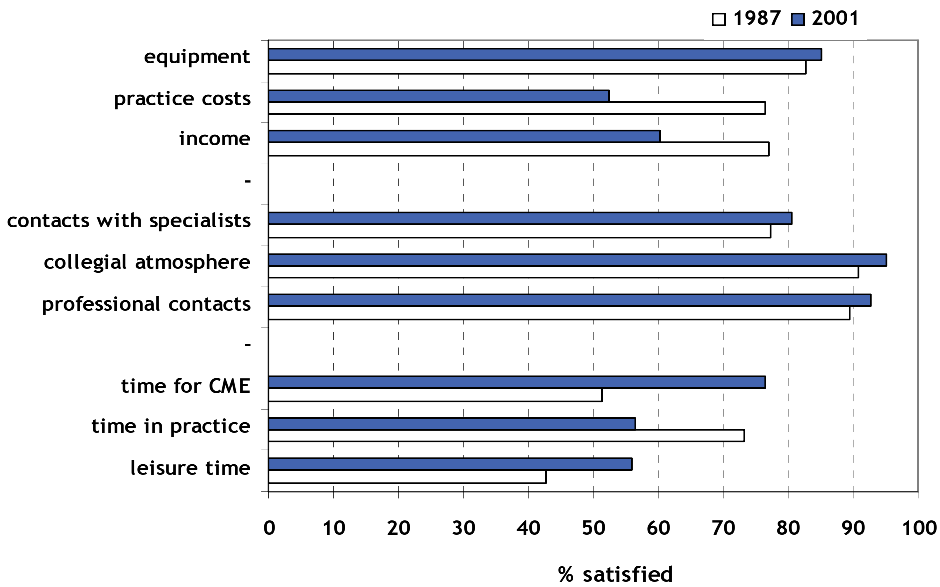
Source:NS1 and NS2

The task scope of GPs has narrowed with respect to psychosocial problems; in 2001, GPs considered psychosocial care less frequently as part of their job than 14 years previously (figure 5.2).
This change in task perception was also reflected in a larger part of psychosocial problems being referred to social workers and primary care psychologists.[9]

5.4.4 Job satisfaction

As we stated previously in this chapter, job satisfaction can be considered as a proxy for subjective workload.
Since there have been so many changes in the field of general practice, one could expect that this will be reflected in the way GPs experience their job and workload. On the question: “How satisfied are you with your job in general?” approximately three quarters answered ‘satisfied’ or ‘very satisfied’ in 2001 against 88% in 1987.

Figure 5.3 Job satisfaction of GPs in 1987 and 2001; percentages



The number of GPs dissatisfied with material and financial circumstances such as practice costs and income, increased by respectively 24% and 17%. The number of GPs dissatisfied with contacts with others like specialists and colleagues did not change statistically significant. Fewer GPs were dissatisfied about the time available for continuous medical education (CME), leisure time and time with the family. This is in contrast with the number of GPs dissatisfied about time for the practice, which increased by almost 17%. In general, in 2001 GPs are less satisfied about their work and more satisfied with the time available for private activities compared to 1987. Most of the discontent was related to a lack of time and money.

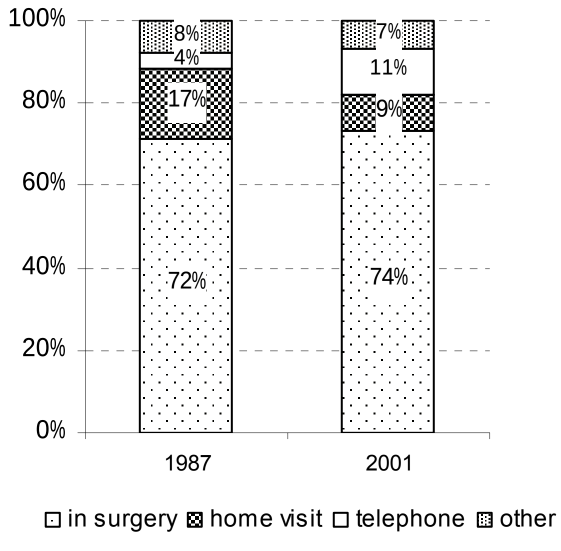
5.5 The organisation of the work in 1987 and 2001

In this section we will describe several changes in the way GPs organised their workload in 1987 and 2001.[6]

5.5.1 Type of contacts

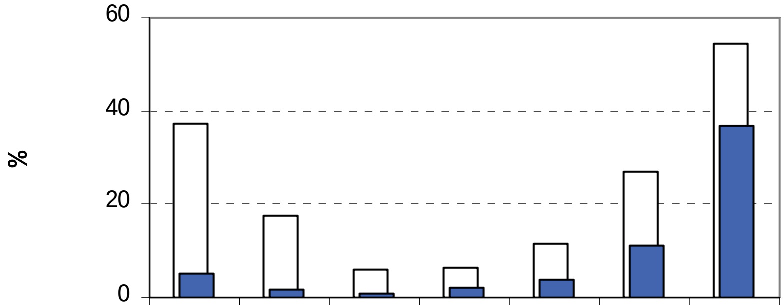
The increase in the number of consultations was accompanied by a shift from time-consuming to less time intensive contacts (figure 5.4). In 1987, 17% of all contacts with GPs were home visits, in 2001 this fell to 9%. At the same time the proportion of telephone consultations rose from 4% in 1987 to 11% in 2001.

Figure 5.4 Type of contact with GPs in 1987 and 2001; percentages Source;contactregistration NS1 and NS2)



The difference between 1987 and 2001 was most noticeable in the youngest age group (0-4) (see figure 5.5). In 1987 as well in 2001, the highest rates of home visits were found for the elderly patients.

Figure 5.5 Number of home visits in 1987 and 2001 as percentage of consultations at the surgery by age; percentages



	0	1-4	5-19	20-44	45-64	65-74	75+
□ 1987	37.3	17.4	6.2	6.6	11.6	26.9	54.5
■ 2001	5.1	1.9	1.0	2.1	4.0	11.3	37.0

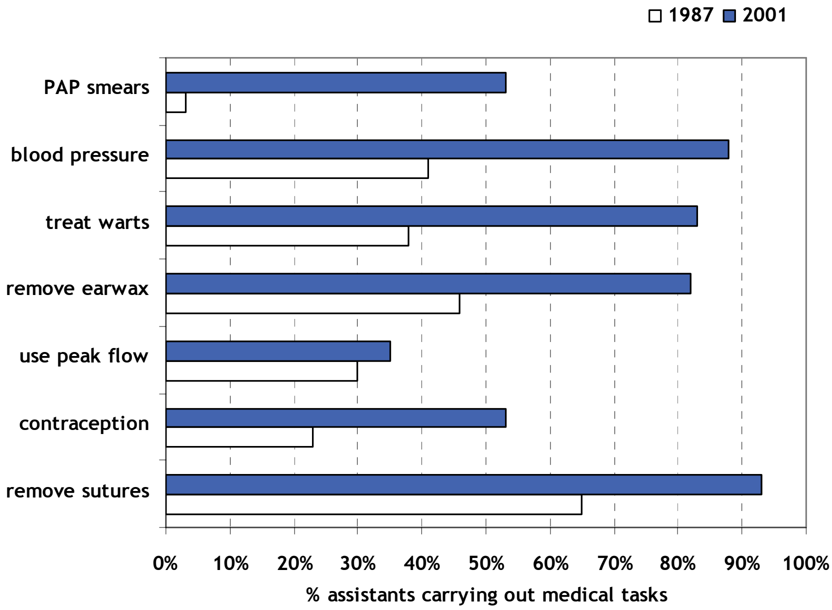
Age (years)

5.5.2 Task delegation to practice assistant

Practice assistants (PAs) played an increasingly important role in general practice in the period between 1987 and 2001. Under pressure of rising demand for care and a growing shortage of GPs, GPs were more in favour to delegate tasks to PAs. Eight out of ten GPs expected that task delegation could reduce their workload and increase their job satisfaction; the proportion of GPs that believed that delegation promoted their job satisfaction increased between 1990 to 2001 by 16% (P<0.001) [10] .

Task delegation was made possible because PAs were better educated and professionalised since 1987. The proportion of qualified PAs increased from 56% in 1987 to 79% in 2001. In addition, per 1000 patients more PAs hours were available: in 1987 this was 14.3 hours per 1000 patients, in 2001 15.3 per 1000 patients. These preconditions made it possible to delegate more tasks to the PAs. This was what actually happened between 1987 and 2001 as is shown in figure 5.6. All activities were being performed more frequently by the practice assistants. The largest difference between 1987 and 2001 occurred for PAP smears performed by PAs: it rose from 3% in 1987 to 53% in 2001.

Figure 5.6 Medical tasks performed by practice assistants in 1987 and 2001; percentages



Nevertheless, a considerable gap in professional abilities exists between GP and practice assistant. Because of a shortage of GPs caused by part-time work and fewer working hours per GP, the need has arisen for a supporting practice nurse with a higher professional level than the practice assistant. At the end of the nineties the training for such practice nurses was established.
In 2001 one-quarter of the practices employed a practice nurse. Practice nurses worked approximately 0.20 fte per standard practice. Practices with practice nurses kept the same number of assistant hours for PAs, so the practice nurse was not a replacement for the PA. Moreover, the number of hours worked by GPs did not differ either between practices with and without practice nurses. So, it seems that practice nurses perform work that otherwise would not have been done.[11] Practice nurses were in most practices particularly deployed for the management of chronic diseases such as diabetes mellitus, hypertension and COPD.

5.6 Changes on the professional level

In this chapter we describe changes that occurred in general practice between 1987 and 2001. However, there was life in general practice before 1987. To put the changes between 1987 and 2001 in a historical perspective, we provide a short overview of the development of general practice between 1945 and 1987.

5.6.1 The development of general practice before 1987

In the first half of the twentieth century, health care was characterised by the rise of medical specialisation.[12] In the Netherlands, in 1890 there was one medical specialist to every thirty general practitioners; by 1950 the ratio was one to three, and by the end of the 1960s, medical specialists were in the majority.[13] In 2001, there were twice as many medical specialists as GPs.
By the midfifties of the late century morale in general practice was low. GPs were trained entirely in hospitals and felt badly prepared for their job. The biomedical diagnostic model they had been taught in medical school, was not appropriate and satisfactory for many of the problems encountered in daily practice. They felt as if their job was limited to supplying patients for medical specialists. However, at the same time, they were the first to perceive that among the population other patterns of illnesses, illness behaviour and health care use were evolving.
It became clear that, for the tide to turn, general practice had to redefine its professional identity, to build up a better professional organisation, and to be acknowledged as an academic discipline.[14]
Fortunately, some individual practitioners (Huygen, Buma, Hogerzeil, van Es) were prepared to meet the challenges and joined forces to establish the Dutch College of General practitioners in 1956, which immediately initiated research programmes.
Buma unfolded in his 'the family doctor and his patient' [15] his vision on the role and the position of general practice; he proclaimed that diagnosis in general practice needed a much broader base, integrating clinical knowledge and skills with an understanding of human behaviour in relation to family and community and that the ongoing personal relationship between GP and patient was an important instrument.

During the important Woudschoten conference in 1959, the content of the discipline was defined:

> GPs were "to assume the responsibility for continuous, integral and personal care for the health of individual and their families, who entrust themselves to the GP". [16]

The impact of this meeting on the development of general practice in the Netherlands has been considerable. In the decades that followed, general practice recovered from self-abnegation. Of particular importance in this context was the growth of an adequate knowledge base.[14] The health problems that the primary care system considered itself well placed to deal with were more accurately classified and defined [17-19], a better understanding was developed of the effectiveness of diagnostic and therapeutic procedures in primary care [20-21], the skills needed for effective communication between GP and patient were identified [22-23], insight into illness behaviour and health beliefs was acquired [24], the influence of the family and the wider social context on health and health behaviour was clarified [25-26], and guidelines for optimal care were formulated. [27-29]
To provide data for a health policy of strenghtening primary care, a National Research Unit of the Dutch College of General Practice (NHI) was established in 1964, the predecessor of the present NIVEL. One of its first activities was the organisation of a National morbidity survey. [30]
In 1966 the first academic chair of general practice was created at the University of Utrecht. By 1974 all universities in the country had chairs of general practice. This period also saw a further professionalization. In 1974, a one-year vocational training was introduced and postgraduate training programmes were started, at the onset on a voluntary base.
In addition, greater emphasis was placed on measuring and promoting the quality of the care provided.

In 1974, the Dutch government identified primary care officially as a separate echelon with the publication of a white paper on the structure of health care. The paper concluded that health care was not coherent, the financing fragmented and that too much emphasis was placed on the inpatient sector (Ministerie van Volksgezondheid en Milieuhygiëne, 1974). In 1980, another policy document, exclusively devoted to primary care, described the features of this echelon, the health professions involved, and launched measures to strengthen primary care (Ministerie van Volksgezondheid en Milieuhygiëne, 1980).

5.6.2 Developments in general practice between 1987 and 2001

In the time period between 1987 and 2001 changes within the medical field took place that affected general practice in a direct or indirect way.

From the perspective of general practice four main developments characterize the period 1987- 2001.

- Extension of the postgraduate vocational training from one to three years and Continuing Medical Education obligatory
- The development and publication of national guidelines (standaarden) by the Dutch College of General Practictioners (NHG)
- Medical Treatment Agreement Act (MTAA)
- The introduction of the computer and the electronic medical record

Postgraduate training and Continuing Medical Education (CME).

The Netherlands is a country with a relatively strong self-regulatory role of medical professional organizations. In 1973 a compulsory one-year post-graduate vocational training in general practice was started in the Netherlands, provided by the University Departments of General Practice of all eight Dutch medical schools. The curriculum was extended to two years in 1988 and again from two to three years in 1994. An argument for the extension of the curriculum was the assumption that a longer curriculum should lead to a higher level of competence of future GPs.
Procedures for accreditation of continuing medical education and the five year relicensing of GPs were established by own professional bodies. Relicensing is only granted if GPs have attended minimally 200 hours accredited medical education in the previous five years.

The NHG guidelines

In 1987, the Dutch College of General Practitioners, Nederlands Huisartsen Genootschap, acknowledged that it was crucially important to set standards and criteria for the quality of care and decided to keep abreast of developments and to start its own standard development programme. In 1989 the first three guidelines were issued (on diabetes mellitus, oral contraception and the referral letter). The guidelines were meant to reflect the 'state of the art' and to be used as guidelines for medical audit, quality assurance, evaluation in vocational training and continuing education.

A 'standard' gives a set of guidelines for the management of one specific health problem such as otitis media, based on existing evidence, and – if evidence was lacking - on consensus among experts. The document's format follows the usual way a general practitioner thinks and acts when in contact with patients.[31]

Based on the guidelines, a great variety of other products have been made, such as interdisciplinary collaboration agreements, an Electronic Prescription Support Programme, patient information letters and educational packages. The NHG publishes the guidelines in the scientific journal Huisarts en Wetenschap (http://www.henw.org/), and on the website (http://nhg.artsennet.nl).

The publication of the Practice Guidelines (more than eighty by 2008) changed the scenery of general practice remarkably.

The vocational training took the guidelines as its starting point, the postgraduate courses mostly based their programmes on the guidelines; many research projects used elements of the guidelines as criteria for their research and practice management projects produced tailor-made adaptations of the practice organisation in favour of the implementation of the guidelines. In this way the guidelines served as crystallization point for compiling relevant and applicable knowledge for the GP. Also, the government, health care insurance companies and patient organisations adopted the authoritative nature of these guidelines.

The guidelines shaped also GPs' relation with medical specialists. Because the guidelines are scientifically firmly grounded, it forced not only GPs, but also the medical specialists to take notice of them and to provide justifications when departing from the guidelines.

The guidelines resulted in an increasing transparency and accountability of GPs to patients and other societal parties (politics and health insurance companies).

Comparing the performance of GPs of 1987 and 2001 means comparing the pre-guideline period with the period where the guidelines are at the core of GPs' daily practice.

Drawing up and dissemination of standards
A standard setting advisory board of the NHG selects topics for standard setting. Small working parties of four to five experienced general practitioners and researchers then develop a draft for each set of standards. This draft document is sent to 50 general practitioners and a few medical specialists who are asked to comment. After adjustments have been made the standards are evaluated by an independent scientific committee and only 'authorized' if this group gives its seal of approval. The standards are then published in the Dutch scientific journal for family doctors (Huisarts en Wetenschap). The essential features of each set of standards are printed on a small plastic card and are sent with the journal to the GPs. The NHG aims to present eight to 10 new sets of standards each year.

- *Global Adherence to guidelines*

Braspenning et al. extracted 139 clinical indicators from 61 NHG guidelines and studied the agreement between the care delivered in Dutch general practices with these guidelines. [32-33]

> In accordance with Donabedian three different types of quality indicators were distinguished: structural, process and outcome indicators.[34]
> Applying this for example to diabetes mellitus, having specific clinic hours for diabetics is a structure indicator, performing feet examination is a process indicator and the haemoglobin A1c value is an outcome indicator.

Most indicators of Braspenning were process indicators, which were categorised in indicators on diagnostics (n=34), on medication (n=52), on referrals to primary and secondary care (n=28), and on health education (n=1). Further, 10 structure indicators and 5 outcome indicators were extracted.
In table 5.4 the adherence for a number of indicators is shown.
Diagnostics: Requests for imaging diagnostics were largely conducted according to the guidelines (76%). Guidelines about laboratory testing were adhered to in 53%; guidelines indicating when a certain test should be done were better adhered to than guidelines indicating there is no need for testing. Overall the

adherence for diagnostics was 65%.
Medication: Guidelines suggesting that a certain drug is not indicated (don'ts) were better adhered to (78%) than guidelines indicating that a specific drug was indicated (do's: 62%). Overall the adherence rate is 68%.
Referrals: Of all referrals 89% were performed according to the guidelines. For referrals to physiotherapy, this was 83%, after excluding the low number of referrals to the physiotherapist in case of urine incontinence in women (19.4%). The other referrals to secondary care have a mean of guideline adherence of 93%.
Braspenning et al calculated a total score, which indicates to what extent the guidelines were followed in general practice: this score is 74%. Literature review shows that this figure was 55% in the period prior to 2001.[35] The figure of 74% may also be regarded as high in international context.[36-38]

Table 5.4 Adherence to Dutch guidelines: means in %

	% adherence
Diagnostics, 11 indicators	65
• imaging techniques	76
• Laboratory testing	53
Medication, 44 indicators	68
• don'ts	78
• do's	62
Referral primary and seconday care, 25 indicators	89
Total	74

Computer in practice

Another major development, which directly affected the daily routine of GPs, was the introduction of the computer in the practice. In 1987, hardly any GP made use of a computer in his daily work; in 2001, nearly all GPs made use of a computer. Among the medical professionals, the GPs were the pioneers in the use of computer systems.

Proportion of Dutch GPs using Electronic Medical Record

1994 37% [39]

1997 90% [39]

2001 92% [40]

However, the computer has more to offer than only recording. It may provide an integrated information system.
Electronic prescription systems were in 2001 available to most GPs. These are software programmes, providing GPs with pharmacotherapeutical and non-pharmacotherapeutical advice linked to a specific diagnosis. These prescription systems take into account age, sex, comorbidity and other prescriptions issued to the patient.[42]
The EMR made it possible to streamline and monitor prescriptions and to identify and monitor specified groups of patients (e.g. diabetics, hypertensives). Together with the guidelines this gave the GPs the opportunity to improve their medical performance.[41]
Registration and proper record keeping have become more and more important, certainly within more-handed practices. Distant access became possible, but this development was in 2001 still at their beginnings. Internet-based patient records were not available in 2001.

Medical Treatment Agreement Act

In 1995 the Wet op geneeskundige behandelings overeenkomst (WGBO) or the Medical Treatment Agreement Act (MTAA) came into force and although it did not originate in general practice, but it affected the work of the GP.
Besides stipulating that a patient has the right to inspect his dossier, it obliged doctors to give the patient complete and explicit information about the treatment, including expected side effects and possible alternatives. By fulfilling the patients' right to know, informed shared decision making could be reached.
The law is an elaboration of the changing power balance during the last decennia and guarantees a more equal relationship between caregiver and patient. The aim of the Act is to clarify and strengthen the legal position of the patient, taking into account the own responsibility of the caregiver for acting as a good caregiver.

- *Patient information and involvement in 1987 and 2001*

Dute et al evaluated whether the healthcare practice has followed the law.[42] This study showed that most patients are informed by GPs about treatment (92%), side-effects (72%) and other available treatments (68%).
However, we were articularly interested whether there were differences in the patient information and involvement between 1987 and 2001.
This question could be answered by studying videotaped consultations of GPs and patients in 1987 and 2001 and measuring verbal behaviour with Roter's Interaction Analysis System (RIAS).[44] The results were published in a report [45] and in different studies.[46]

In summary:

- GPs in 2001 asked more often for informed consent than in 1987
- Gave more information about the proposed treatment in 2001 than in 1987
- In 2001, more informed decision making was observed than in 1987
- There were no differences in information about alternatives, or side-effects between 1987 and 2001

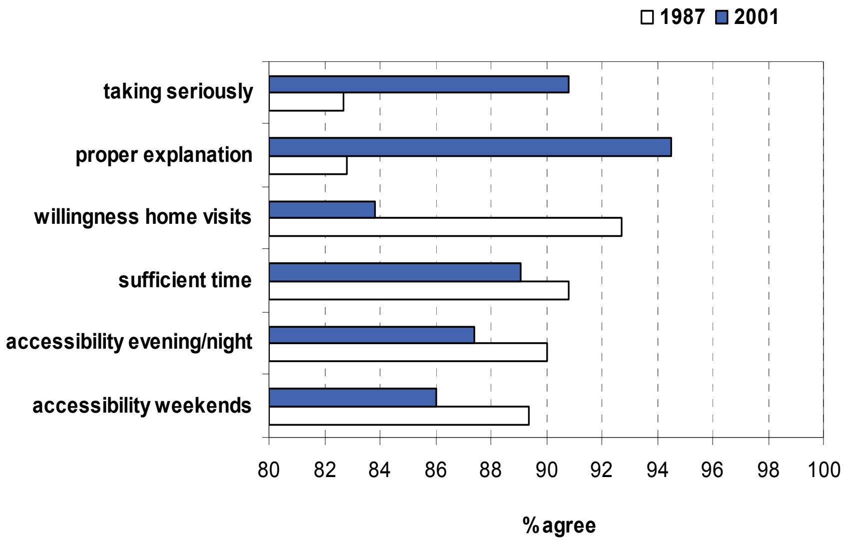
However:

- GPs asked in 2001 less often for patients' own opinion than in 1987 and
- They asked less often whether the information had been understood by the patient in 2001 than in 1987

Patient satisfaction with GP care

The judgment of patients about GP care is an important element in the quality of care. Given all changes described in this chapter, it is important to know how satisfied patients were with GP care in 1987 and 2001.[47] In both years a number of items in the patient questionnaires referred to this subject. Some of the questions referred to communicative aspects, some to organisational aspects (figure 5.7).
Over the period 1987-2001 , patient satisfaction with the communication style of the GP care has increased, whereas patient satisfaction with the way GP practices are organised has decreased.
Overall, patient satisfaction with GP care was on a high level.

Figure 5.7 Patients' ratings on quality of GP care in 1987 (n=7679-10112) and 2001(8007-9256); percentages



5.7 Discussion

5.7.1 Summary

Between 1987 and 2001 changes took place within the population of GPs. On average the GPs in 2001 were older than those in 1987, and the proportion of female GPs was higher in 2001 than in 1987.
We considered the objective and subjective workload. With more patients per GP and higher consultation rates in 2001 than in 1987, the demand for GP care increased between 1987 and 2001. We expected that the objective workload of GPs would increase. However, we saw a distinct decline in the average number of working hours a week even when adjusting for the increase in parttime work between 1987 and 2001.

GPs achieved the reduction in working hours by organising their work more efficiently. A clear shift has taken place towards less labour-intensive and time-consuming contacts. This was not achieved by reducing the consultation time of patients seen in the surgery: the average consultation duration remains almost ten minutes. However, fewer home visits were performed and more

telephone contacts.
Moreover, the task scope of GPs has narrowed with respect to time-consuming contacts like psychosocial problems; in 2001, GPs considered psychosocial care less frequently part of their job than in 1987.
There has been a particularly significant increase in the number of technical medical tasks delegated to practice assistants. These include, among other things, conducting cervical smears, reading blood pressure and treating warts.
There were few signs that quality of care suffered from these developments; patient satisfaction with the communication of GPs increased slightly, whereas patient satisfaction with the way GPs practices were organised decreased slightly.
The reduction in working hours was in line with societal developments. Between 1987 and 2001 there was in the Netherlands a general trend to a shorter work week. This societal development and the changing ideas about working hours did affect also GPs.
In spite of the reduction of the working hours of GPs between 1987 and 2001, the work week of a fulltime GP was in 2001 much higher than the average work week in the Netherlands: GPs worked 53 hours a week whereas the average work week was was 39 hours.
Overall in 2001, GPs were less satisfied about their work than in 1987, most of the discontent was related to a lack of time and money. GPs were in 2001 more satisfied with the time available for private activities compared to 1987.

5.7.2 Study hypotheses

The reduced task perception with regard to psychosocial problems brings us to the hypothesis that in 2001 fewer psychosocial problems will be diagnosed than in 1987.

The NHG standards will give rise to a more intensive treatment of patients with chronic disorders like diabetes mellitus, hypertension and patients with cardiovascular diseases. This will result in a higher consultation rates and higher prescription rates for these disorders.

Another expectation is that the larger workload in 2001, will give rise to higher referral rates in 2001 than in 1987.

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Chapter 6

The first and the second Dutch National Survey of General Practice: designs, similarities and differences

6.1 Aim and research themes of the first and second National Survey

In this chapter we will describe the background, aim and design of the first and the second Dutch National Survey of General Practice (NS1 and NS2). [1, 2, 3]. The data of these surveys have been used to answer the research question in this thesis.
For the description of these surveys we made use of existing sources.
The aim of the National Surveys was "to provide an actual and nationally representative insight into the role and function of general practice in Dutch health care". Data on national level were collected on the relation between the need, demand and supply of care in general practice. General practice was used as point of entry.

As described in chapter 1 general practice is a suitable setting for providing information on the population's health in the Netherlands.
However, because only a part of the health problems in the population is presented to GPs[4], health interviews were included in the NS1 and NS2, in which detailed questions were asked about the health status , so that insight could be obtained into the relation between the health problems in the population and the presentation of health problems in general practice.

To gain insight into the role and function of general practice the following aspects were studied

- the pattern of diseases registered in general practice;
- the management of diseases in general practice;
- identification of determinants on the patient's side which influence the presentation of health problems to general practice;
- identification of determinants on the general practitioner's side which influence the reactions of general practitioners to the problems presented to them.

On the basis of these research questions, five data collections within different (sub) populations took place in the participating practices:

- Registration of data about all contacts between GPs and patients
- Patient census of the total practice population to collect socio-demographic data

- Patient health interview survey
- GP and practice assistant questionnaires
- Videotaping of GP-patient consultations during consultation hours of GPs

A crucial aspect of these data collections is that they can be linked to each other by means of a unique anonymous patient and practice identifier.
The data collection of the NS1 occurred between April 1987 and March 1988 and the data collection of the NS2 occurred between April 2000 and March 2002. In this book 1987 is used as a reference to the NS1 and 2001 as a reference to the NS2.

6.2 Background of the NS1 and NS2

In 1974 the Dutch government published the White paper on the structure of health care, a policy document aimed at presenting an outline for the organisation of the health services in the next decade [5] . In this White paper, primary care was officially identified as a separate echelon; also, the government attached much importance to the work of GPs and allotted them the role as a gatekeeper to secondary care.
The main points in this document were:

- to promote the coordination, cooperation and the cohesion in the health services
- to curb the growth of the health cost
- to shift the emphasis from residential care to home care, from specialistic to generalistic care, and from curative to preventive care.

In contrast with information about hospital care, there was a conspicuous lack of representative data about the GP's work. The only information available was from small groups of university-linked GPs. Most basic data about morbidity, consultation and interventions were not available. In his thesis "the demand to the services of GPs" van der Zee [6] had to rely on data collected in household surveys, and on data from the 2nd National morbidity Survey in England and Wales [7].
It was perceived that it was very difficult to implement structural changes in health care services without having adequate information on demand, need and supply of GP care.
The Netherlands Institute of General Practice – from 1985 the NIVEL Institute -

took the initiative in filling this information gap inspired by the example of The British National Morbidity Surveys[8].
It took some years of debate and testing before the Institute presented a detailed research proposal [9]. In 1986, the ministry of Welfare, Health and Cultural Affairs and the National Council of Sickness Funds were prepared to fund the first National Survey of General Practice.
The NS1 proved to be a very important source for answering policy and research questions in the nineties about the functioning of the Dutch health care system in general and the role of the general practitioner in particular.

However, more than ten years after completing the first survey, so many changes had taken place in the health care system, in the general population and in the field of general practice that the results of the NS1 became outdated.
As a consequence, in October 1998 the project plan for the NS2 was presented to the ministry of Health, Welfare and Sport; on the base of the favourable experiences with the NS1 the ministry financed the NS2.
The NS2 was carried out by NIVEL (Netherlands Institute for Health Services Research) in cooperation with the Dutch National Institute of Public Health and the Environment (RIVM) and the Centre for Quality of Care Research (WOK) of the Radboud University in Nijmegen. Also, several additional research projects and secondary analyses were planned in cooperation with research groups within the Netherlands and abroad.

In planning the NS2, the broad design of the NS1 was followed and great effort was made to make the survey comparable with the NS1. This was achieved by making use of many identical measuring instruments and variables.

6.3 General Design

The surveys were designed in such a way that the demand for care and supply of care in general practice could be studied. A link between practice-based and population-based information was therefore one of the cornerstones.

3.1 Practices and patients

The study population of patients was not directly sampled from the Dutch population, but via the selection of their GPs. The NS1 and NS2 data are hierarchical with patients registered to GPs, and GPs, when not working solo, nested within general practices. In terms of survey sampling theory, they can be characterised as a multistage sampling design.

NS1

In the NS1 103 general practices throughout the Netherlands participated with a total of 161 GPs and a practice population of N= 334,007. This population was representative for the Dutch population with regard to age and sex.
To recruit the practices a non-proportional stratified sample of GPs was drawn from the list of all GPs in the Netherlands. The stratification variables were: degree of urbanisation, region and distance from the practice to the hospital. Non-pro¬por¬tional stratification guaranteed that all values of the stratification variables were well presented in the sample. However, because of practical reasons* and because of refusal to participate, the characteristics of the participating GPs differed slightly from those of all Dutch GPs

- The average age of the GPs taking part in the study was lower than the national average;
- relatively more female doctors participated and
- relatively less doctors working in single handed practices participated.

Weights were used to produce data representative for the Netherlands.

The participating GPs were divided in four groups of 40 GPs who were consecutively involved in the data collection during 3 months from 01/04/1987 to 31/03/1988.

NS2

The collection of the data took place in 104 general practices throughout the Netherlands with 195 general practitioners (GPs) and a practice population of approximately N=400,000.

* Colleagues of GPs working in the same practice were also requested to participate for several reasons. In the first place because the patient list was linked to the whole practice and often not to the doctors individually. Secondly, because patients often see several GPs in the same practice over time. Because it was the aim to link reasons for encounter to episodes of care, information on contacts with colleagues in the same practice was indispensable. In a limited number of stratification cells it was necessary to accept the participation of volunteering GPs

For the recruitment first practices already participating in the Dutch National Information Network of General Practice (LINH), were invited to participate in the NS2. 61 of these LINH practices were prepared to participate in the NS2. More practices were recruited by mailing a sample of practices*. This led to another 43 practices willing to participate. The 104 participating practices included 195 GPs, equivalent to 165 full-time working GPs.
The participating GPs were representative of all Dutch GPs (n = 7217). No statistically significant differences for age, gender, or urbanisation were found. A pilot study also showed no differences in performance between GPs participating in a registration network and those who were not participating[10]. With respect to type of practice, GPs working alone were relatively underrepresented (32% versus 44%).

The patient lists of all participating practices were used as the population denominator for the NS2. The patient lists were derived from the practice computers at the beginning and at the end of the study.
For some parts of the data collection the population at the start of the study (N=399,068) was used as the denominator, for other parts the mid-time population (the mathematical mean of the population at the start and at the end of the study; N=400,912) was used.

With some minor deviations the population of the NS1 and NS2 can be considered as representative for the Dutch population in the respective years with regards to age (Table 6.1).

* The mailed sample was drawn from the national NIVEL register of GPs and weighted for region, urbanisation level and status of 'deprived area' in order to increase the representativeness of the participating practices. The invitation was accompanied by a letter of the Dutch College of General Practitioners and the Dutch Association of General Practitioners recommending participation.

Table 6.1 Age distribution practice population NS1 before and after Weighting and NS2; Dutch population 1987 and 2001; percentages

	NS1 N=334,007		Netherlands N=14615,000	NS2 N=400,912	Netherlands N=15987,000
	Before weighting	After weighting	1987		2001
0-4 y	6.6	6.1	6.1	5.8	6.3
5-14 y	12.7	12.8	12.8	12.4	12.4
15-24 y	17.1	17.0	17.0	12.4	11.8
25-44 y	32.2	31.6	31.6	32.5	31.3
45-64 y	19.4	20.2	20.2	24.3	24.7
65-74 y	6.9	7.2	7.2	7.0	7.5
≥75 y	5.2	5.2	5.3	5.6	6.1

6.3.2 Data collection modules

On the basis of the research questions, five data collections within different (sub)populations took place in the participating practices:

- Registration of data about all contacts between GPs and patients
- Census of the total practice population to collect sociodemographic data like age, sex, marital status, ethnicity, profession, level of education, living conditions and type of health insurance.
- Patient health interview survey collect information on perceived health status, use of health services, life-style, attitude towards illness and health, social networks:
    - in 1987 a random sample of 100 patients on the list of every participating GP
    - In 2001 a random sample of 5% of each practice, and in addition a survey among Turkish, Moroccan, Surinam and Antillean migrants of 18 years and older
- GP and practice assistant questionnaires:
    - in 2001 partly via audit visits to the practices
- Videotaping of GP-patient consultations during consultation hours of GPs

By using unique identifiers in the data collection, interlinkage at all measurement levels were possible.

Registration of data about contacts between GPs and their patients

The consultation was identified by registration of

- consultation diagnosis
- place of the consultation (consultation in the practice; home visits etc)
- date of consultation
- duration of the consultation
- type of consultation (first; repeated)

In both surveys all health problems presented within one consultation were recorded separately. Both surveys were episode orientated, meaning that different consultations concerning the same health problem were linked to one episode. If there were several consultations in a single episode, the chronically last diagnosis made was considered the diagnosis of the episode.
A consultation during the registration period could be part of a new episode or be part of an existing episode. In the latter, the first consultation of this episode occurred in the preregistration period. Only new episodes were used for calculating the incidence; for calculating the prevalence all episodes were used.

For every health problem presented, GPs could record the following interventions:

- requests for laboratory investigations
- prescriptions of medication (classified by using the Anatomical Therapeutic Chemical classification system[11] (ATC).
- activities concerning health promotion, counselling, vaccinations and minor surgery
- referral to primary and secondary health care

In 1987 hardly any GP made use of a practice computer and data collection took place on paper forms, while in 2001 all participating GPs were using an electronic medical record from which consultation data were extracted. The registration period of the NS1 was three months per practice whereas the NS2 included data from a full 12 months period.

- NS1

In 1987 it was an evitable decision to limit the registration period to three

months in order to restrict the burden for the participating general practitioners.
GPs were divided in four groups and each group registered all health problems between patient and practice on registration forms during one of the four consecutive three month periods during 1987, thus taking into account seasonal variation.

The registered data included face-to-face contacts as well as consultations with the practice assistants. Consultations by telephone were only registered in case of prescriptions or referral. GPs were asked to describe the presented problems in diagnostic terms whenever possible. Diagnoses made by the GP were coded afterwards by well trained clerks with a medical background, working with a specially adjusted version of the International Classification for Primary Care (ICPC)[12]. The clerks checked the forms the GPs had filled in for consistency and completeness and informed the GPs on any gaps or inconsistencies. The clerks constructed also the disease episodes and consulted the GP when they faced problems with the episode construction.

To gain insight into the validity of the diagnoses made by 30 GPs, vignettes were presented to all participating GPs, whereby each vignette represented a diagnostic problem of a patient. One vignette was later withdrawn. There was a concordance of diagnoses in 75 per cent, in 27 diagnoses out of the 29 vignettes, and a diagnostic concordance of 90 per cent, in 21 out of the 29 vignettes.

Incidence rates and prevalence rates are usually calculated over a time-period of one year. The yearly incidence rates of the NS1 were calculated by multiplying the three-months incidence by four. However, from the three months period of the study, it is not possible to calculate valid annual prevalence rates.

- NS2

In 2001, in every participating practice data about contacts between GPs and their patients over a period of 12 months were derived from the electronic medical records. The interference with the daily work was therefore less obtrusive than in the NS1. This made it feasible to ask the GPs to participate for a period of one year.
The GPs coded the diagnostic information themselves. They were instructed to

code their interpretation of the consultation and not the symptoms prompting the reason for encounter. GPs were offered courses in ICPC coding and received feedback reports during the registration period.

To determine the reliability of GPs in classifying and assigning ICPC codes, 30 vignettes were presented to all participating GPs. From 161 GPs (response 83%) the results could be processed. The same 30 vignettes were presented to four “expert” GPs, who did not participate in the NS2. The average concordance with (at least one of) the experts was 81 per cent.

Census

From all patients on the list of the participating practices additional information was collected by using a census form. These registration forms were filled in by patients themselves.
With this form data were obtained about

- age, sex and marital status
- educational attainment, last practiced occupation, current employment status, type of health care insurance
- living arrangements, household composition, type of housing
- ethnicity (based on country of birth of the respondent and both parents)

- NS1

It was possible to collect all or part of the information of 91.2 percent of the total patient population. Written questionnaires were handed over in the waiting room by practice assistants. The respondent was asked to fill in the form for all members of the family. Non-response was higher in groups with a lower educational of occupational background. With regard to education the non-response was 20.7%, the occupation remained unknown in 13.4%.

- NS2

Data about age and sex were derived from the practice lists.
A written questionnaire with 14 items in 4 languages (Dutch, English, Turkish and Arabic) was sent to all patients registered in the participating practices at the start of the study (N=385,461) with a letter of their GP. Compared with the NS1 questionnaire, an item on self-rated health was added*.

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* Self-rated health (SRH) is widely used for measuring the health of a population. With a

Data of 294,999 persons were available for analyses, representing a response rate of 76.5%; non-response was not selective for age and sex of the respondents. With respect to ethnicity of the respondents, the non-indigenous population was underrepresented: 12.5% in the response versus 17.5% in the Dutch population.

Health interview survey

- Patient selection

In addition to the census an all-age* random sample of the listed practice population was invited to participate in an extensive health interview survey. Invitations were accompanied by a letter of their GP.
Patients selected for the interview did not need to have had contact with their GP to be selected for the interview. The average interview duration was 90 minutes. The interviews were randomly distibutued over a calendar year.

In the **NS1** a random sample of 100 patients of the listed practice population of every GP was invited. The net size of the sample was 17074 persons; the response rate for the health interview was 76% (13,014 persons).

In the **NS2** a five percent all age random sample of the listed practice population was invited. Roughly 80 interviews per full time GP were carried out. The interviews were randomly distributed over the calendar year 2001. Of the 19,685 invited persons, data of 12,699 valid interviews could be used for the analyses (response = 64.5%).
In addition, interviews were held with non-native individuals from Turkey, Morocco, Surinam and the Dutch Antilles: 2,682 persons were invited to participate in this survey†, of which 1,339 responded (49.9%)*.

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single question people rate their overall health on a scale from excellent to very poor.

* For children under 12 proxy interviews were conducted with the most important caretaker of the child; for children 12 to 17 years the interview was carried out with a caretaker present at home.

† The sample for this additional interview was drawn from the census, because this was the only source with information on the ethnic background of people in the study population. From the 7,355 persons of 18 years and older, who reported to be from Turkish, Moroccan, Surinam or Netherlands Antilles origin, 2682 persons were invited. These were interviewed by specialised (non-native) interviewers and, if necessary, in their own language by native interviewers. The interview included partly the same instruments as used in the health

- Measuring instruments

The core part of the interview included validated instruments to measure health status and health care utilisation.
The following items were addressed in the health surveys of the NS1 and NS2 [13]

- *Socio-demographic characteristics* like household composition, occupation, nationality
- *Health indicators* like BMI, self-rated health, disability, alcohol dependency, social problems, mental problems, acute and chronic conditions.
- *Health care utilisation*
  Contacts with GP, physiotherapist, community nurse/ social worker, logopedist/ dietician, alternative healer, ambulatory mental health care, dentist, medical specialist.
  Hospital admission
- *Life style* items such as alcohol, drugs, tobacco consumption, nutrition
- *Social characteristics*
  Social network, threatening experiences, social support, coping, loneliness
- *Attitudes toward health services*
  Opinions about quality of care, Nijmegen expectation questionnaire

GP and practice assistant questionnaire

In the NS1, GPs, practice assistants and practice nurses received an extensive questionnaire, covering a wide range of issues: e.g. organisation of the practice and daily work, co-operation with other care providers, task delegation, attitudes (e.g. prescription of antibiotics, coping with uncertainty, job satisfaction), time management, years of experience.
In the NS2, most data had already been collected by a systematic practice visiting instrument[14] and only a small questionnaire was necessary to cover items not addressed in the practice visiting instrument.
The “systematic practice visiting instrument” was used for audit visits to participating practices, that took place in the years 2000-2002. This was

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interview survey among the practice population sample. In addition, an instrument measuring the degree of acculturation in Dutch society was administered.

[*] The main reason for non-response was difficulties in reaching people. Non-response analysis shows that the distribution of the four ethnic groups by age and gender is comparable to the immigrant population in the Netherlands.

realised for 98 out of the 104 practices (=94%), including 181 GPs and their assisting personnel (271 practice assistants and nurse practitioners).
Within the extensive questionnaire of the NS1 and the systematic practice visiting instrument, data were collected about six dimensions:

- practice equipment
- task delegation
- service and organisation
- registration
- quality system
- workload.

In addition, in the NS1 and the NS2 the GPs were asked to keep a detailed diary covering 24 hours a day during one week. This diary made it possible to estimate the GPs' workload.
The practice assistants were asked to complete a questionnaire in order to obtain information on characteristics of the practice assistant and the practice, and task perceptions[15].

Videotaping of consultations

In 1987, 442 GP-patient consultations were videotaped (consultations of 16 GPs and 442 patients)[16,17].
In 2001, 142 GPs (72.8% of the participating GPs) agreed to have GP-patient consultations videotaped. A total of 2,784 consultations were recorded during regular consultation hours of the GPs, 11.9% of the eligible patients refused participation.
Patients filled in written questionnaires before, immediately after and 2 weeks after the consultation. The videotaped consultations were observed by trained observers using standardized observation schemes (Roter Interaction Process Analysis System[18]) and additional checklists. Observation was carried out on verbal and non-verbal communication style, patient participation, and content of the consultation (information, advice). Patient questionnaires included measuring instruments regarding health status, reason to consult the GP, preferences to see a specific GP, and the patient's opinion about the consultation.

6.4 Summary

Table 6.2 Summary data NS1 and NS2: main statistics

	NS1	***NS2***
No. participating GP practices	103	104
No. of participating GPs	161	195
Total number of full time equivalents (fte's)	165	161
Population at start	334,007	399,068
Population patient registration	303,248	*294,999*
Patient Health interview survey	13,066	12,699
Patient Health interview survey non-Western immigrants	-	1,339
Videotaping consultations	442 (16GPs)	2,784 (142GPs)
Total no. episodes presented to GP	316,497	949,220
Prescribed medicines	275,000	2143,558
Referrals	32,000	116,080

6.5 Discussion

An important aim of the second Dutch National Survey was to compare the results of 2001 with those from the first survey of 1987 [19]. This required as much comparability as possible in the design of both surveys. In general, the comparability is strong. However, developments over time made it inevitable to change some aspects of the survey in 2001. Most changes represented an improvement. We will focus in this discussion on the differences between the NS1 and NS2 and on the consequences of these differences.
In table 6.3 the differences between the NS1 and NS2 are summarised.

Table 6.3 Differences between the NS1 and NS2

	NS1	*NS2*
Participating GPs and practices	recruitment on the basis of a non-proportional stratified random sample of Dutch GPs	Recruitment among participants of LINH , filled up with 43 other practices to ensure representativity
Representativity GPs and practice populations	Representative age / gender Underrepresentation single-handed practices in rural and deprived areas	Representative age/gender Underrepresentation single-hand practices
Overall study population	• At start: 334007 Closed cohort	• At start 399,068 • At the end 402,755 • Midtime 400,912 Dynamic cohort
Representativity population	Underrepresentation of deprived and urban areas: patient population weighted to Dutch population for correction	representative
Data collection in practices	• with registration forms • 3 months period • central coding by clerks	• registration within own computing system • 12 months registration period coding by GP
Health interview survey	Interview	• Interview with more validated instruments • Survey among migrants
Data concerning practice	Questionnaire for GPs and practice assistants	• Questionnaire for GPs and practice assistants identical. • Practice Visiting instrument
Videotaping consultations	Performed among selected GPs	Performed among volunteering GPs

The two most important differences between NS1 and NS2 were

- a three months registration period in the NS1 versus a twelve month registration period in the NS2

- central coding of consultations in the NS1 versus peripheral coding in the NS2.

We will discuss the repercussion of these two differences.

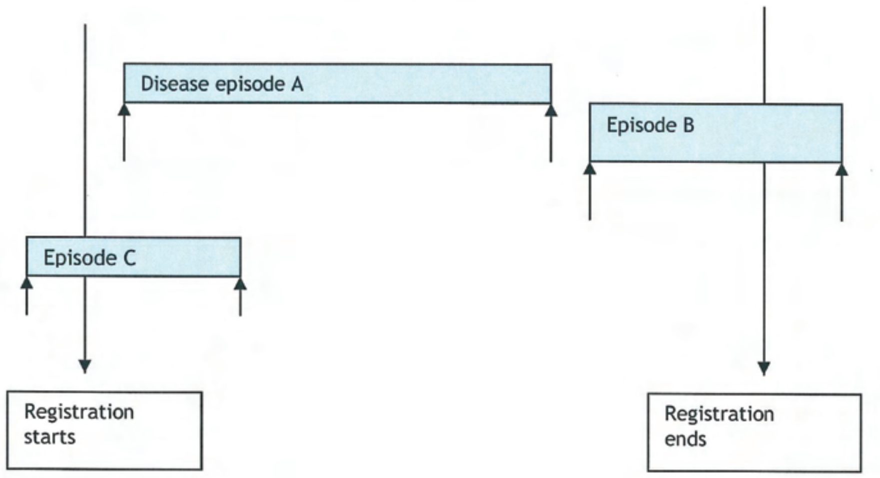
Three months versus 12 months registration

The choice for a three-month registration period for the
NS1 was the result of what had been proved feasible in a pilot study. A 12-month period, which was preferable, was not possible because it imposed too high a workload for a too long a period on the participating GPs.

As indicated previously, incidence rates and prevalence rates are usually calculated over a time-period of one year. We refrained from providing annual prevalence rates.

To compare the incidence rates of the NS1 with the rates of NS2, we multiplied the three month incidence by four. We have to take into account that converting a three-month incidence to an annual incidence may give rise to a small underestimation of the incidence in the NS1. This can be illustrated with figure 6.1.

Figure 6.1 Explanation how Incidence rates are influenced by duration of registration period



Disease episodes A and B are classified as new episodes; disease C is coded as existing episode. From the figure it becomes clear that in a shorter registration period it will occur more often that episodes (like episode C) are coded as existing than in the survey of 2001 with a 12 months registration period. This could result in an underestimation of incidence rates in 1987. However, the fact that 80% of the new episodes consisted of only one contact with the GP (156,172 new episodes gave rise to 208,691 contacts) this makes the difference of minor importance.

Central versus peripheral coding

In 1987 none of the participating GPs made use of a practice computer, while in 2001 all participating GPs were using electronic medical records.
In 1987 patient contacts were recorded on specially designed registration forms and coding was carried out centrally by trained clerks, who checked and, where necessary, discussed diagnoses with the GP concerned. The use of clerks for coding was necessary in order to prevent that GPs were too highly taxed.
As stated previously, the clerks checked for completeness and consistency of the data and could go back to the GP for additional information if necessary. They constructed also the disease episodes, which were subsequently fully checked by four physicians. Incompatibility concerning the combination diagnosis-age and diagnosis-sex was detected by a computer program.
After the clerks were trained in the use of ICPC, they were regularly submitted to uniformity tests with paper vignettes. Through these tests insight was obtained into the uniformity of coding. Further instruction was directed towards those points where uniformity left to be desired. On account of the training aspect deliberate use was made of “problem cases”. In this way an average agreement of 80 per cent was achieved for the coding of diagnoses by the clerks, with considerable improvement over time.
In 2001 the patient contacts were directly recorded in the practice computer and subsequently coded by the GP. In all electronic medical record systems ICPC codes could be assigned via a thesaurus.
As we will see in PART 2, in 2001 a higher proportion of the presented health problems than in 1987 were coded as ICPC symptom codes (rubrics 1-29) like diarrhoea (D11) or cough (R05). In 1987, the clerks used more often specific diagnoses like gastrointestinal infection (D70) of acute upper airway infection (R74). These coding differences should be kept in mind when comparing disease-specific incidence rates. To account for these differences in coding behaviour, we composed, where possible, clusters of related symptom and disease codes.
We will illustrate this with an example: ICPC code L01 (neck complaint) and ICPC code L83 (Syndrome cervical/neck) were combined in neck syndromes. Other examples are shown in table 6.4.

Table 6.4 Example of combining of ICPC codes into disease clusters

Dorsopathies		***Back symptoms/ complaints/disorder***	
	L03	Low back symptom/complaint	
	L86	Low back syndrome with radiation	
	L02	Back symptom/complaint	
	L85	Acquired deformity of spine	
	L84	Osteoarthose/spondylosis spine	
		Neck symptom/complaints/disorders	RSI
	L01	Neck symptom/complaints	
	L83	Syndrome cervical/neck	
Upper extremity		***Shoulder symptom/complaint/disorders***	
	L08	Shoulder symptom/complaint	
	L92	Shoulder syndrome	
		Arm elbow wrist hand complaints	
	L09	Arm symptom/complaint	
	L10	Elbow symptom/complaint	
	L93	Tennis elbow	
	L11	Wrist symptom/complaint	
	L12	Hand/finger symptom/complaint	
	N93	Carpal tunnel syndrome	

At first sight it seems surprising that central coding by clerks resulted in a higher proportion of specific diagnoses than peripheral coding by GPs. However, one should keep in mind that the clerks were trained and instructed to code at the highest level of understanding, whereas the coding of the GPs was part of their daily practice. In general, GPs coded d the presented health problems during the consultation. For GPs it is in daily practice not important whether to code a patient with diarrhoea as a symptom (D11) or as an gastrointestinal infection (D70).

6.6 Conclusion

The intention to make the data from the NS2 as much as possible comparable with those of the NS1 could be achieved to a considerable extent. The comparability was guaranteed for most aspects by using identical measuring

instruments and variables.
The two most important differences between the NS1 and NS2 were the differences in registration periods and the different persons by whom the presented morbidity was coded. Inevitably, this resulted in some coding differences. By presenting incidence rates at higher levels of aggregation, we ventured to circumvent these different coding practices.
The three-month registration period of the NS1 prevented us from presenting prevalence rates of morbidity.

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Part 2 Morbidity in general practice in 1987 and 2001

Chapter 7

The incidence of health problems in 1987 and 2001

7.1 Introduction

The aim of this part of the thesis is to compare the morbidity as presented to the GP in 1987 and 2001. Practice-based morbidity surveys provide us with a different type of morbidity information than population-based surveys, because they have the added input of GP interpretation and because they represent the selection of morbidity for which people seek medical care [1].
Practice-based morbidity data are invaluable for the scientific development of general practice, but they are invaluable for daily practice as well. To provide high quality care to their patients on the base of sound decision making, GPs need evidence on the effects of diagnostic, therapeutic and preventive interventions. Prerequisite is knowledge about the incidence and prevalence of symptoms and diseases in their population. This information can only be obtained from practice-based morbidity surveys.
Morbidity data from general practice are particularly important also for allocating resources within a health care system, because the diagnosis of the GP is often the starting point of treatment with drugs or other forms of medical intervention.
We are interested in changes that occurred in the presented morbidity to GPs between 1987 and 2001. Changes can reflect real changes in morbidity between these two periods, but may also be the result of a different level of detection and coding of morbidity by GPs and the result of differences in the presentation of morbidity by patients.
A patient population with a similar distribution of age and socioeconomic status can differ in help-seeking behaviour between two different time periods as was demonstrated by Cardol [2] (see chapter 2).
Also, the composition of the population did not remain similar between 1987 and 2001: the age structure and the distribution across the socioeconomic (SES) groups changed.
We took account of the change in age structure by standardising all incidence rates to the age structure of the Dutch population in 2001 and we took account of the change in the distribution of SES by providing 2001/1987 ratio's for persons of the same SES group.

In this chapter we will explore the differences in the presented health problems between 1987 and 2001 in relation to sex, SES and age, and try to find out how these differences can be explained.

7.2 Methods

Data on presented morbidity were derived from the NS1 (1987) and the NS2 (2001). We restricted ourselves to new health problems. As mentioned previously, morbidity data in 1987 were based on the registration during three months; in 2001 the duration of registration was one year (chapter 6). This made a comparison of prevalence rates between the two surveys not feasible. However, the incidence rates can be compared: by multiplying the incidence rate of 1987 by four, we obtained the incidence rate per year. The incidence rates of the 1987 survey were standardised for age according to the age distribution of the Dutch population in 2001.
We will present the incidence rates on five levels of aggregation:
Chapter 7

- overall level i.e. all new health problems
- level of ICPC rubrics i.e. symptom codes vs. disease codes
- level of organ systems

Chapter 8, 9, 11 and 12

- on cluster level: a cluster is a collection of ICPC codes, which form together a meaningful unit for research.

Chapter 10

- on disease level

Box 7.1 ICPC classification

ICPC is a biaxial classification system. The first axis is formed by seventeen chapters with an alpha code referring to a body system/problem area;
the other axis is formed by a two-digit numeric code referring to a rubric. Rubrics within a chapter are

- 1 - 29 symptoms and complaints
- 30 - 69 process codes (diagnostic, screening, medication, test results, administrative
- 70 - 99 diseases.

According to the coding instructions no process codes (30 – 69) were used for recording morbidity.

The population “at risk” (the epidemiological denominator) in 1987 was the total practice population and in 2001 it was approximated by the midtime

population. The epidemiological numerator of the incidence rate is the total number of new episodes per year.
Contact diagnoses relating to the same presented health problem were clustered into episodes of care. This is the period from the first presentation of a health problem to the GP, until the completion or the last encounter for this health problem.

Reading Guide for PART 2

We relate the changes in presented morbidity between 1987 and 2001 standardly to sex, socioeconomic group (SES) and age and use in the chapters of PART 2 a recurrent template to show the changes in incidence rate in relation to to sex, socioeconomic groups (table 7.1) and age (figure 7.1).
All rates for sex and SES were age-standardised according to the Dutch population in 2001.
For purposes of comparison between 1987 and 2001, the ratios of the incidence rates of 2001 and 1987 will be used in this thesis. Let us suppose that the incidence rate for a certain condition is 40 per 1000 in 1987 and 30 per 1000 in 2001. This results in a 2001/1987 ratio of 30/40 or 0.75. In several places we translate this ratio into a “25% decrease in 2001 compared with 1987”.

In the standard table (see table 7.1) the main data are the annual incidence rates in 1987 and 2001. Derived from these rates are horizontally the 2001/1987 ratios of the various subgroups, and vertically the female/male ratio and the lowest/highest SES group ratio within 1987 and 2001.
In the standard figure (see figure 7.1) we present graphically the incidence rate per age group in 1987 and 2001. Under this figure, we present a table with ratios in three rows: the 2001/1987 incidence ratio per age group, the female/male incidence ratios per age group in 1987 and 2001.

The 2001/ 1987 incidence ratio is directly derived from the incidence rates shown in the figure. The female/male ratios of 1987 and 2001, were separately computed and can not be directly derived from the above figure.

If one of the ratios is statistically significant ($p<0.05$), the figures in the tables are depicted in bold.

7.3 Incidence of all health problems in 1987 and 2001

When we compare the incidence rates of 1987 and 2001, we can see that the rates were lower in 2001 than in 1987 for all subgroups of sex and SES (table 7.1) and age (figure 7.1).
Overall, the incidence rate was in 2001 24 % lower than in 1987; in males the incidence was 29% lower, in females 19%. The female/male ratio was 1.27 in 1987 and 1.44 in 2001.
The highest rates were in the lowest SES groups, the lowest rates were in the highest SES groups. The ratio between the lowest and the highest SES group was 1.34 in 1987 and 1.37 in 2001.

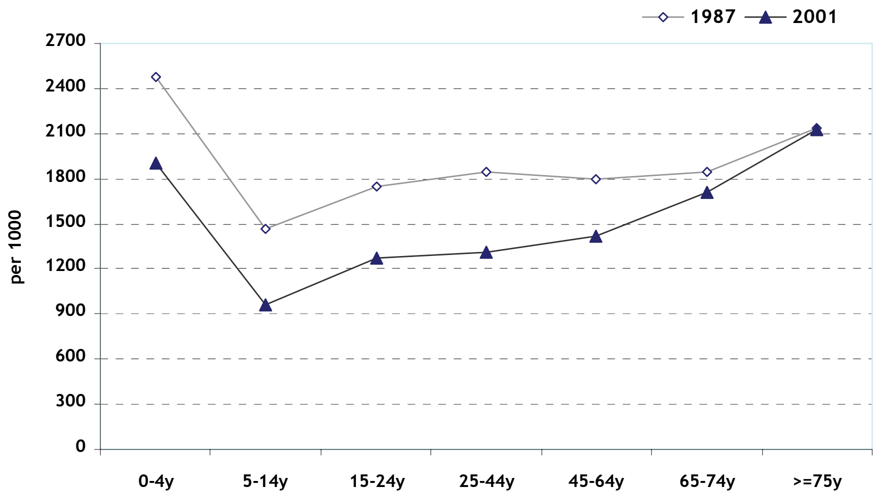
Table 7.1 Overall incidence rates by sex and SES in 1987 and 2001 with 2001/1987 ratio's and female/male and lowest/highest SES group ratio's in 1987 and 2001; rates per 1000 per year

	1987 **N=152,175** /1000	**2001** **N=525,291** /1000	***2001/1987*** *ratio*
All	1827	1397	***0.76***
SEX			
Males	1601	1144	***0.71***
females	2040	1647	***0.81***
Female/male ratio	***1.27***	***1.44***	
SES			
lowest	2024	1652	***0.82***
middle	1804	1420	***0.79***
highest	1510	1202	***0.80***
lowest/highest SES ratio	***1.34***	***1.38***	

Bold p<0.05

In all age groups the incidence rates were higher in 1987 than in 2001. However, from the age of 65 onwards the differences between 1987 and 2001 were small (figure 7.1). In both years, the incidence rates of the youngest and eldest groups were by far the highest, whereas in the age from 5 to 14 the incidence rates were the lowest.
The incidence in females was in 1987 and 2001 higher across all age groups with the exception of the youngest age group.

Figure 7.1 Overall incidence rate of health problems in 1987 and 2001 by age; per 1000 per year



Age	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	≥75y
2001/1987 ratio	**0.77**	**0.66**	**0.72**	**0.71**	**0.79**	**0.93**	1.0
Female/male							
1987	**0.96**	**1.10**	**1.52**	**1.38**	**1.27**	**1.24**	**1.16**
2001	**0.91**	**1.09**	**1.88**	**1.75**	**1.38**	**1.21**	**1.15**

Bold p<0.05

7.4 Incidence of health problems by ICPC rubrics

In the rubrics of the ICPC a distinction is made between symptom codes and disease codes.

In 1987, 71% of all health problems presented to GPs were coded as diseases against 53 % in 2001 (Table 7.2). The 2001/1987 ratio for the incidence rate of diseases was 0.57 indicating an incidence rate that was 43% lower in 2001 than in 1987. On the other hand, the incidence for symptoms and complaints was 22% higher in 2001 than in 1987. These differences were statistically highly significant (p<0.0001).
Between organ systems, there were considerable differences (see appendix 7.1). The highest 2001/1987 ratio for symptoms was ear problems (3.65) (appendix 1). For diagnoses, the 2001/1987 ratios were lower than one for all organ systems; the lowest ratio (0.43) occurred in gastrointestinal tract diseases and respiratory tract diseases.

Table 7.2 Incidence rate by ICPC rubric in 1987 and 2001, proportional distribution of ICPC disease codes and ICPC symptom codes, and 2001/1987 ratios; rates per 1000 per year

	1987		**2001**		**2001/1987**
	/1000	*%*	/1000	*%*	*ratio*
Diseases (70-99)	1290	*71*	740	*53*	***0.57***
Symptoms and complaints	537	*29*	658	*47*	***1.22***
Total	1827	*100*	1397	*100*	***0.76***

Bold p<0.05

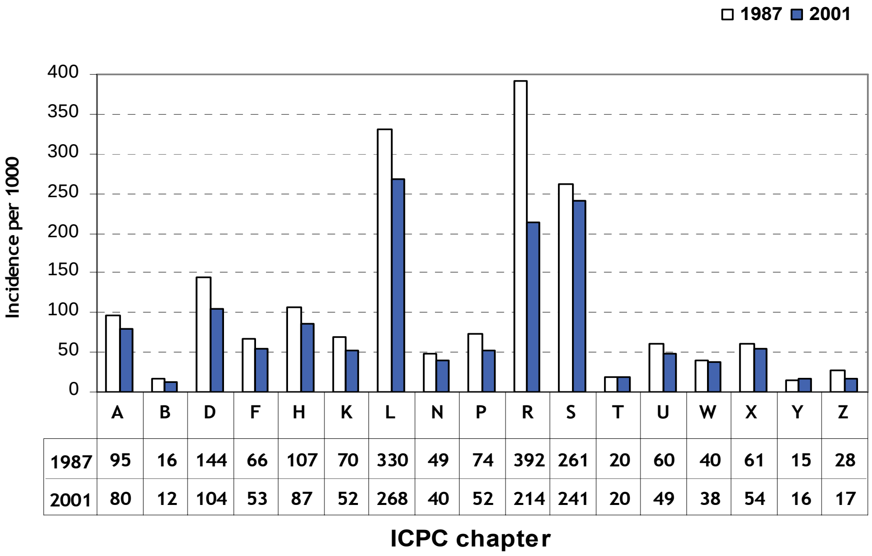
7.5 Incidence rates of health problems per organ system.

Between 1987 and 2001 the overall incidence rate declined by 24%. This figure can be taken as point of reference when we consider the incidence rates of the separate organ systems.

For almost all organ systems the incidence rates were lower in 2001 than in 1987 with the exception of male genital problems and Endocrine, Metabolic and Nutritional system problems. The decline was most marked for the respiratory tract problems with a decrease of 45% and social problems with a decrease of 39% .

The differential decline in incidence rates per organ system changed the proportional contribution of each organ system to all new health problems between 1987 and 2001.
In 1987, problems of the respiratory tract (chapter R) were most frequently presented (21.4%); in 2001 it dropped to the third place (15.3%) and was surpassed by symptoms and diseases of the musculoskeletal tract (chapter L, 19.2%). The incidence rate of skin-related problems (chapter S) moved up from the third place in 1987 to the second position (17.3%) in 2001.
Overall, half of the problems presented in general practice were related to three organ systems - the musculoskeletal system, the respiratory tract and the skin related problems both in 1987 and 2001.
Approximately 6% of the presented health problems were classified as general and unspecified health problems (chapter A).

Figure 7.2 Incidence rates in 1987 and 2001 organ system(ICPC chapter); per 1000 per year



A	B	D	F	H	K	L	N	P	R	S	T	U	W	X	Y	Z
0.83	**0.77**	**0.72**	**0.81**	**0.81**	**0.75**	**0.81**	**0.83**	**0.7**	**0.55**	**0.92**	1.00	**0.81**	**0.93**	**0.89**	**1.07**	**0.61**
2001/1987 ratio																

Bold ratio's p<0.05

Table 7.3 Proportional contribution of each organ system (ICPC chapter) to the overall incidence rates in 1987 and 2001; percentages

		1987	**2001**
chapt		%	%
A	General and unspecified	5.2	5.7
B	Blood Organs and Immune Mechanism	0.9	0.9
D	Digestive	7.9	7.4
F	Eye	3.6	3.8
H	Ear	5.8	6.2
K	Cardiovascular	3.8	3.7
L	Musculoskeletal	18.1	19.2
N	Neurological	2.7	2.9
P	Psychological	4.1	3.7
R	Respiratory	21.4	15.3
S	Skin	14.3	17.3
T	Endocrine,Metabolic and Nutritional	1.1	1.4
U	Urological	3.3	3.5
W	Pregnancy,Family planning	2.2	2.7
X	Female Genital	3.3	3.9
Y	Male Genital	0.8	1.2
Z	Social problems	1.5	1.2

Bold ratio's p<0.05

Incidence rates of health problems by organ system by sex in 1987 and 2001

Table 7.4 Incidence rate per organ system by sex in 1987 and 2001(per 1000 per year); and female/male ratio in 1987 and 2001; and male/male ratio and female/female ratio in 2001/1987

	1987		**2001**		***2001/ 1987***	***2001/ 1987***	***1987***	***2001***
	male	**female**	**male**	**female**	***male***	***female***	***Female/ male***	***Female/ male***
A	81	109	64	95	***0.80***	***0.87***	***1.36***	***1.48***
B	11	20	8	16	***0.78***	***0.78***	***1.87***	***1.88***
D	131	156	87	120	***0.67***	***0.77***	***1.19***	***1.37***
F	66	67	51	56	***0.77***	***0.84***	*1.01*	***1.11***
H	106	108	86	87	***0.81***	***0.81***	*1.01*	*1.01*
K	61	77	44	60	***0.72***	***0.78***	***1.26***	***1.36***
L	324	334	242	294	***0.75***	***0.88***	***1.03***	***1.22***
N	39	58	31	50	***0.79***	***0.87***	***1.48***	***1.63***
P	59	88	43	62	***0.72***	***0.70***	***1.49***	***1.45***
R	377	408	188	240	***0.50***	***0.59***	***1.08***	***1.28***
S	253	269	216	266	***0.86***	*0.99*	***1.06***	***1.23***
T	14	25	16	23	***1.13***	***0.94***	***1.75***	***1.44***
U	27	90	21	76	***0.77***	***0.84***	***3.36***	***3.70***
W		79	1	74		***0.94***		
X		118		107		***0.91***		
Y	31		33		*1.04*			
Z	21	34	13	21	***0.61***	***0.61***	***1.60***	***1.61***
total	1601	2040	1144	1647	***0.71***	***0.81***	***1.27***	***1.44***

Bold ratio's p<0.05

A= General and unspecified; B=Blood Organs and Immune Mechanism; D=Digestive system; F=Eye; H=Ear; K=Cardiovascular; L=Musculoskeletal; N=Neurological; P=Psychological; R=Respiratory;S=Skin; T=Endocrine, Metabolic and Nutritional; U=Urological; W=Pregnancy,Family planning; X= Female Genital; Y=Male Genital; Z=Social problems

Males

Overall, the incidence rates in males were 29% lower in 2001 compared with 1987 (table 7.4). The difference in incidence rates between 1987 and 2001 was largest for the respiratory system (chapter R) (50% decrease). Only in diseases related to endocrine, metabolic and nutritional problems (T chapter) the incidence rate increased between 1987 and 2001.

Females

Overall, the incidence rates in females were 19% lower in 2001 compared to 1987. Like males, the incidence rate of health problems related to the respiratory system (chapter R) decreased most (41%). The rate remained stable for health problems in chapter S (skin related disorders); the rates for all other chapters were lower in 2001 than in 1987.

Female/ male ratio in 1987 and 2001

Overall, the incidence rate in females was 27% higher than in males in 1987 and 44% higher in 2001. The patterns of female/male ratios of incidence rates across the organ systems were quite similar in both years.

Incidence rates of health problems per organ system by SES 1987- 2001

The incidence rates in the lowest SES group were lower in 2001 compared with 1987 for almost all organ systems with the exception of cardiovascular system (chapter K), for which the rate was 5% higher in 2001 than in 1987 (P=0.01). The rates for the highest SES group also, were lower in 2001 than in 1987 with the exception of female genital tract (chapter X), for which the rate was 88% higher in 2001 than in 1987.

The incidence rates in the lowest SES group exceeded those of the highest SES group for most organ systems with the exception of male genital system (chapter Y) in 1987 and pregnancy and family planning problems (chapter W) and male genital system (chapter Y) in 2001.

The gap between the lowest and highest SES group increased in particular for health problems related to the cardiovascular tract (chapter K) in 1987 and 2001: in 1987 the ratio lowest/highest ratio was 1.11, in 2001 this increased to 2.07.

Table 7.5 Incidence rates in 1987 and 2001 by of health problems by organ system by SES and ratio lowest/highest SES groups; per 1000 per year

	1987 **SES**			**2001** **SES**			**2001/ 1987**	**2001/ 1987**
	lowest /1000	highest /1000	*Low/ high ratio*	lowest /1000	highest /1000	*Low/ high ratio*	*Low low ratio*	*High/ high ratio*
A	102	80	***1.28***	91	69	***1.32***	***0.89***	***0.87***
B	15	16	*0.96*	14	10	***1.34***	*0.91*	***0.62***
D	166	119	***1.39***	125	84	***1.50***	***0.75***	***0.71***
F	73	55	***1.31***	62	48	***1.29***	***0.85***	***0.87***
H	108	107	*1.01*	92	85	***1.08***	***0.85***	***0.79***
K	73	66	***1.11***	77	37	***2.07***	***1.05***	***0.56***
L	383	246	***1.55***	348	213	***1.63***	***0.91***	***0.87***
N	56	33	***1.70***	51	32	***1.57***	***0.91***	*0.97*
P	80	67	***1.18***	63	41	***1.54***	***0.79***	***0.61***
R	463	296	***1.57***	234	189	***1.24***	***0.51***	***0.64***
S	280	236	***1.19***	256	231	***1.11***	***0.91***	*0.98*
T	24	16	***1.47***	25	15	***1.72***	*1.06*	*0.94*
U	65	41	***1.58***	67	34	***1.95***	*1.03*	***0.82***
W	33	35	*0.96*	58	72	***0.81***	*1.75*	*2.08*
X	57	52	***1.10***	104	97	***1.08***	*1.83*	***1.88***
Y	14	19	***0.74***	32	34	***0.96***	*2.22*	*1.75*
Z	32	25	***1.26***	21	12	***1.72***	***0.67***	***0.48***

Bold p<0.05

A= General and unspecified; B=Blood Organs and Immune Mechanism; D=Digestive system; F=Eye; H=Ear; K=Cardiovascular; L=Musculoskeletal; N=Neurological; P=Psychological; R=Respiratory;S=Skin; T=Endocrine,Metabolic and Nutritional; U=Urological; W=Pregnancy,Family planning; X= Female Genital; Y=Male Genital; Z=Social problems

Incidence rates of health problems by organ system by age 1987-2001

To present the incidence rates of health problems by organ system by age we calculated the top-3 of incidence rates for each organ system per age group (table 7.6). In appendix 7.2 the incidence rates per age group for all organ systems are presented.
In table 7.7 the 2001/1987 ratio's of the incidence rates by ICPC chapter per age group were presented.
We will comment per age group on the top-three (table 7.6) and on the most noticeable characteristics of the 2001/1987 ratio's (table 7.7).

0 to 4 years
- The top 3 of incidence rates per organ systems included the same organ systems (R,S,H) in 1987 and 2001. Health problems related to the ears (ranking on 3rd position) were found in the top-three only in this age group.
- The incidence rate of respiratory tract problems (R) decreased by 40%.
- The incidence rates for problems of the neurological system (N), Psychological problems and Female genital tract problems (X) were in contrast with the general trend higher in 2001 than in 1987.

5 to 14 years
- In 1987 health problems related to the respiratory tract problems (R) were most common, in 2001 problems of the skin (S).
- In 2001 the incidence of neurological system problems (N), Psychological problems (P) and Pregnancy,family planning problems (W) were higher in 2001 than in 1987.

15 to 24 years
- In 2001 skin problems (S) replaced respiratory tract problems (R) as the organ system with the highest incidence.
- For all organ system the incidence rates were higher in 1987 than in 2001

25 to 44 years
- Problems of the musculoskeletal system (L) had the highest incidence rates both in 1987 and 2001. In 2001 respiratory tract problems (R) lost its 2nd place to skin problems (S)
- For all organ systems the incidence was higher in 1987 than in 2001.

45 to 64 years
- Problems of the musculoskeletal system (L) had the highest incidence rate and respiratory tract problems (R) changed position with skin

problems (S) in 2001

- The rate was higher in 2001 than in 1987 for the Pregnancy,family planning problems (W) and the Endocrine,Metabolic and Nutritional problems (T).

65 to 74 years

- In 1987 problems of the respiratory tract had the highest incidence, in 2001 problems of the musculoskeletal system (L).
- In 2001 higher rates than in 1987 were found for problems of male genital problems (Y)), Endocrine,Metabolic and Nutritional problems (T), skin problems (S) and General and unspecified problems (A).

75 years and older

- In 2001 respiratory tract problems (R) were no longer at the top like in 1987; they were surpassed by musculoskeletal problems (L).
- Higher incidence rates in 2001 than in 1987 were found for the following organ system : General and unspecified problems (A), health problems related to blood and immune system (B), eye problems (F), skin related problems (S), Endocrine,Metabolic and Nutritional problems (T) and urological problems (U).

Table 7.6 Incidence rates by age per 1000 per year and ranking for the top-three organ system

and incidence top-three	0-4y		5-14y		15-24y		25-44y		45-64y		65-74y		75 and older	
	1987	**2001**	**1987**	**2001**	**1987**	**2001**	**1987**	**2001**	**1987**	**2001**	**1987**	**2001**	**1987**	**2001**
1	**R**	**R**	**R**	**S**	**R**	**S**	**L**	**L**	**L**	**L**	**R**	**L**	**R**	**L**
/1000	*964*	*578*	*400*	*256*	*346*	*259*	*370*	*275*	*405*	*345*	*353*	*346*	*362*	*350*
2	**S**	**S**	**S**	**R**	**L**	**L**	**R**	**S**	**R**	**S**	**L**	**S**	**L**	**S**
/1000	*378*	*366*	*311*	*178*	*324*	*234*	*356*	*214*	*340*	*216*	*342*	*252*	*362*	*350*
3	**H**	**H**	**L**	**L**	**S**	**R**	**S**	**R**	**S**	**R**	**S**	**R**	**K**	**R**
/1000	*294*	*246*	*189*	*143*	*321*	*188*	*247*	*185*	*217*	*188*	*353*	*229*	*268*	*247*

H=Ear; K=Cardiovascular; L=Musculoskeletal; N=Neurological; R=Respiratory; S=Skin;

Table 7.7 2001/1987 ratio's of Incidence rates by organ system and by age

ICPC chapter		0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	75y ao
A	General and unspecified	***0.70***	***0.55***	***0.77***	***0.75***	***0.92***	***1.21***	***1.55***
B	Blood and Immune system	***0.69***	***0.59***	***0.71***	***0.64***	0.98	0.97	***1.45***
D	Digestive	***0.78***	***0.50***	***0.68***	***0.67***	***0.74***	0.96	1.03
F	Eye	1.09	***0.79***	***0.59***	***0.67***	***0.85***	1.10	***1.13***
H	Ear	***0.84***	***0.69***	***0.78***	***0.71***	***0.90***	0.97	1.04
K	Cardiovascular	***1.88***	***0.66***	***0.67***	***0.75***	***0.72***	***0.78***	***0.75***
L	Musculoskeletal	***0.81***	***0.76***	***0.72***	***0.74***	***0.85***	1.03	1.02
N	Neurological	***1.63***	***1.27***	***0.88***	***0.71***	***0.73***	0.92	1.10
P	Psychological	***1.26***	***1.18***	***0.67***	***0.63***	***0.65***	***0.76***	0.98
R	Respiratory	***0.60***	***0.45***	***0.54***	***0.52***	***0.55***	***0.65***	***0.68***
S	Skin	0.97	***0.82***	***0.81***	***0.87***	0.99	***1.20***	***1.27***
T	Endocrine,Metabolic,Nutritional	0.88	***0.70***	***0.69***	***0.80***	***1.19***	***1.34***	***1.23***
U	Urological	***0.80***	***0.78***	0.97	***0.74***	***0.67***	***0.86***	***1.09***
W	Pregnancy,Family planning		***2.44***	***0.93***	***0.88***	***2.01***		
X	Female Genital	***2.14***	1.16	***0.88***	***0.82***	0.96	1.09	0.95
Y	Male Genital	1.23	***0.80***	***0.82***	0.98	***1.22***	***1.71***	1.09
Z	Social problems	***0.44***	***0.50***	***0.60***	***0.65***	***0.57***	***0.58***	***0.72***

Italic Bold p<0.05

7.6 Discussion

Summary

Overall

- The overall incidence rate of health problems was in 2001 24% lower than in 1987
- The decrease in the incidence rate between 1987 and 2001 was much larger in males (29%) than in females (19%)
- In 1987, females presented 27% more new health problems than males; in 2001, this difference was 44% percent.
- The differences between the lowest and the highest SES groups remained stable between 1987 and 2001.
- In 2001 many more new health problems were coded with a symptom diagnosis than in 1987

Organ systems

- In 1987, problems of respiratory tract (R) were most frequently presented; in 2001, this tract was surpassed by musculoskeletal tract problems (L).
- The general decline in incidence rates between 1987 and 2001 was most marked for incidence rates of problems related to respiratory tract (R).
- Overall, more than 50% of all newly the problems presented in general practice were related to three organ systems; musculoskeletal system problems (L), respiratory tract problems (R) and skin related problems (S).
- All incidence rates decreased between 1987 and 2001 with the exception of the rates of health problems related to the Endocrine/Metabolic and Nutritional problems (T), health problems related to the male genital system (Y) and health problems related to the skin (S) in females.

Reflections on the differences between 1987 and 2001

Various factors may influence the difference in the incidence of morbidity between two time periods.
In the first place differences in morbidity can obviously be caused by "real"

changes in morbidity. With a real change we mean that not only the morbidity presented to GPs underwent a change, but that the incidence among the population (presented and not presented health problems) changed.
Besides the “real” changes in morbidity, we can distinct four different explanatory categories: changes in incidence between two time periods may be related to changes in

- characteristics of the population
- characteristics of general practice
- the characteristics of the health care system
- methodological characteristics

“Real” changes in morbidity

It seems unlikely that a drop of 24% a drop in the incidence of presented health problems between 1987 and 2001 is the result of a real change. An indication from our survey that this is highly unlikely is overall the self-rated health between 1987 and 2001 remained similar (chapter 4). However, it is conceivable that for some individual diseases real changes in morbidity occurred between 1987 and 2001. We will explore this further in the following chapters of PART 2.

Changes related to characteristics of the population

Differences in *composition* of the population can create changes in the observed morbidity. Most clearly this applies for the ageing of the population. However, we corrected for this effect by standardising the 1987 population to the age structure of the Dutch population in 2001. Moreover, we provided morbidity figures per age group.
The socioeconomic composition of a population influences also the incidence rates of health problems presented to GPs. In paragraph 3 of this chapter we showed that the rates in the lowest SES group were more than 30% higher than in the highest SES group in 1987 as well in 2001. In chapter 3 we found that in 1987 34.9% of the population belonged to the lowest SES group and 16.5% to the highest SES group; in 2001 these figures were 29.5% and 28.8% respectively. It is plausible that these changes in the socioeconomic composition of the Dutch population, contributed to the decrease in incidence of presented health problems between 1987 and 2001.

Changes in *health seeking behaviour* are also a potential cause for an altered presentation of health problems. We have indications that consultation

behaviour changed between 1987 and 2001.
Part of the fall in the overall incidence may be explained by patients bypassing their GPs and presenting their health problems directly to another health care provider. In the Netherlands this is in particular possible for injuries and sexually transmitted infections. In chapter 10 and in chapter 21 we will come back on this subject.
Cardol[2] studied changes in patients' attitudes towards the management of minor ailments between 1987 and 2001 and showed a shift away from consulting GPs for minor ailments in 2001. These changes in attitude could have contributed to the lower incidence rates in 2001. In the following chapter we will explore the incidence rates of a number of common ailments.

Changes related to characteristics of general practice

Factors, relating to GPs and general practice may also influence the incidence of health problems. We previously described the changes that occurred between 1987 and 2001 in general practice (chapter 5). We demonstrated how the professionalisation of GPs progressed. The postgraduate vocational training was extended from one to three years. The Dutch College of General Practitioners published between 1988 and 2001 more than 80 guidelines about important subjects in the field of general practice. The publication of the practice guidelines changed the scenery of general practice remarkably. Under the influence of the guidelines, GPs focused more on primary and secondary prevention of some diseases.
For example, with the aim of preventing or recurring cardiovascular diseases more attention was paid to the detection of elevated levels of cholesterol. This resulted in an incidence rate of 3.3 per 1000 in 2001, against 0.8 per 1000 in 1987.

Changes related to the characteristics of the health care system

Changes in the health insurance system can influence the presentation of health problems to GPs. When patients need a prescription to obtain a medicament or to get a medicament reimbursed, they will consult their GP and the GP will record and classify the presented health problem before prescribing the medicament.
Some antitussive drugs, that didn't need a prescription in 1987, but were reimbursed on prescription, were in 2001 not reimbursed anymore even when prescribed by a health care provider.
For a number of drugs the need for a prescription was abolished between 1987

and 2001. For example, in 1987, patients needed a prescription for obtaining a drug against oxyuriasis, a common minor ailment among children. In 2001, no prescription was needed any more for this drug, and so there was no need to present this condition to the GP.
Van de Lisdonk et al [4] demonstrated a sharp fall in the incidence rate of oxyuriasis between 1987 and 2001.

Methodological changes

In chapter 6 we discussed elaborately the differences between the National Surveys of 1987 and 2001 and the consequences.
Alterations in the way in which GPs have recorded and classified presented morbidity have to be taken into account. In section 4 of this chapter we noticed that in 1987 about 71 percent of all new episodes was coded with ICPC "disease"code (rubric 70-99); in 2001 only 53 percent of the episodes were coded with a "disease" code. However, because we studied morbidity in the previous chapters on a high level of aggregation, differences in incidence between 1987 and 2001 cannot be contributed to this difference in coding behaviour.

7.7 Conclusion

Although the incidence rate was 24% lower in 2001 than in 1987, patients had approximately 10% more contacts with general practice in 2001 than in 1987.[3] This indicates a shift in the work of GP from incident cases to prevalent cases.

In this chapter we studied differences between incidence rates in 1987 and 2001 on a high level of aggregation. Herewith we avoided a potential bias by coding differences between 1987 and 2001. However, this limited us in finding explanations for the observed differences in incidence between 1987 and 2001. By going down in aggregation level to clusters of diseases in the following chapters, we hope to elucidate more extensively the differences between 1987 and 2001.

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Chapter 8

The incidence of Infectious diseases in 1987 and 2001

8.1 Introduction

In this chapter we present the incidence of infectious diseases in general practice. A great deal of the work of GPs is related to infectious diseases. Most of the infectious diseases subside spontaneously and are hardly influenced by medical interventions. However, a small proportion may be potentially serious and then early diagnosis and treatment is necessary. GPs work with probability and thus uncertainty. Epidemiological knowledge of infectious diseases within their population is important for GPs for assessing the risk of serious infections, which warrant medical treatment. In this chapter we provide this type of epidemiological data.
Diseases - and infectious diseases in particular- are not randomly distributed across the population. The distribution is dependent on the one hand on virulence factors possessed by the organisms, and is on the other hand dependent on host factors.
Host factors affect both the chance of exposure and the individual response to the infection. Important host factors include age and sex, travel, sexual behaviour, hygiene, occupation, crowding, previous immunity and underlying diseases. As composite measure of some of these host factors, we included socioeconomic status in our analyses.

We were interested to know whether changes occurred in the presentation of infectious diseases to the GP between 1987 and 2001.
This brings us to the following research questions:

1. Which infectious diseases were presented in general practice in 1987 and 2001 (overall, by sex, by age, by socioeconomic group)
2. Which differences were found in the incidence rates of infectious diseases between 1987 and 2001 (overall, by sex, by age, by socioeconomic group)

8.2 Methods

We selected all ICPC codes referring to infections (see appendix 8.1) and calculated the incidence rates and standardised the results of 1987 for age using the age composition of the Dutch population on 1-1-2001 as a standard.

We will compare the incidence rates of infectious diseases on different levels of aggregation:

1. on overall level: i.e. all new episodes of infectious diseases
2. on cluster level: clusters of infections, which form together meaningful units for research.

We will describe the occurrence of infectious diseases in the following clusters (table 8.1)

- Respiratory tract infections
- Skin infections
- Gastrointestinal infections
- Infections of the eyes
- Urinary tract infection

Table 8.1 Clusters of infectious diseases as discussed in this chapter

Clusters	*Description of ICPC codes*
Respiratory tract infections	***Upper Respiratory tract infections*** R05 cough, R07 nasal congestion, R08 nose symptom, R09 sinus symptom, R72 Strept. Throat, R74 acute Upper respiratory infections, R75 Sinusitis acute/ chronic, R76 Tonsillitis acute, R77 Laryngitis/ tracheitis acute, R90 Hypertrophy tonsils/adenoids H71 Acute otitis media/myringitis ***Lower Respiratory tract infections*** R70 respirat tuberculosis, R71 whooping cough, R78 Acute bronchitis/bronchiolitis, R80 Influenza, R81 Pneumonia, R83 other Resp. infection
Skin infections	S03 warts, S09 Infected finger/toe, S10 Boil/carbuncle, S11 Skin infection post-traumatic, S70 Herpes zoster, S71 Herpes simplex, S72 Scabies/other acariasis, S73 Pediculosis/skin infestation other, S74 Dermatophytosis, S75 Moniliasis/ candidiasis skin, S76 Skin infection other, S84 Impetigo, S85 Pilonidal cyst/fistula, S90 Pityriasis rosea S95 Molluscum contagiosum , R73 Boil/abscess nose,
Gastrointestinal infections	D11 diarrhoea, D70 Gastrointestinal infection, D73 Gastroenteritis presumed infection
Infections of the Eyes	F02 Red eye F03 Eye discharge F70 Conjunctivitis infectious, F72 Blepharitis/stye/chalazion, F73 Eye infection/inflammation other
Urinary tract infections	U70 Pyelonephritis/pyelitis, U71 Cystitis

8.3 Incidence of Infectious diseases

8.3.1 Incidence of all infectious diseases

With an overall incidence rate of 405 per 1000 in 2001 and 667 per 1000 in 1987, the rate in 2001 was 39% lower than in 1987 (table 8.2).
In 2001 the incidence rate in males was 43% lower than the rate in 1987, the rate in females was 36% lower. Significantly more women than men presented with infectious diseases: in 1987 the rate was 23% higher in females than in males, in 2001 37%.
The highest incidence rates of infectious diseases were seen in the lowest SES group, and the lowest incidence rates in the highest SES group. Comparing the similar SES groups over time, for the lowest SES group the rate was in 2001 42% lower than in 1987, for the highest SES group this was 31%. In 1987, the incidence rate in the lowest SES group was 38% higher than in the highest SES group, in 2001 this difference was reduced till 14%.

Table 8.2 Incidence rates of all infectious diseases by sex and SES in 1987 and 2001

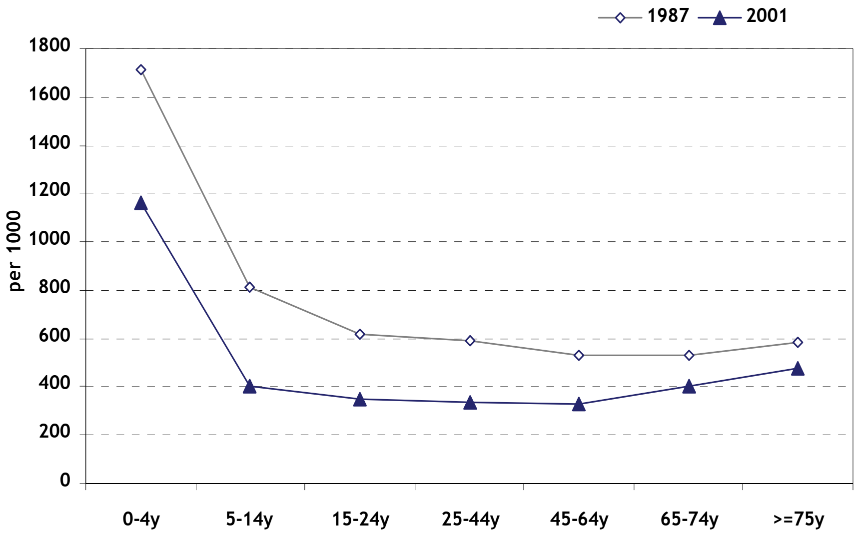
	1987 /1000	**2001 /1000**	***2001/1987 ratio***
All	667	405	***0.61***
SEX			
Male	598	342	***0.57***
Female	733	467	***0.64***
Female/male ratio	***1.23***	***1.37***	
SES			
Lowest	747	432	***0.58***
Middle	649	417	***0.64***
highest	543	380	***0.69***
Lowest/highest SES ratio	***1.38***	***1.14***	

Bold p<0.05

In 1987 as well as in 2001 the peak incidence rates occurred in the youngest

age group (figure 8.1) The rates of children from 0 to 4 were approximately two times higher than the second in ranking; in 1987, the second in ranking was the age group 5 to 14, in 2001 it was the oldest age group (>=75). The difference in incidence rates between 1987 and 2001 was the smallest for the oldest two age groups.
With the exception of the youngest age group, females presented more new infections than males. This pattern of the female/male ratio was similar in 1987 and 2001.

Figure 8.1 Incidence rates of all infectious diseases by age in 1987 and 2001; per 1000 per year



Age	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**0.68**	**0.49**	**0.57**	**0.57**	**0.63**	**0.76**	**0.82**
Female/male ratio							
1987	0.98	**1.13**	**1.47**	**1.36**	**1.24**	**1.26**	**1.07**
2001	0.94	**1.13**	**1.91**	**1.68**	**1.42**	**1.29**	**1.26**

Bold p<0.05

8.3.2 Incidence of respiratory tract infections

The incidence rate of respiratory tract infections dropped steeply from 365 per 1000 in 1987 to 177 per 1000 in 2001 resulting in a proportional decrease of 51 per cent (Table 8.3).
The incidence rate in *males* decreased more than in *females* (2001/1987 ratio 0.45 and 0.51 respectively). The rate for *females* was in both studies higher than for males: in 1987 the female/male ratio was in 1.10 and in 2001 1.24.
The fall in incidence rate between 1987 and 2001 was the steepest for the *lowest SES group*. The lowest and highest SES group approached each other between 1987 and 2001; in 1987, the ratio between the lowest and the highest group was 1.55, in 2001 this ratio was 1.14.

Table 8.3 incidence rated of Respiratory tract infections by sex, age and SES; per 1000 per year

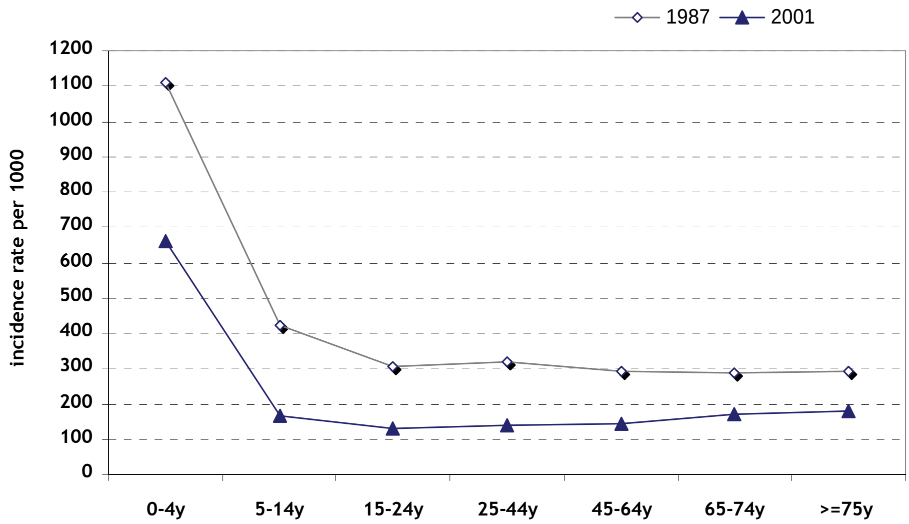
	1987 /1000	**2001 /1000**	***ratio 2001/1987***
All	365	177	***0.49***
SEX			
Male	348	158	***0.45***
Female	383	196	***0.51***
Female/male ratio	***1.10***	***1.21***	
SES			
Lowest	428	187	***0.44***
Middle	354	185	***0.52***
Highest	276	164	***0.60***
Lowest/highest ratio	***1.55***	***1.14***	

Bold p<0.05

Proportionally, the decrease in the incidence rate between 1987 and 2001 was most marked for the age group 5 to 14 (from 421 to 166 per 1000); the decrease was proportionally less than average for the youngest and oldest age groups (figure 8.2) .
The incidence rate in the youngest age group was by far the highest. In 1987, it was 2.6 higher than the next in ranking (5 to 14 years), and 3.8 higher than

the group with the lowest rate (65 to 74). In 2001, the youngest age group was 3.7 times higher than the second in ranking (75 and older) and 5 times higher than the group with the lowest rate (15 to 24).
In most age groups the incidence rates were higher in females than in males both in 1987 and 2001 with the exception of the youngest age group and the oldest age group. The differences in the rates between males and females became larger between 1987 and 2001 for most age groups.

Figure 8.2 Incidence rates of respiratory infections in 1987 and 2001 by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**0.60**	**0.39**	**0.43**	**0.44**	**0.49**	**0.58**	**0.62**
Female/male ratio							
1987	0.95	**1.11**	**1.32**	**1.21**	**1.11**	1.00	**0.78**
2001	**0.90**	**1.06**	**1.61**	**1.66**	**1.39**	**1.15**	0.96

Bold p<0.05

Incidence rates of upper respiratory tract infections and lower respiratory tract infections

Although the respiratory tract is a single contiguous unit, it is also useful practice to separate it in a lower and upper tract, because their diseases differ and have different significance in severity and course. In table 8.4 we present separate incidence rates for upper and lower respiratory tract infections (URTI and LRTI).

In Table 8.4 we present the incidence rates of upper respiratory tract infections and lower respiratory tract infections.

The incidence rate of upper respiratory tract infections dropped from 273.3 to 144.7 (2001/1987 ratio 0.53); the rate of lower respiratory tract infections decreased from 91.2 to 32.1 (2001/1987 ratio 0.35). However, when we excluded influenza from the lower respiratory tract infections, the ratio was 0.49.

In appendix 8.2 we demonstrate that the proportional the contribution of each individual disease to the total of upper respiratory tract infections was stable between 1987 and 2001; in both years the combination R74-R05-R07 (common cold) constituted about 60 percent of all upper respiratory tract infections.

The fact that the proportional decline of lower respiratory tract infections was about the same as for upper respiratory tract infections demonstrates that it were not only the minor ailments that showed a decrease.

Table 8.4 The incidence rates of upper respiratory tract infections and lower respiratory tract infections in 1987 and 2001 and the 2001/1987 ratios; per 1000 per year.

		1987 /1000	**2001 /1000**	***ratio 2001/1987***
R72	Streptoc throat	1.1	1.3	*1.21*
R75	sinusitis	35.9	22.1	***0.62***
R76	acute tonsillitis	22.8	10.0	***0.44***
R77	laryngitis/tracheitis	14.0	4.1	***0.29***
R74-R05-R07	Total Common cold	170.7	88.5	***0.52***
R90	chronic tonsillitis	2.0	2.0	*1.00*
H71	otitis media	26.9	16.5	***0.61***
All	**Upper respiratory tract infections**	**273.3**	**144.7**	***0.53***
	Lower respiratory tract infections (LRTI)			
R78	bronchitis	48.1	21.5	***0.45***
R81	pneumonia	9.2	6.4	***0.70***
R71	whooping cough	1.2	0.9	***0.75***
R70	tuberculosis (primary)	0.1	0.0	
R83	Other RTI	3.9	1.1	***0.28***
	LRTIs all without influenza	62.5	30.0	***0.48***
R80	influenza	28.7	2.1	***0.07***
All	**LRTIs (incl influenza)**	**91.2**	**32.1**	***0.35***

Bold p<0.05

8.3.3 Incidence of skin infections

Skin infections form a heterogeneous group of disorders. We arranged them according to pathogen in bacterial, viral, fungal and parasitic infections.

The incidence of skin infections remained stable between 1987 and 2001 with a rate of 91 and 89 per 1000, respectively.
The incidence rate in males was in 2001 5% lower than in 1987 (p=0.002), the

rate in females did not differ statistically significantly between 1987 and 2001. Females presented in 1987 5% more skin infections than males (p=0.03) and in 2001 13% (p<0.001) (table 8.5).
Between 1987 and 2001 the rates in the three SES groups were approximately similar.
The small difference between the lowest and highest SES in 1987 (p=0.003), disappeared in 2001.

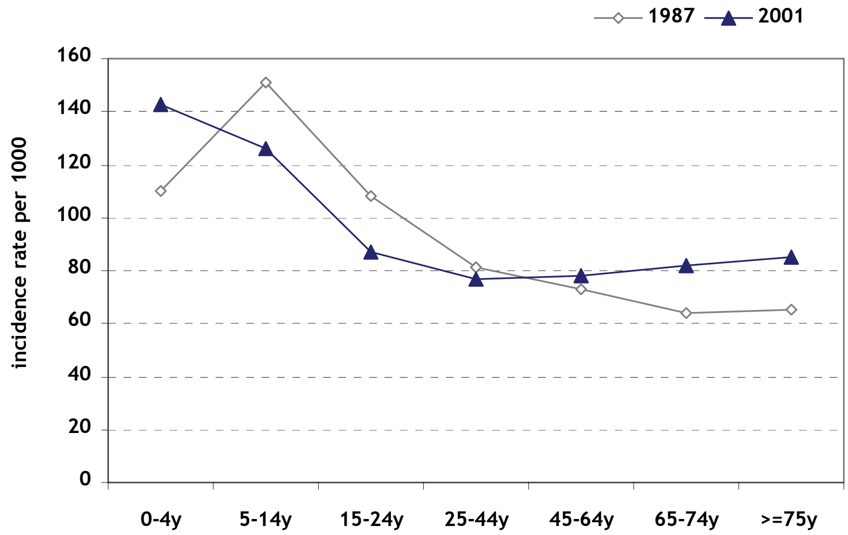
Table 8.5 Incidence rates of skin infections in 1987 and 2001 by sex and SES (per 1000 per year) and ratios

	1987 /1000	**2001** /1000	***Ratio*** *2001/1987*
Incidence rate per 1000 per year	91	89	*0.99*
SEX			
Male	88	84	***0.95***
Female	93	95	*1.02*
Female/male ratio	***1.05***	***1.13***	
SES			
Lowest	95	92	*0.96*
Middle	89	93	***1.04***
highest	85	90	*1.06*
Lowest/highest SES	***1.11***	*1.02*	

Bold p<0.05

In 2001 the incidence rates were higher than in 1987 in children below five years and in persons of 45 years and older (figure 8.3).
The incidence rates of skin infections in females were in 1987 only in the age group 65 to 74 higher than in males; in all other age groups the difference in rates was statistically not significant. In 2001 the incidence rates in females were higher than in males in all age groups with the exception of the youngest age group, in which the rates did not differ significantly.

Figure 8.3 Incidence rates of skin infections in 1987 and 2001 by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**1.30**	**0.83**	**0.81**	0.96	**1.07**	**1.29**	**1.30**
Female male ratio							
1987	1.08	1.03	1.03	1.03	1.02	**1.33**	1.12
2001	1.05	**1.06**	**1.34**	**1.12**	**1.13**	**1.16**	**1.19**

Bold p<0.05

In table 8.6 we present the incidence rates of the individual diseases which compose together the skin infections and clustered them according to pathogen. The most striking finding is that the incidence of fungal skin infections increased from 24.7 to 36.5 per 1000 (2001/1987 ratio 1.48); in the youngest age group and in persons of 65 years and older fungal skin infections more than doubled between 1987 and 2001 (data not shown).
Bacterial skin infections decreased, but remained stable in the youngest age group and in the two eldest age groups (not in table).

Table 8.6 The incidence rates of skin infections according to pathogen in 1987 and 2001 (per 1000 per year) and the ratio 2001/1987

		1987 /1000	**2001** /1000	*2001/1987 ratio*
Bacterial skin infections				
S09	Infected finger/toe	6.4	4.2	***0.66***
S10	Boil/carbuncle	7.1	3.2	***0.45***
S11	Skin infection localised	4.7	8.0	***1.70***
S84	Impetigo	6.2	6.2	*1.00*
S85	pilonidal cyst/fistula	0.4	0.3	***0.75***
R73	Boil/abcess nose	0.2	0.4	***2.00***
S76	Erysipelas/erytrasma	7.1	5.1	***0.72***
	bacterial all	**32.1**	**27.3**	***0.85***
Viral skin infections				
S03	Warts	20.3	17.0	***0.84***
S95	mollusc contagiosum	2.5	2.2	***0.87***
S70	herpes zoster	4.1	3.0	***0.72***
S71	herpes simplex	3.2	1.6	***0.51***
S90	Pityriasis rosea	1.8	1.0	***0.57***
	viral all	**32.0**	**24.8**	***0.78***
Fungal skin infections				
S74	Dermatophytosis	21.1	31.2	***1.48***
S75	Moniliasis/candidiasis skin	3.6	5.3	***1.47***
	fungal all	**24.7**	**36.5**	***1.48***
Parasitic skin infections				
S72	Scabies	0.6	0.3	***0.51***
S73	pediculosis	1.2	0.3	***0.27***
	parasitic all	**1.8**	**0.6**	***0.33***

Bold p<0.05

8.3.4 Incidence of gastrointestinal infections

The incidence rate of gastrointestinal infections dropped by 47% from 33.1 per 1000 in 1987 to 17.7 per 1000 in 2001 (Table 8.7).

The rates were virtually similar in males and females in 1987 and 2001.

The gap between the incidence rate of the lowest and highest SES group became smaller between 1987 and 2001: in 1987, the rate in the lowest SES was 54% higher than in the highest SES group; in 2001, this was diminished to 17%.

Table 8.7 Incidence rates of gastrointestinal infections in 1987 and 2001 by sex and SES (per 1000 per year) and ratios

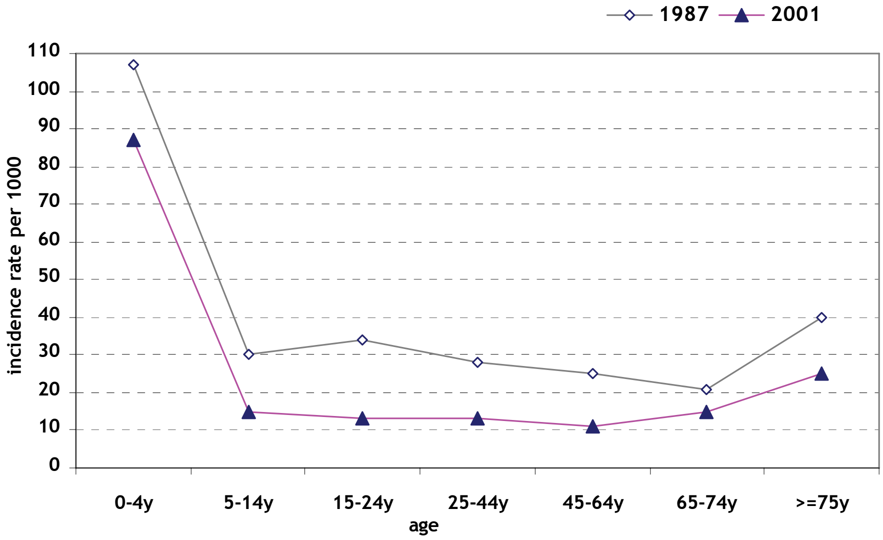
	1987 /1000	**2001** /1000	***2001/1987*** *Ratio*
Diarrhoea (D11)	3.8	6.7	***1.76***
gastrointestinal infection (D70)	1.5	1.0	***0.63***
gastroenteritis presumed infection D73)	27.8	10.0	***0.36***
Infectious diarrhoea (D11,D70,D73)	33.1	17.7	***0.53***
SEX			
Male	32.8	17.0	***0.52***
Female	33.3	18.3	***0.54***
female/male ratio	*1.02*	***1.08***	
SES			
Lowest	38.9	18.9	***0.49***
Middle	32.2	17.4	***0.54***
highest	25.3	16.1	***0.64***
lowest/highest SES ratio	***1.54***	***1.17***	

Bold $p<0.05$

In all age groups the incidence rates of gastrointestinal infections were lower in 2001 than in 1987 (figure 8.4). The peak rates occurred in the youngest age group: in this age group the fall in incidence between 1987 and 2001 was less (19%) than in the other age groups (28-61%). Between the age of 15 to 74 the

distribution across the age groups remained stable in 1987 and 2001, whereas in the oldest age group the rates rose slightly.
The incidence rates in males and females differed in 1987 only significantly in one age group (65 to 74); in 2001 males in the youngest age group had a 19% higher rate, from the age of 15 years onwards females had higher rates.

Figure 8.4 Incidence rates of gastrointestinal infections by age in 1987 and 2001; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**0.81**	**0.50**	**0.39**	**0.44**	**0.43**	**0.72**	**0.62**
Female/male							
1987	0.90	1.00	0.91	0.97	1.04	**2.32**	1.22
2001	**0.81**	0.91	**1.73**	**1.21**	1.05	**1.24**	1.52

Bold p<0.05

8.3.5 Incidence of infections of the eyes

Infections of the eyes were the only cluster of infectious disease with a higher incidence rate in 2001 than in 1987: the rate in 2001 was 60% higher than in 1987.
The rise in infectious conjunctivitis was mainly responsible for this increase (Table 8.8). We may assume that most cases of red eye (F02) and eye discharge (F03) involved also persons with an infectious conjunctivitis.
The proportional increase in incidence between 1987 and 2001 was similar for males and females. Women were slightly more often affected than men: in 1987, they had a 15% higher rate; in 2001, their rate was 17% higher.
The proportional increase was roughly similar for the three SES groups. In 1987, the lowest/highest SES group gradient was not statistically significant; in 2001, the incidence in the lowest SES group was 17% higher than in the highest group.

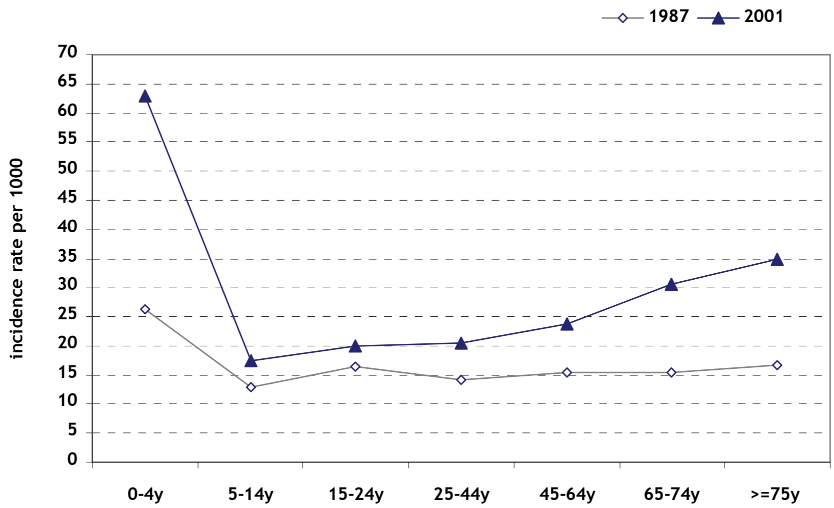
Table 8.8 Incidence rates of infections of the eyes in1987 and 2001 by sex and SES (per 1000 per year), and ratios

	1987 /1000	**2001 /1000**	***2001/1987 ratio***
F02 red eye	0.4	2.1	***6.00***
F03 eye discharge	0.2	1.6	***9.45***
F70 infectious conjunctivitis	7.4	14.0	***1.89***
F72 Blepharitis/Chalazion/Stye	5.3	5.7	*1.08*
F73 Eye infection/ other	2.3	1.4	***0.61***
All eye infections	15.5	24.8	***1.60***
SEX			
Male	14.4	22.9	***1.59***
Female	16.5	26.7	***1.62***
Female/male ratio	***1.15***	***1.17***	
SES			
Lowest	15.9	27.8	***1.74***
Middle	14.8	24.6	***1.67***
highest	14.6	23.9	***1.64***
Lowest/highest ratio	*1.09*	***1.16***	

Bold: p<0.05

In 2001 the incidence rates were higher than in 1987 across all age groups. The youngest age group had in both years by far the highest rates (figure 8.5); in 2001, the difference with other age groups was larger than in 1987. In the middle age groups the rates of the both years converged, while diverging again from the age of 65 onwards.
Both in 1987 and 2001, the incidence in females was higher in the age from 5 to 44. In the age group 45 to 64 there was a reversal; in 1987 the rate in females was 23% lower than in males (p=0.04), whereas it was 17% higher in 2001 (P<0.001). In the youngest age group and from the age of 65 ears onwards the differences between females and males were statistically not significant.

Figure 8.5 Incidence rates of eye infections of the eyes by age in 1987 and 2001; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	≥ 75y
2001/1987	**2.40**	**1.35**	**1.23**	**1.45**	**1.55**	**1.98**	**2.10**
Female/male ratio							
1987	1.09	**1.47**	**1.37**	**1.41**	**0.77**	0.94	1.40
2001	0.94	**1.29**	**1.30**	**1.24**	**1.17**	1.00	1.14

Bold p<0.05

8.3.6 Incidence of urinary tract infections

It is useful to make a distinction between the common lower urinary infections (cystitis) and the uncommon upper urinary infections (pyelitis). Lower urinary tract infections are generally considered to be infections of the bladder, but strictly speaking prostatitis, epidydimitis, and orchitis are also lower urinary tract infections. However, these disorders are mostly classified as sexually transmitted infections. We will not include them here under the lower urinary tract infections.

Like most infections, the incidence rate of urinary tract infections decreased

between 1987 and 2001 by 28%. More than 95 per cent of all urinary tract infections were bladder infections.
In 1987, the rate of urinary tract infections was more than five times higher in females than in males; in 2001, the rate was nearly 8 times higher in females. Between 1987 and 2001 the rate in males went down by 47%, the rate in females by 21%.
Both in 1987 and 2001, the incidence of urinary tract infections was higher in the lowest SES group compared with the highest SES group: the gap became wider from 60% in 1987 to 111% in 2001.

Table 8.9 incidence rates of urinary tract infections by sex and SES; per 1000 per year

	1987 /1000	**2001** /1000	*2001/1987 ratio*
Pyelonephritis/pyelitis (U70)	1.2	0.7	***0.58***
Cystitis (U71)	45.7	33.3	***0.73***
urinary tract infections	46.9	34.0	***0.72***
SEX			
Males	14.9	7.9	***0.53***
Females	75.8	59.8	***0.79***
Female/male ratio	***5.10***	***7.56***	
SES			
lowest	51.2	48.4	*0.95*
middle	44.9	33.9	***0.75***
highest	31.9	23.0	***0.72***
Lowest/highest SES ratio	***1.60***	***2.11***	

Bold p<0.05

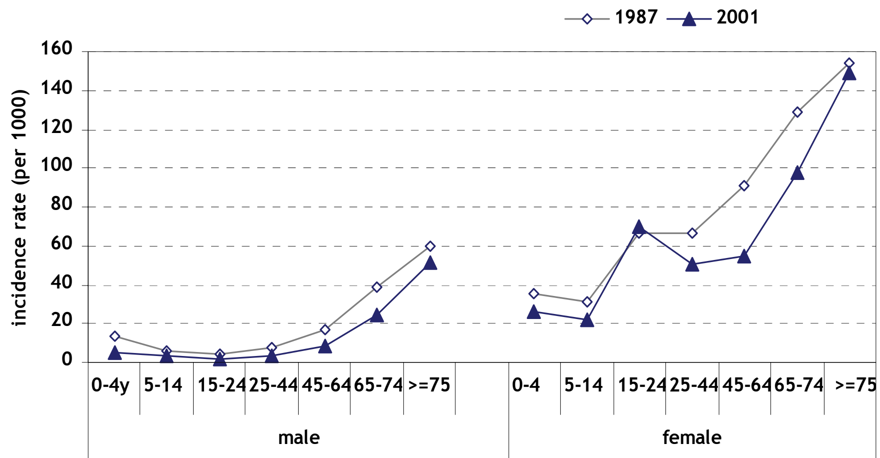
Because urinary tract infections have a different meaning in males and females, we will present the rates for age groups separately for both sexes [1] (figure 8.6).
In males both in 1987 and 2001 the incidence rate for the youngest group was higher than for males from 5 to 44 years; the group from 45 years and older

surpassed the rates of the youngest group and became higher in each older age group.

In females, we saw both in 1987 and 2001 the same irregular pattern across the age groups.

The incidence rates were the lowest in the two youngest age groups in 1987 as well as in 2001. In 1987 the incidence in the age group 15 to 24 years and 25 to 44 years was similar, whereas in 2001 the incidence in the 15 to 24 years group was clearly higher than in the 25 to 44 years group (70 vs. 51 per 1000). From the age of 65 years onwards there was a steep rise in incidence in 1987 and 2001.

Figure 8.6 incidence rates of urinary tract infections by sex and age; per 1000 per year



	male								female						
	0-4y	5-14	15-24	25-44	45-64	65-74	>=75		0-4	5-14	15-24	25-44	45-64	65-74	>=75
1987	13	6	4	8	17	39	60		36	32	66	67	91	129	154
2001	5	3	1	4	8	24	51		26	22	70	51	55	97	149

2001/1987	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	≥ 75y
Male/male	**0.38**	**0.52**	**0.31**	**0.45**	**0.50**	**0.63**	0.86
Female/fem	**0.73**	**0.70**	1.06	**0.76**	**0.60**	**0.75**	0.97

Bold p<0.05

We refrained from adding dysuria (U01) and urinary frequency (U02) to the cluster urinary tract infections. However, it is conceivable that GPs used these

ICPC codes in a number of cases to record urinary tract infections [*].

8.4 Discussion

Summary

Overall

(see table 8.10)

- The strongest decline in incidence rates between 1987 and 2001 occurred in *gastrointestinal infections and respiratory tract infections.*
- The proportional contribution of *respiratory tract infections* to the total of all infectious diseases dropped from 55 to 44 per cent.
- The incidence of *skin infections* remained stable, the proportional contribution of *skin infections* rose from 14 to 22 per cent.
- *Infections of the eyes* were the only cluster with a rising incidence between 1987 and 2001; the incidence rate increased by 60% and their proportional contribution increased from 2% to 5%.

By sex, age an SES

- The incidence of infectious diseases was higher in females than in males; the gap in incidence rates between males and females increased between 1987 and 2001 from 23% to 37%.
- The incidence of infectious diseases is higher in the lowest SES group than in the highest SES group; the gap in incidence rates between the lowest and the highest SES group decreased between 1987 and 2001 from 38% to 14%.
- The decrease in the gap between the lowest and highest SES group was most marked for respiratory tract infections and for gastrointestinal infections.
- The SES differences in incidence rates of urinary tract infections showed an unaltered large socioeconomic gradient.
- The decline in incidence rate between 1987 and 2001 was most pronounced for persons in the age from 5 to 64 years.

[*] We calculated what the incidence rates of urinary tract infections would have been, if we had included these two ICPC codes The outcome was that the incidence of urinary tract infections would have been 49 per 1000 instead of 47 per 1000 in 1987 and 38 per 1000 instead of 34 per 1000 in 2001.

- The decline in incidence between 1987 and 2001 was least for the two elderly age groups.
- The peak incidence rates occurred in the youngest age group with the exceptions of infections of the skin and urinary tract infections both in 1987 and 2001.

Table 8.10 Incidence rate of discussed clusters (per 1000 per year, proportional contribution of each cluster to the total of infectious diseases.

	1987		**2001**	
	incidence	*%*	incidence	*%*
Respiratory tract infections	365	*55*	177	*44*
Skin infections	91	*14*	89	*22*
gastrointestinal infections	33	*5*	18	*4*
Infections of the eyes	16	*2*	25	*6*
Urinary tract infections	47	*7*	34	*8*
Infections not discussed	114	*17*	58	*15*
Total of infectious diseases	666	*100*	401	*100*
Total of new episodes	1827		1397	

Reflections on the differences between 1987 and 2001

We examined the incidence rates of infectious diseases in general practice in 1987 and 2001. Infections accounted for 37% of all new episodes of illness in 1987 and 29% in 2001. In data from the fourth practice-based national morbidity survey in the UK conducted in 1991 and 1992, Fleming found that infections constituted 40% of all new episodes[2].

Both in 1987 and 2001, incidence rates were highest in children aged less than 5 years and lowest in the age from 15 to 64 years. Except in the age group 0 to 4 years rates were higher in females.

Differences in incidence between 1987 and 2001 may have arisen for several reasons, some of which will be considered below.

Besides real differences in the incidence rate of infectious diseases in the population, the number of infections presented to GPs can be caused by any combination of changes in characteristics of the population, changes in the characteristics of general practice, by changes in the health care system and by changes in the methodological characteristics. We will try to link the changes we will discuss below to one or more of these causes.

Real differences in incidence

Vaccination campaigns are a major reason for a decline in the incidence rate of an infectious disease. We can illustrate this with several examples.

In 1996 the implementation of vaccination against influenza for all persons of 65 years and older and for specific groups at risk was laid in the hands of GPs. The proportion of vaccinated persons from high risk groups went up from 28% in 1991 to 77% in 1999 and stabilised at 75% in 2001[3]. In 1987 the incidence of influenza was 28.5 per 1000 persons, in 2001 this came down to 2.1 per 1000.

In 1987 babies were not vaccinated for mumps and haemophilus influenzae.

Mumps (D71) was virtually eradicated after it was included in the vaccination scheme : in 2001 only 17 cases were recorded by our GPs. The effect of the vaccination against haemophilus influenzae is less easy to evaluate, but it is conceivable, that it has contributed to the decrease in respiratory tract infection between 1987 and 2001.

A possible reason for the rise in *eye infections* from the age of 14 years onwards is the increasing number of people that wear contact lenses. In 2001, the Health Council of the Netherlands issued a report on the risks of contact lenses[4] . In 1999 more than ten per cent of the population of twelve years and older were wearing contact lenses, amounting to a total of 1.4 million people. The available literature[5] showed that at least six per cent will develop contact lens related eye problems. For the Dutch situation this would mean about 80,000 new cases every year

The increase in *skin and eye infections* in the youngest age group may be due to more toddlers and children spending their days in day care centres (nurseries) in 2001 than in 1987. The level of crowding by living in groups will bring about closer contact with other children and this can result in more infections.

However, we should also consider a changed consultation pattern as reason for the increased incidence rates of skin and eye infections. Day care providers are usually very concerned when seeing children with signs of a skin or eye infection and insist on treatmentIt is likely that this resulted in more consultations for these infections.

However, how to explain the reduced presentation of respiratory tract infections in this age group? After all, the same mechanism (crowding) is operating, and this should result in a higher attack rate of respiratory tract infections for young children. Nevertheless, we established that the number of presented infections fell by 40% between 1987 and 2001.
A possible explanation could be that skin- and eye infections are highly visible. When a child with such an infection is brought to the centre, staff and parents of the other children are often worried that the infection will spread to other children. The parents will be pressurised to seek medical treatment. On the other hand, respiratory tract infections are considered so much part of the daily life of toddlers, that their occurrences give rise to less anxiety and to less pressure to seek medical aid. In addition, when children with respiratory tract infections would be barred, very few children would attend the day care centres in the high season.

The rate of *fungal infections* was in 2001 higher than in 1987. Several explanations can be postulated for this rise. Firstly, plastic pants and synthetic footwear were more frequently used in 2001. A supplemental reason for the higher incidence rates could be that in the nineties new drugs became available for fungal infections and this was accompanied by intensive marketing campaigns directed at doctors and patients. The increase in the incidence rate of fungal infections may be due to a “real” increase and to changes in the attitudes of GPs and patients.

The reduction of *gastrointestinal infections* could point to improvements in hygienic living conditions. The gap in incidence rate between the highest and lowest SES group was in 2001 less than in 1987. Traditionally, hygienic conditions are worse in the lower SES groups. The narrowing gap - just like in skin infections-, is an indication that the lower SES groups caught up in hygienic living conditions.
Obviously, we should always be aware that changes in incidence rate between two periods can be caused by variation in epidemics. However, because we considered a broad range of infections, it is unlikely, that an epidemic of one of the infectious diseases would affect the overall incidence of infections to a large extent.

Changes related to the population

Patients bypassing their GP

In the Netherlands GPs are gatekeepers for most disorders, but patients may seek medical care for sexually transmitted infections directly from a municipal health service or STI clinic without referral by a GP. In the four largest cities, there are STI clinics that offer free and anonymous care. Some have treatment facilities for STI and other collaborate with STI clinics or dermatovenerological departments.

Van Bergen et al interviewed within the framework of the NS2 9,687 persons of 18 years and older about their STI-related health care seeking behaviour: 63% of the interviewees consulted their GP for these complaints [6].

Changes in help-seeking behaviour

Over time, attitudes to illness can also change in a population resulting in another consultation behaviour with as a consequence an altered presentation of health problems. We found a confirmation of this assumption in the publication of Cardol[7] . Cardol found that in 2001 patients were less inclined to consult their GP for minor ailments than in 1987 (see chapter 2). This runs parallel with the results that we presented in this chapter.

Because most infectious diseases are self limiting, this is a welcome development. It means also that the educational efforts of GPs with the aim to encourage patients to use self-care, enforced by campaigns with information leaflets of the Dutch College of GPs, may have been successful.

Changes related to general practice

In Dutch general practice there has always been a policy a policy of restraint in prescribing antibiotics. The NHG guidelines joined this tendency and stressed the limited place of antibiotics in the treatment of many infections.

The reactions of GPs on presented health problems influence subsequent consultation behaviour of patients.

Otters et al studied changes in antibiotic prescribing patterns for children aged from 0 to 17 between 1987 and 2001 in the populations of the NS1 and NS2 [8]. They found that the annual population-based prescription rates decreased from 300/1000 children (in 1987 to 232/1000 children in 2001. It is quite conceivable that guidelines and leaflets changed the attitudes of doctors and patients with as final result that the presentation of infections in general practice went down; GPs were more restrained in the prescribing of antibiotics and patients were less inclined to present to present minor ailments to their

GP. This can be seen as a demedicalisation of respiratory tract infections.

Changes related to the health care insurance

The incidence rate of *worms (D22)* dropped from 13.7 to 1.3 per 1000 (data not shown). The majority of these cases were suffering from oxyuriasis. In 1987, patients needed a prescription to obtain mebendazol from the pharmacy for treatment; in 2001, mebendazol could be purchased “over-the counter” and the cost of this drug was not longer compensated for by the health care insurance.
Some antitussive drugs, that in 1987 didn’t need a prescription, but were reimbursed on prescription, were in 2001 not reimbursed anymore even when prescribed by a health care provider. We presume that this is one of the reasons of the drop in the presentation of respiratory tract infections.

Methodological characteristics

We presume that the differences we found were not caused by the methodological differences between 1987 and 2001. We have discussed these differences in extenso in chapter 6 and come back on this subject in chapter 20.

8.5 Conclusion

The most significant finding is that patients presented fewer infectious diseases in 2001 than in 1987. This runs counter to the popular notion, that the threshold for consulting a GP has become lower over the last decade.
Several reasons can be held responsible for this decline in the incidence rate of infectious diseases. *Vaccination schemes* and c*hanges in the insurance package* were responsible for some of the reductions in incidence rate, however, these changes explain only part of the reduction, because they concern only a limited number of disorders.

Because it is unlikely that the morbidity of infectious diseases has really gone down as much as we found, the main cause of the reduced incidence rate must be a *change in help seeking behaviour*. For infectious diseases, the submerged portion of the iceberg has become larger.
We found a confirmation of this assumption in the publication of Cardol.

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Chapter 9

The incidence of health problems related to the musculoskeletal system in 1987 and 2001

9.1 Introduction

Problems of the musculoskeletal system are very common in general practice. They comprehend a wide range of health problems related to muscles, bones, joints, tendons and ligaments. Their consequences vary from short periods of local pain without a specific diagnosis to progressive diseases like osteoarthritis or rheumatoid arthritis.
Because GPs are so frequently consulted for musculoskeletal problems, it is of great importance for them to develop the skills and the ability to recognize important patterns of pain and associated physical signs for making a correct diagnosis. In most cases radiographic and laboratory examinations are not needed. Diagnostic facilities should be utilized judiciously and must be interpreted in the light of existing clinical findings and a priori suspicion for specific diagnoses.

The social impact of health problems of the musculoskeletal system is large. They result in substantial utilisation of health services absenteeism from work and (long-term) disability.[1]
In the Netherlands 26% of the functional disability in the population can be attributed to musculoskeletal disease.[2] About 6% of the total healthcare costs are spent on musculoskeletal problems second only to mental problems but ranking higher than cancer and cardiovascular diseases.[3]

The aim of this chapter is to compare incidence rates between 1987 and 2001 for a number of disorders of the musculoskeletal system: we included the incidence rate of all musculoskeletal disorders dorsopathies problems of the upper extremity and problems of the lower extremity. In addition, we composed a cluster of problems of the neck, upper extremities and carpal tunnel syndrome because together they form the “the repetitive stress injury” (RSI) also denoted as “work related upper limb disorder”.
Complaints related to these chosen health problems are a common reason for consulting a GP and are responsible for the major part of the costs of the musculoskeletal system.

Summarising the aim of this chapter is to compare the incidence between 1987 and 2001 by sex SES and age for

- all health problems related to the musculoskeletal system;
- dorsopathies;
- health problems related to the upper extremities;
- health problems related to RSI;
- health problems related to the lower extremities.

9.2 Methods

We distinguished the following clusters: dorsopathies, problems related to the upper extremities, RSI and problems related to the lower extremities. These clusters were composed from symptoms and diagnoses of the musculoskeletal system (ICPC chapter L); in the case of RSI, the carpal tunnel syndrome, one of the diagnoses of the neurological system (chapter N) was added.

The composition of these clusters can be found in table 9.1 .

Using the same data of the second Dutch national survey of general practice Bot et al[4] reported about the incidence density of complaints of the neck and upper extremity and Van der Waal et al[5] reported about the incidence density of complaints of the lower extremity. We used the same clusters but calculated the slightly different incidence rate instead of the incidence density and additionally we made a comparison with the data from the first Dutch national survey.

Table 9.1 ICPC codes of the musculoskeletal system with clusters

Cluster	Code	Description	
Dorsopathies		***Back symptoms/ complaints/disorder***	
	L03	Low back symptom/complaint	
	L86	Low back syndrome with radiation	
	L02	Back symptom/complaint	
	L85	Acquired deformity of spine	
	L84	Osteoarthose/spondylosis spine	
		Neck symptom/complaints/disorders	RSI
	L01	Neck symptom/complaints	RSI
	L83	Syndrome cervical/neck	RSI
Upper extremity		***Shoulder symptom/complaint/disorders***	RSI
	L08	Shoulder symptom/complaint	RSI
	L92	Shoulder syndrome	RSI
		Arm elbow wrist hand complaints	RSI
	L09	Arm symptom/complaint	RSI
	L10	Elbow symptom/complaint	RSI
	L93	Tennis elbow	RSI
	L11	Wrist symptom/complaint	RSI
	L12	Hand/finger symptom/complaint	RSI
	N93	Carpal tunnel syndrome	RSI
Lower extremity		***Lower limb symptoms/complaints***	
	L13	Hip symptom/complaint	
	L14	Leg/thigh symptom/complaint	
	L15	Knee symptom/complaint	
	L16	Ankle symptom/complaint	
	L17	Foot/toe symptom/complaint	
		Injuries and diseases lower limb	
	L77	Sprain/strain of ankle	
	L78	Sprain/strain of knee	
	L96	Acute internal damage knee	
	L97	Chronic internal damage knee	
	L89	Osteoarthrosis of hip	
	L90	Osteoarthrosis of knee	

All incidence rates presented in this chapter were standardised for age according to the age distribution of the Dutch population on 1 January 2001.

9.3 Incidence rates of health problems related to the musculoskeletal system in 1987 and 2001

9.3.1 Overall incidence rates

The overall incidence rate for musculoskeletal conditions was 330 per 1000 in 1987 and 267 per 1000 in 2001 (table 9.2). This implies that the rate in 2001 was 19 per cent lower than in 1987.
The incidence rate in males was in 2001 25 per cent lower than in 1987 (241 vs. 324 per 1000) and in females the rate was 12 per cent lower (294 vs. 324 per 1000). The ratio females/males was 1.03 in 1987 (p=0.001) and 1.22 in 2001
In the three SES groups the rates were lower in 2001 than in 1987. There was a marked socioeconomic gradient in both years; the lowest/highest SES ratio was 1.55 in 1987 and 1.63 in 2001.

Table 9.2 Incidence rates health problems musculoskeletal system in 1987 and 2001 by sex and by SES (per 1000 per year) ratios

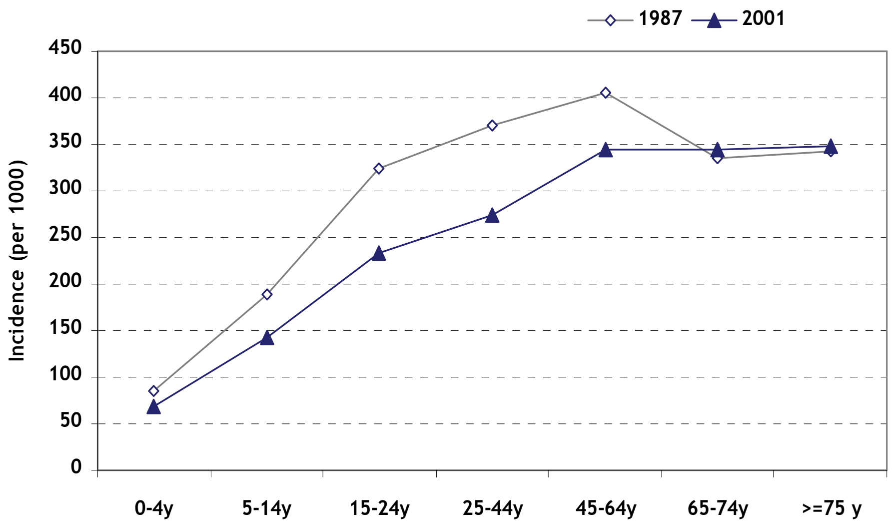
	1987 /1000	**2001 /1000**	***2001/1987 ratio***
All	330	268	***0.81***
SEX			
Male	324	241	***0.75***
Female	334	294	***0.88***
Female/male ratio	***1.03***	***1.22***	
SES			
Lowest	383	348	***0.91***
Middle	330	275	***0.83***
highest	246	213	***0.87***
Lowest SES/highest SES ratio	***1.55***	***1.63***	

Bold p<0.05

The incidence rates were in 2001 lower than in 1987 in the age groups below 65; in patients from 65 years and older the rates were about similar (figure 9.1). In 1987 the incidence peaked in the age group 45 to 64 and fell by 15% in the two older age groups. In 2001 the incidence rates reached also the highest level in the age group 45 to 64 but the rate remained at the same level in the two oldest age groups.

Both in 1987 and 2001 from the age of 45 onwards the incidence in females was higher than in males. The age groups below 45 had a different female/male patterns in 1987 and 2001: in the age from 15 to 44 the rates were lower in females than in males in 1987 whereas in 2001 the rates were higher in males. In the youngest age group there was no difference between the sexes in 1987 in 2001 the incidence in males was 11% higher than in females.

Figure 9.1 Incidence rates of health problems of musculoskeletal system by age in 1987 and 2001; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**0.81**	**0.75**	**0.72**	**0.74**	**0.85**	1.03	1.02
Female/male ratio							
1987	*0.98*	***1.19***	***0.89***	***0.83***	***1.18***	***1.48***	***1.55***
2001	***0.89***	*1.03*	***1.08***	***1.14***	***1.26***	***1.43***	***1.44***

Bold p<0.05

9.3.2 Incidence rates of dorsopathies

The incidence rates of neck and cervical syndromes increased from 8 per 1000 in 1987 to 19 per 1000 in 2001; the incidence of low back pain declined from 43 per 1000 in 1987 to 36 per 1000 in 2001 whereas the rate of the category “other backpain” increased from 14 to 15 per 1000 (table 9.3).
In 1987 males had higher rates than females (ratio 0.94; p= 0.022) whereas in 2001 the rate in females was 22% higher than in males in 2001.
In all the three SES groups the incidence rates were higher in 2001 than in 1987. The lowest/highest SES ratio remained the same between 1987 and 2001.

Table 9. 3 Incidence rates of dorsopathies by sex and SES (per 1000 per year) and 2001/1987 ratio’s female/male ratio and lowest/highest SES in 1987 and 2001

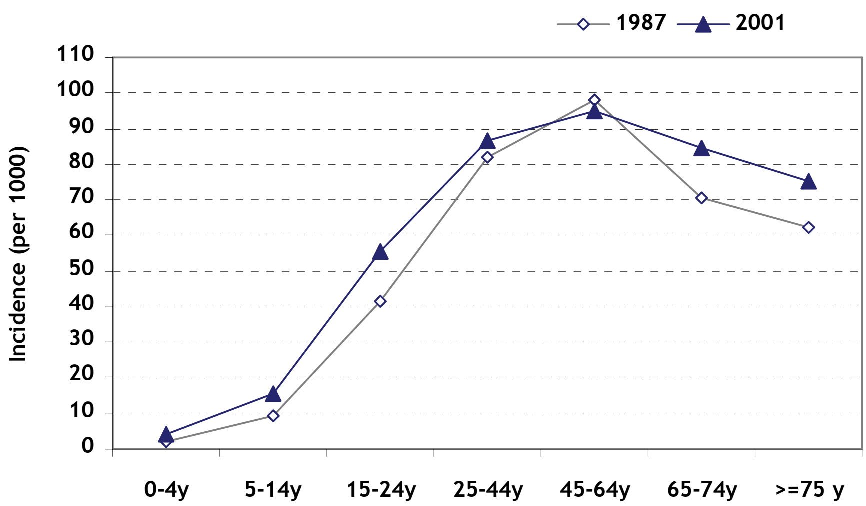
	1987 /1000	**2001 /1000**	***2001/1987 ratio***
Neck syndromes	8.4	19.4	***2.33***
Low back pain	43.1	36.0	***0.83***
Backpain other	13.7	15.0	***1.09***
dorsopathies	65.2	70.4	***1.08***
SEX			
male	67.3	63.6	***0.94***
female	63.3	77.2	***1.22***
female/male	***0.94***	***1.22***	
SES			
lowest	79	93	***1.17***
middle	65	72	***1.10***
highest	46	54	***1.16***
lowest/highest SES	***1.69***	***1.71***	

Bold p<0.05

In all age groups the incidence rate was higher in 2001 than in 1987 with the

exception of the age group 45 to 64: the difference between 1987 and 2001 in this age group was not statistically significant (figure 9.2).
Both in 1987 and 2001 the incidence rates across the age groups showed a similar pattern with a peak incidence in the age from 45 to 64.
The incidence rates in females were higher than in males in 1987 as well as in 2001 in the age group 5 to 14 15 to 24 (in 1987 not statistically significant) and in the age group 65 to 74. In the remaining age groups 1987 and 2001 showed different patterns. This was most outspoken in the age group 25 to 44 years; in this age group the incidence was in 1987 higher in males (21%) than in females however in 2001 the incidence in females was higher.

Figure 9.2 Incidence rates dorsopathies by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**2.21**	**1.69**	**1.35**	**1.06**	0.97	**1.20**	**1.21**
Female/male ratio							
1987	1.84	**1.53**	1.05	**0.79**	1.01	**1.30**	0.95
2001	0.97	**1.44**	**1.47**	**1.21**	**1.12**	**1.20**	**1.30**

Bold <0.05

9.3.3 Incidence of health problems related to the upper extremities

The incidence rates of problems of the upper extremity was 79% higher in 2001 than in 1987: in males it was 56% higher and in females 100% higher (table 9.4).
In 1987 there was no difference in incidence between males and females in 2001 the incidence in females was 26% higher than in males
The incidence rate of the lowest SES group was both in 1987 and 2001 60% to 70% higher than the rate of the highest SES group.

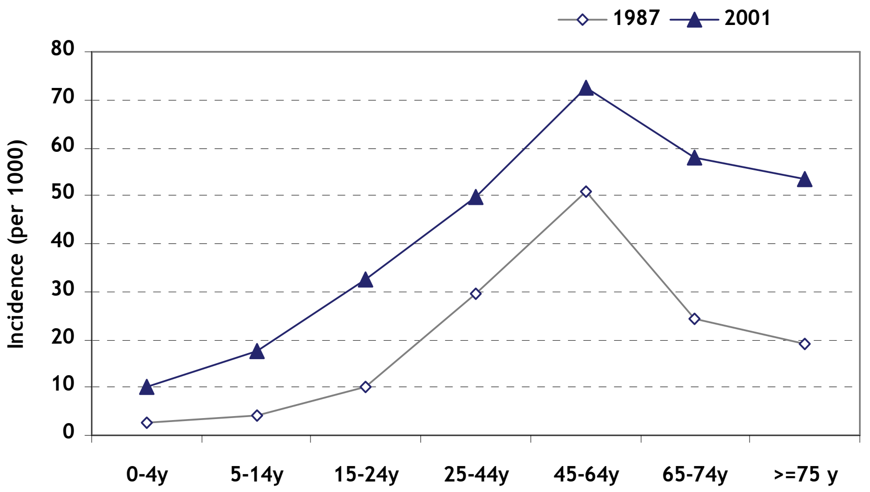
Table 9.4 Incidence rates of health problems related to the upper extremities by sex and SES (per 1000 per year) and ratios

	1987 /1000	**2001** /1000	**2001/1987** ratio
All	26.8	47.7	**1.79**
SEX			
Males	27.1	42.3	**1.56**
females	26.5	53.1	**2.00**
Female/male ratio	*0.98*	***1.26***	
SES			
lowest	31.3	63.1	**2.02**
middle	27.7	49.3	**1.78**
highest	19.6	37.2	**1.90**
lowest/highest SES ratio	***1.60***	***1.70***	

Bold p<0.05

In all age groups the incidence rates went up between 1987 and 2001 (figure 9.3). Proportionally the rise was the strongest in the three youngest age groups (more than three times higher in 2001 than in 1987) and the eldest groups (more than two and a half higher). The peak incidence was in the age group 45 to 64 years. In 1987 the difference between males and females was not statistically significant in all age groups with the exception of the age from 25 to 44 years (ratio 0.85). In 2001 from the age of 15 years onwards all rates were higher in females.

Figure 9.3 Incidence rates of health problems related to the upper extremities by age; per 1000 per year.



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**3.78**	**4.22**	**3.23**	**1.68**	**1.42**	**2.38**	**2.79**
Female/male ratio							
1987	0.38	0.94	1.15	**0.85**	1.03	0.99	1.50
2001	0.95	1.12	**1.22**	**1.28**	**1.21**	**1.29**	**1.51**

Bold p<0.05

9.3.4 Incidence rate of RSI

The incidence rate of RSI was in 2001 89% higher than in 1987 (table 9.5). In females the increase was largest with a 2001/1987 ratio of 2.19. This resulted in a female/male ratio in 2001 of 1.38 whereas this ratio was in 1987 1.07. Both in 1987 and 2001 there was a strong socioeconomic gradient which remained similar (1.6).

Table 9.5 Incidence rates of RSI by sex and SES (per 1000 per year) and ratios

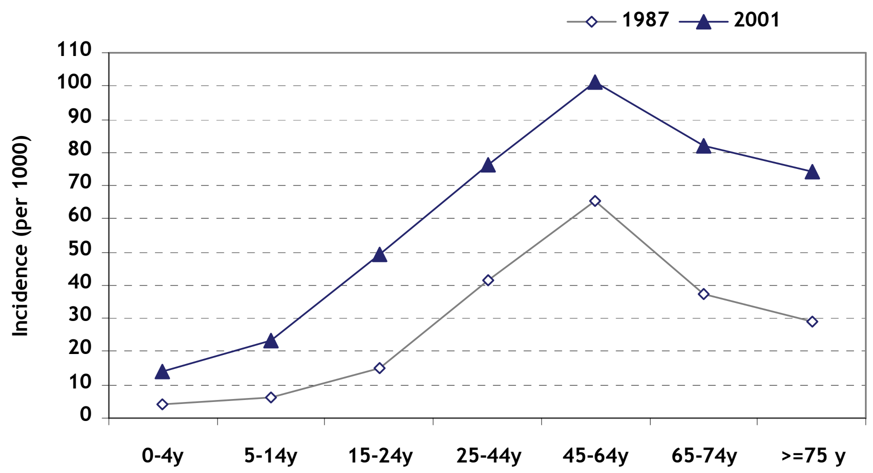
	1987 /1000	**2001** /1000	***2001/1987*** *ratio*
All	36.5	69.1	***1.89***
SEX			
males	34.2	58.1	***1.70***
Female	36.5	79.9	***2.19***
Female/male	***1.13***	***1.38***	
SES			
Lowest SES	41.0	87.4	***2.13***
middle SES	35.8	69.4	***1.94***
Highest SES	24.9	53.4	***2.14***
Lowest/highest	***1.65***	***1.64***	

Bold P<0.05

In 2001 the incidence rates were higher than in 1987 in all age groups (figure 9.4). The age distribution of RSI showed a peak incidence in the age from 45 to 64.

In 1987 solely in the age from 45 to 64 there was a statistically significant difference between female and males; in 2001 from the age of 15 onwards the rate was higher in females than in males below this age the differences were not statistically significant.

Figure 9.4 Incidence rates of RSI by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**3.20**	**3.86**	**3.26**	**1.84**	**1.55**	**2.18**	**2.56**
Female/male ratio							
1987	0.63	0.91	1.24	1.07	**1.16**	1.16	1.39
2001	0.93	1.14	**1.44**	**1.45**	**1.32**	**1.33**	**1.50**

Bold p<0.05

9.3.5 Incidence rates of health problems related to the lower extremities

In 2001 the incidence rates for problems of the lower extremity were 39% higher than in 1987 (64 per 1000 in 2001 and 46 per 1000 in 1987)(table 9.6). This increase was brought about mainly by females. In 1987 males and females had roughly similar incidence rates for problems of the lower extremities in 2001 the incidence rate in females was 19% higher than in males.
For the three SES groups the increase in the incidence rate between 1987 and 2001 was similar the lowest/ highest ratio remained also the same in 1987 and 2001 (1.56).
In appendix 1 the incidence rates of the individual musculoskeletal symptoms and diseases of the lower extremities are shown.
The increase in the incidence rates of problems of the lower extremities was

produced exclusively by an increase in “symptoms”; in 1987 “symptoms” related to problems of the lower extremities amounted to 9 per 1000 whereas in 2001 this was 44 per 1000.
The incidence rates related to “injuries and diseases” fell from 37 per 1000 in 1987 to 20 per 1000 in 2001.

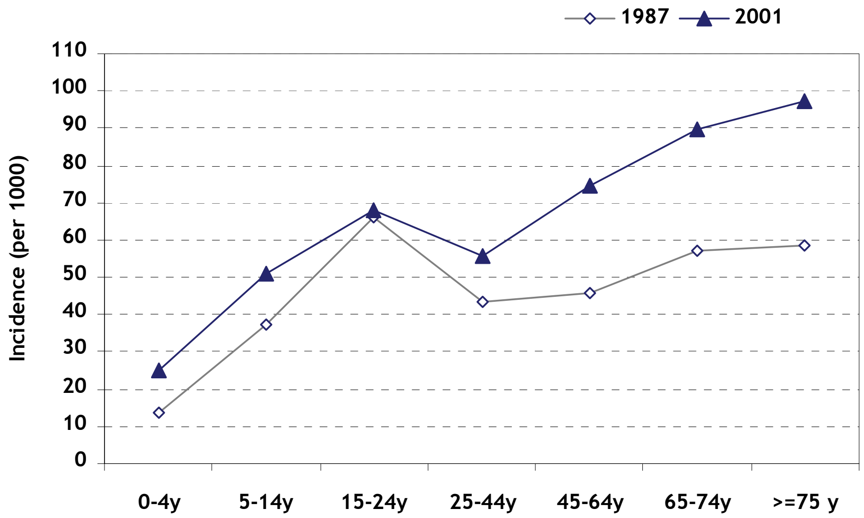
Table 9.6 Incidence rate of lower extremity in 1987 and 2001 for sex and SES (per 1000 per year) and ratio’s

	1987 /1000	**2001** /1000	***2001/1987*** *ratio*
All	46.2	64.2	***1.39***
SEX			
Males	46.6	58.6	***1.26***
females	45.0	69.7	***1.55***
Female/male	*0.97*	***1.19***	
SES			
Lowest SES	51.8	82.4	***1.59***
middle SES	45.4	67.8	***1.50***
Highest SES	33.3	53.0	***1.59***
Lowest/highest	***1.56***	***1.56***	

Bold <0.05

In comparison with 1987 incidence rates were higher in 2001 across all age groups with the exception of those in the age from 15 to 24 (figure 9.5). The largest difference between 1987 and 2001 was in the youngest and eldest age group.
The pattern of distribution across the age groups differed between 1987 and 2001. In 2001 the highest rates were found in the older age groups whereas in 1987 the peak incidence occurred in the age group 15 to 24. Overall in 1987 the differences between the age groups were smaller than in 2001.
Both in 1987 and 2001 the incidence rates were higher in women from the age of 45 onwards below this age the rates in males were in general higher (with the exception in the age group 5 to 14).

Figure 9.5 Incidence rates of health problems related lower extremities by age; per 1000 per year.



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**1.81**	**1.37**	1.02	**1.28**	**1.63**	**1.57**	**1.66**
Female/ male ratio							
1987	0.97	1.17	**0.65**	**0.56**	**1.43**	**2.04**	**2.91**
2001	**0.85**	1.01	**0.90**	0.98	**1.36**	**1.75**	**1.53**

Bold<0.05

9.4 Discussion

Overall the incidence rates of health problems related to the musculoskeletal system (ICPC chapter L) were in 2001 19% lower than in 1987 (chapter 7).
In literature persons with lower socio-economic status are found to suffer more often from musculoskeletal pain[17 18 19] and to consult the general practitioner more often compared to those with a high socio-economic status.[20 21] Our results were congruous with these findings.
For the whole musculoskeletal system the lowest/ highest SES ratio was 1.55 in 1987 and 1.63 in 2001.

When we look at the identified clusters we demonstrated that the incidence rate of dorsopathies remained about similar (2001/1987 ratio 1.08) that the rate of the health problems related to the upper extremities went up by 79% and the rate of problems of the lower extremities by 39%.
First we have to explain how it is possible that the overall incidence rates of the musculoskeletal system were lower in 2001 than in 1987 (19% lower) whereas the incidence rates of the clusters were higher in 2001 than in 1987.
However one should realise that injuries like fractures strains and luxations are part of the musculoskeletal system in the ICPC classification. In chapter 11 we will see that the incidence rates for these injuries were much lower in 2001 than in 1987. In addition there were a number of other health problems of the musculoskeletal system not included in the clusters with a much higher rate in 1987 than in 2001. The two most noteworthy examples are muscle pain (L18; 56.2 per 1000 in 1987 and 11.3 per 1000 in 2001) and other musculoskeletal diseases (L99; 36.3 per 1000 in 1987 and 14.3 per 1000 in 2001)

Comparison with other morbidity registration

How did our figures compare with the incidence rates of musculoskeletal system of the CMR Nijmegen. We excluded the injuries because the way injuries are registered in the CMR Nijmegen is different from the way in the two National surveys.
In the period 1986 to 1990 the annual incidence rate in the CMR was 253 per 1000 against 242 per 1000 in the NS1 (1987). In the period 1999 to 2003 the annual incidence of the CMR was 256 per 1000 and 231 per 1000 in the NS2 (2001). While the incidence rate in the CMR remained stable between the two time periods the incidence in 2001 (NS2) was 5% lower than in 1987 (NS1). The rates were in the CMR in the first period 5% higher and in the second period

11% higher than in the National Surveys.

Table 9.7 Comparison incidence rates musculoskeletal system (exclusive injuries) CMR Nijmegen and National Surveys; per 1000 per year

	CMR		NS1	NS2	WKS
	1986-1990	1999-2003	1987	2001	2001
Incidence rate	253	256	242	231	231

Reflections on the differences between 1987 and 2001

Differences in incidence rates between 1987 and 2001 may have arisen for several reasons some of which will be considered below.

Besides real differences in the incidence rates of health problems related to musculoskeletal system in the population the number of musculoskeletal problems presented to GPs can be caused by any combination of changes in characteristics of the population changes in the characteristics of general practice by changes in the health care system and by changes in the methodological characteristics. We will try to link the established changes to one or more of these causes.

The largest increase in incidence rates occurred in health problems related to the *upper extremities* and *RSI*.

The incidence rate for problems of the upper extremity was in 2001 79% higher than in 1987. After adding the incidence rates of the neck syndrome and carpal tunnel to this this cluster with the aim to bring together all components that constitute repetitive stress injury the rate in 2001 was 89% higher in 2001 than in 1987 for females the rate was even more than twice as much. This is congruous with the findings of other studies. [6 7 8] A possible explanation of the higher incidence found among women could be that women more often have jobs characterised by static load and monotonous and repetitive tasks and are more often exposed to additional stress from unpaid work (such as housekeeping and child care).[9] Another explanation that has been postulated is the increase of the use of personal computers in homes and offices.[10 11 12] Other explanations are an increase in the number of working women; the net labour participation of women increased from 35% in 1987 to 52% in 2001[13 14] and the increased productivity demands.[15]

The enormous publicity around RSI in the nineties might have contributed to an

increased tendency to present problems of the upper extremities and of the neck to GPs.
In conclusion the increase in incidence for the clusters health problems related to the upper extremities and RSI is most likely a combination of a "real" change and a increased tendency to consult the GP for kind of health problems .

The incidence rates of *health problems related to the lower extremities* were in 2001 39% cent higher than in 1987. It is unlikely there was a real change in incidence between 1987 and 2001.
We have no direct indication what caused this increase. The incidence rate of symptoms related to the lower extremities increased from 9 per 1000 in 1987 to 44.per 1000 in 2001 (appendix 9.1). Could it be that GPs allocated in 2001 more frequently symptom codes in case of vague complaints where they allocated psychological codes in 1987? As we will see in chapter 12 the incidence rate of psychosocial problems decreased and the incidence rate of ten common medically unexplained physical symptoms went up steeply.

Changes in the health care system
Between 1987 and 2001 there were no changes in the health care system which might explain differences in incidence rates. Most people after being referred to a physiotherapist got the costs of their treatment reimbursed.
The proportion of persons being referred to a physiotherapists was about the same in 1987 and 2001: both in 1987 and 2001 13% of the Dutch population reported to have been treated by a fysiotherapist in the previous year [16] .

Methodological Differences
In the comparison of all musculoskeletal conditions between 1987 and 2001 a significant finding was that in 1987 62% diagnoses were coded as "disease" codes whereas in 2001 this was only 37 per cent. In chapter 6 we elaborated on the differences in coding between the first and the second Dutch National Survey. Apparently the trained personnel in the first National Survey assigned more readily codes referring to diagnoses than the GPs in the second National Survey.
We can illustrate this with the ICPC codes L13 (hip symptom/complaint) and L89 (osteoartritis of hip). L13 had in 1987 an incidence rate of 0.4 per 1000 and in 2001 a rate of 5.1 per 1000 whereas the incidence for code L89 was 2.7 per 1000 in 1987 and 1.2 per 1000 in 2001. It is likely that the trained

personnel in 1987 more easily assigned the code osteoarthritis to problems related to hips. After all there is no gold standard for the diagnosis osteoarthritis. The participating GPs in 2001 were apparently more reluctant to assign the label osteoarthritis to problems of the hip. It is unlikely that the incidence of osteoarthritis really declined between 1987 and 2001.
This difference in coding behaviour underlines the need to be careful when comparing the incidence rates of individual symptoms and diseases (ICPC codes) in 1987 and 2001; it preferable to study aggregated data instead of separate ICPC codes when comparing data from 1987 and 2001.
By composing clusters in this chapter we overcame the problems of the different coding practices.

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Chapter 10

Carpal tunnel syndrome in general practice in 1987 and 2001: incidence and the role of occupational and non-occupational factors

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10.1 Abstract

Background : Most studies on the incidence of the carpal tunnel syndrome and the relation of this disorder with occupation are population-based. In this study we present data from general practice.
Aim: To compare incidence rates of carpal tunnel syndrome in 1987 with those in 2001, and to study the relationship between carpal tunnel syndrome and occupation.
Design of study: Analysis of the data of the first and second Dutch National Survey of General Practice, conducted in 1987 and 2001 respectively.
Setting: General practices in the Netherlands
Method: One hundred and three general practices in 1987 with 355,201 listed patients, and 96 practices with 364,998 listed patients in 2001, registered all patients who presented with a new episode of carpal tunnel syndrome. Patient and GP populations were largely representative for The Netherlands.
Results: The crude incidence rate was 1.3 per 1000 (95% confidence interval [CI] = 1.0 to 1.5) in 1987, and 1.8 per 1000 (95% CI = 1.7 to 2.0) in 2001. In males it was 0.6 (95% CI = 0.5 to 0.7) and 0.9 (95% CI = 0.8 to 1.0) respectively; in females 1.9 (95% CI = 1.7 to 2.1) and 2.8 (95% CI = 2.6 to 3.1).
At both study periods, peak incidence rate occurred in the 45–64-year age group: in 2001 this peak reached reached 4.8 per 1000 (95%CI 4.1 to 5.4) for females and 1.6 (95% CI 1.2 to 2.0) for males .
Women who performed unskilled and semi-skilled work had 1.5 times greater risk of acquiring carpal tunnel syndrome than women with higher-skilled jobs ($P<0.001$). In men no relationship of this kind was found.
Conclusion: In 2001 the crude incidence rate of carpal tunnel syndrome was 1.5 times higher than in 1987, but the difference was not statistically significant after subdividing by age and sex. In both years the female:male ratio was 3:1. Incidence rates were related to the job level of women, but not of men.

10.2 Introduction

Carpal tunnel syndrome is a common cause of pain in the hand, but there is no gold standard for its diagnosis. It is often thought to be increasing in incidence.[1,2]

There are few studies that describe the incidence of carpal tunnel syndrome in general practice and they are difficult to access [3,4] because they are hidden in morbidity tables.
Incidence rates from general practice are different from population-based studies because they represent those patients who experience so much discomfort by their symptoms that they decide to consult their GP; in population-based studies, patients with symptoms are actively sought.
Carpal tunnel syndrome has been linked to jobs with strenuous and rapid repetitive hand activity [5,6], although Loslever and Ranaivosoa suggested that non-occupational factors may be more important than occupational factors.[7]
The aim of this study was to use data from Dutch National Surveys in 1987 and 2001 to fill this information gap, and to study the incidence of carpal tunnel syndrome in general practice in 1987 and 2001. The study also aimed to explore associations with age, sex, and occupational factors in general practice.

10.3 Method

Design

Data were obtained from the first (1987) and second (2001) Dutch National Survey of General Practice (DNSGP-1, DNSGP-2 respectively)
In both studies, the population of patients and GPs were largely representative for The Netherlands. The design of these studies has been extensively described elsewhere.[8,9] In both surveys all morbidity presented to the GPs was coded according to the International Classification of Primary Care (ICPC).
In the DNSGP-1,[8] data from 355,201 persons were collected, from which 181,887 persons were aged between 25 to 64 years; in the DNSGP-2,[9] data from 364 998 patients were collected with 203,942 persons aged from 25 to 64 years.

Measurements and analyses

Patients with carpal tunnel syndrome were defined according to the ICPC code N93 and the assignment of a 'new' episode by GPs. Incident episodes are the sum of 'first ever' and 'new' episodes (for example, previous episode in the other wrist). Each patient could contribute with only one incident episode during the study period.

Occupational factors

The relationship between carpal tunnel syndrome and occupation was analysed according to age groups of 25-44 years and 45-64 years.
Data about occupation were obtained by sending a questionnaire by mail to all listed patients. Occupational data were obtained from 118 208 patients (65% response rate) in 1987,
and 127 466 patients (63% response rate) in 2001.
In 2001, occupations were coded according to the Occupational Classification 1992 (SBC92) of Statistics Netherlands (CBS). In 1987 a previous edition of the SBC92 was used. Two categories of labour were distinguished: unskilled and semi-skilled labour versus skilled labour and higher-skilled professions.

Analyses

For calculation of incidence rates, 95% upper and lower confidence intervals (CI) were used. Differences between 1987 and 2001 for the various sex and age groups were assessed using chi-square tests (for categorical variables).
The association between carpal tunnel syndrome and occupation was analysed for both sexes
separately, with logistic regression adjusted for age.

10.4 Results

Incidence rates of carpal tunnel syndrome

In 2001, 672 new cases occurred during the registration period of 1 year. In 1987, 113 new cases presented over a period of 3 months. The crude incidence rate was 1.8 per 1000 in 2001 and 1.3 in 1987 (Table 10.1).
When we compare the incidence rates of 2001 and 1987 by age and sex, the differences were not statistically significant, although in most subgroups the rates in 2001 were higher than those in 1987.
Incidence rates in females were more than three times higher than for males at both study period [$P<0.001$). The highest incidence rate was found in the 45–64-year age group in 1987 and 2001. The distribution pattern across the age groups was roughly the same for both sexes.
Table 1. Incidence rates of carpal tunnel syndrome in 2001 and 1987 by sex and age.

Table 10.1 incidence rates of carpal tunnel syndrome by sex and age; per 1000 per year

Age	1987		2001		
	n	Incidence per 1000 (95% CI)		Incidence per 1000 (95% CI)	*P value*
15-24 years	5	0.3 (0.2 to 0.5)	15	0.3 (0.2 to 0.5)	0.999
Male	2	0.3 (0.0 to 0.7)	2	0.1 (0.0 to 0.2)	0.495
Female	3	0.4 (0.0 to 0.8)	13	0.6 (0.3 to 0.9)	0.819
25-44 years	54	1.9 (1.7 to 2.3)	247	2.1 (1.8 to 2.4)	0.920
Male	14	1.0 (0.2 to 1.5)	54	0.9 (0.7 to 1.2)	0.929
Female	40	2.7 (1.9 to 4.3)	193	3.3 (2.9 to 3.8)	0.529
45-64 years	34	2.0 (1.7 to 2.3)	288	3.1 (2.8 to 3.5)	0.411
Male	7	0.8 (0.2 to 1.5)	75	1.6 (1.2 to 2.0)	0.242
Female	27	3.1 (1.9 to 4.3)	213	4.8 (4.1 to 5.4)	0.109
>=65 years	20	1.9 (1.5 to 2.3)	123	2.6 (2.2 to 3.1)	0.759
Male	3	0.7 (0.0 to 1.5)	30	1.5 (1.0 to 2.1)	0.394
Female	17	2.7 (1.4 to 3.9)	93	3.4 (2.7 to 4.1)	0.657
All	113	1.3 (1.0 to 1.5)	672	1.8 (1.7 to 2.0)	0.001
Male	26	0.6 (0.4 to 0.9)	161	0.9 (0.8 to 1.0)	0.204
Female	87	1.9 (1.5 to 2.3)	511	2.8 (2.6 to 3.1)	0.004

Carpal tunnel syndrome and occupational factors (25-64-year age group)

In neither 1987 nor 2001 was any association found between the skill level of work and incidence of carpal tunnel syndrome in males (Table 2).
However, the incidence rate in females was higher among the unskilled/semi-skilled workers than among the workers in higher skilled jobs: 4.2 versus 2.6 in 1987 and 5.4 versus 3.5 in 2001 in the unskilled and higher skilled jobs respectively (P=0.001)
The odds ratio (OR) adjusted for age in females was 1.5 (95% CI = 1.2 to 2.0, P = 0.001) for unskilled and semi-skilled work when compared with work in higher job categories.
For males the OR was 1.1 (95% CI = 0.7 to 1.6, P = 0.82). This confirmed that occupational level is associated with the occurrence of carpal tunnel syndrome in women, but not in men.

Table 10.2. Association between incidence of carpal tunnel syndrome and skill level of work for the 25–64-year age group.

	Incidence per 1000 per year (95% CI)	
	Unskilled and semiskilled labour	Skilled labour and higher
1987		
Male	0.9 (0.2 to 1.6)	1.0 (0.5 to 1.6)
Female	4.2 (2.3 to 5.8)	2.6 (1.5 to 3.8)
2001		
Male	1.4 (0.9 to 2.0)	1.4 (1.0 to 1.7)
Female	5.4 (4.4 to 6.4)	3.5 (2.9 to 4.1)

10.5 Discussion

Summary of main findings

The incidence rates found in this study are congruent with data from comparable settings in Britain. The incidence rate in the fourth National Morbidity Study,[3] conducted in 1990–1991, was 1.4 per 1000; in the Weekly Returns Service [4] in 2004 this was found to be 1.9 per 1000. The distribution across age groups and male:female ratios of these two studies were also similar to the current findings.

The incidence rate was higher in 2001, however, for separate age and sex groups the differences between 1987 and 2001 reached no significance due to small absolute numbers in 1987.

Comparison with existing literature

In a general health mail survey followed by clinical examination in Sweden in 1997, Atroshi et al [10] found a prevalence rate of 3.8% in a sex- and age-stratified sample of 2466 responders aged between 25 and 74 years. In 1985 de Krom et al [11] performed a study in The Netherlands to determine the prevalence of carpal tunnel syndrome in a general population. In an age and sex-stratified survey of 715 participants (70% response rate) aged 25–74 years, the prevalence rate of undetected carpal tunnel syndrome was 5.8%.

Incidence and prevalence rates from general practice are more than 10 times lower than those of community-based studies. It appears that there is a large proportion of people with carpal tunnel syndrome who do not present their symptoms to a GP. Assuming that patients will consult a doctor when symptoms are seriously affecting them, it is most likely that the prognosis is much better than suggested by studies from other settings ,[12,13] as the symptoms of most cases subside spontaneously over time.

Carpal tunnel syndrome and occupation

For women in unskilled and semi-skilled job categories, the risk of acquiring carpal tunnel syndrome was 1.5 times higher than for women grouped in the 'higher job' category. For men, no relationship was found between incidence and type of job. This sex difference was not identified in the literature.

Several reasons can be proposed to explain the difference between incident rates of the sexes. In addition to their paid jobs, many women often perform the majority of hand-intensive work in the home. Another possibility is that the unskilled and semi-skilled jobs held by women might be more strenuous on the wrist than jobs that men hold in that category. A more detailed job analysis is required to provide a definitive answer.

Strengths and limitations of the study

A limitation in exploring the link between carpal tunnel syndrome and occupation was that the study included no information regarding the types of hand activities involved in a specific job. Additionally, GPs' diagnoses had to be taken at face value. As 30% of the patients were referred, a specialist verified the diagnosis in those patients, but in all other cases the

diagnosis could not be verified in other ways. The authors assumed that GPs diagnoses of carpal tunnel syndrome were made only in cases where the syndrome was clearly indicated. Concordance with other primary care studies appears to be a confirmation of this premise. [3,4]

Occupation was known for approximately 65% of the population. An analysis was performed on those whose occupation was not known which found more or less the same incidence rates as for those whose occupation was known.

A strength of the study is that information about the incidence of carpal tunnel syndrome is presented for a large population from general practice. The patient population and the participating GPs were representative of the Dutch population as a whole and Dutch GPs respectively. Practice-based morbidity surveys disclose a different type of information than population-based surveys, because they have the added input of GP interpretation.

Implications for future research

In general terms, an average of four to six new cases of carpal tunnel syndrome presented to GPs in 2001 in a normative practice of 2350 patients. This is much lower than incidence rates found in community-based studies and studies that rely on self-reporting. Overall, the contribution of occupational factors for developing carpal tunnel syndrome seems limited. Taking into account that the risk of having carpal tunnel syndrome is 1.5 times higher for women in unskilled job categories than that for their counterparts in skilled work, demanding job categories were responsible for only one or two extra cases in a group of 1000 working women. The previously unreported finding of higher incidence in females requires further investigation.

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Chapter 11

The incidence of injuries in 1987 and 2001

11.1 Introduction

All people are exposed to injuries as part of their everyday lives, but the burden is not evenly spread: injuries disproportionately affect some people more than others. Large variations occur in injury morbidity related to a person's age, sex, socio-economic group, cultural and/or ethnic group, and place of residence.

In this chapter we describe and explore the changes that occurred between 1987 and 2001 in injuries presented to GPs and we will study these changes in relation to sex, age and socioeconomic status.

However, when interpreting differences between 1987 and 2001, we have to keep another mechanism in mind. GPs are gatekeepers in the Dutch health care system, however in the case of injuries, patients can easily bypass their GP; when suffering an injury, they can go directly to an accident and emergency department of a hospital, even if it concerns a minor injury. It is possible that the preference of patients whether to present an injury to GP or to a hospital, has changed between 1987 and 2001. We have to consider that differences between 1987 and 2001 may be partly created by this shift.
In this chapter we will present incidence rates of all injuries that were primarily seen by the GP and for a large part, also managed by the GP.

This brings us to the following research questions

- Which new injuries were presented to general practice in 1987 and 2001 (Overall, by sex,by age, by SES)?
- Which differences were found in the presented episodes of new injuries between 1987 and 2001?

11.2 Methods

We selected all ICPC codes referring to injuries (table 11.1) and divided them in the following clusters:

Table 11.1 Injury clusters

Injury	ICPC codes
Fractures	L72- L73- L74- L75- L76
Sprains, strains and (sub)luxations	L77- L78- L79- L80- L81-L96
Foreign body eye	F76
Foreign body elsewhere	D79- H76- R87- S15
Burns/scalds	S14
Concussion	N79- N80
Major injuries	A80- A82
Minor injuries	S12- S13- S14-S16- S17-S18-S19-H78-H79-F75-F79
Poisoning	A84- A86

We will compare the occurrence of accidents and injuries on different levels of aggregation. We will start on the highest level of aggregation and subsequently go down to a lower level of aggregation.

Concretely, this means that we will consider incidence rates on three levels:
1 on the overall level i.e. all new episodes with accidents and injuries will be included (paragraph 3.1).
2 on cluster level (paragraph 3.2).
3 on the level of fractures (paragraph 3.3), and sprains, strains and luxations (paragraph 3.4).

11.3 Incidence rates of Injuries

11.3.1 The overall incidence rates

Overall, the incidence rate for injuries was 160 per 1000 in 1987 and 85 per 1000 in 2001 resulting in a 47% lower rate in 2001 compared with 1987 (table 11.2).
In both sexes there was a decline in the number of newly presented injuries between 1987 and 2001; in males the incidence went down by 50 per cent, in females by 45 per cent.
The incidence rate of presented injuries in males was in 1987 22% higher than in females and in 2001 14% higher.
Persons from the lowest SES group sustained more injuries than those from the highest SES group. Between 1987 and 2001 the rates for all SES groups

dropped, the decrease was least for the highest SES group. The incidence rate of presented injuries was in the lowest SES group in 1987 55% higher than in the highest SES group, in 2001 the rate was 27% higher.

Table 11.2 incidence rates of Injuries in 1987 and 2001: incidence by sex, age, SES (per 1000 per year) and 2001/1987 ratio

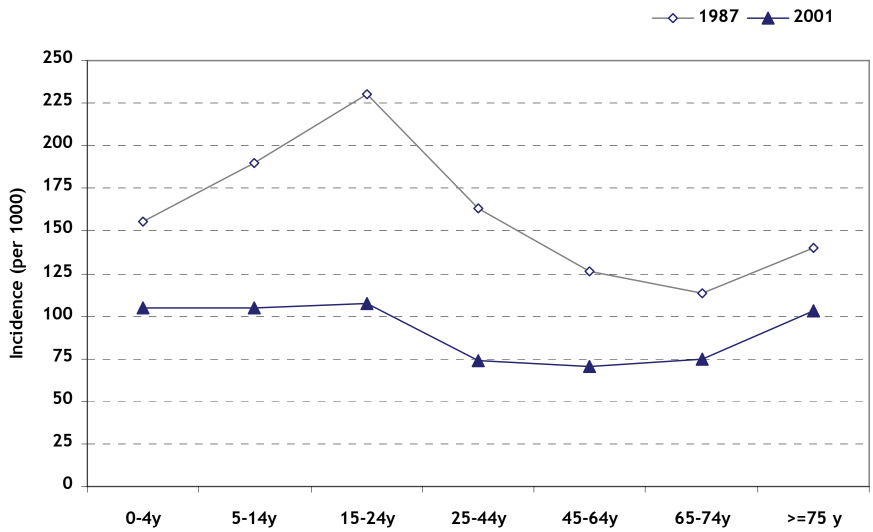
	1987 /1000	**2001 /1000**	***2001/1987 ratio***
All	160	85	***0.53***
SEX			
Male	180	91	***0.50***
Female	141	78	***0.55***
Female/male ratio	***0.78***	***0.86***	
SES			
Lowest	182	96	***0.53***
Middle	159	87	***0.55***
highest	117	75	***0.64***
Ratio lowest/highest SES	***1.55***	***1.27***	

Bold p<0.05

In 1987 the incidence rate of injuries was 156 per 1000 in the youngest age group, the rate mounted to 230 per 1000 in the age group 15 to 24 and subsequently went down till 114 per 1000 in the age group 65 to 74 and increased to 140 per 1000 in th oldest age group (figure 11.1).
The pattern in 2001 was different. In the three youngest age groups (0 to 24) the incidence rates were similar (105 per 1000), in the nex three age groups (25 to 74) the rates were also similar but on lower level (incidence rate 70 to 75 per 1000), whereas the rate increased again in the oldest age group (103 per 1000). In all age groups the rates were lower in 2001 than in 1987, the steepest decline occurred between the age from 15 to 44 (rate in 2001 more than 50% lower than in 1987).
The fall in incidende rates between 1987 and 2001 was visible in both sexes

across all age groups. While men presented overall more injuries, from the age of 65 onwards they were surpassed by women; in both surveys women older than 75 presented one and a half times more episodes than men of this age group. In the age from 45 to 64 the incidence rates were exactly the same in men and women. Males from 15 to 24 were most accident-prone; however, whereas this age group had in 1987 a high peak, in 2001 the peak was much lower compared with the 0 to 14 year olds.

Figure 11.1 Incidence rates of Injuries in 1987 and 2001 by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y
2001/1987	**0.67**	**0.55**	**0.47**	**0.46**	**0.56**	**0.66**	**0.74**
Female/male ratio							
1987	***0.83***	***0.88***	***0.63***	***0.59***	*1.00*	***1.38***	***1.64***
2001	***0.74***	***0.82***	***0.69***	***0.73***	*1.00*	***1.21***	***1.51***

Bold p<0.05

11.3.2 Incidence rates of Clusters of injuries

The incidence rates of all clusters in table 1 were lower in 2001 than in 1987 (table 11.3). In 1987, the cluster with the highest incidence rate was "sprains, strains and (sub)luxations" with a rate of 77.6 per 1000 per year. However, the incidence of "sprains , strains and (sub)luxations" went down by 62% in 2001 and was surpassed as cluster with the highest incidence by "minor injuries", which incidence rate was in 2001 30% lower than in 1987.

In most clusters the incidence rates were higher in *men* than in *women* with the exception of poisoning in 1987 and burns in 2001. In 1987 the incidence rates were about similar in males and females for fractures, burns and concussions; in 2001 the male-female rates were similar for fractures, concussions, major injuries and poisoning.

In foreign bodies of the eye the differences in incidence rates between males and females were largest: in 1987 the rate in males was 12.8 per 1000 against 1.2 per 1000 in females, in 2001 these figures were 5.6 and 0.7 per 1000 respectively.

In general the incidence rates for both sexes approached each other between 1987 and 2001.

Table 11.3 Incidence rates of injury clusters in 1987 and 2001 by sex (per 1000 per year) and female/male ratios in 2001 and 1987

	1987		**2001**		***2001/1987***
	/1000	*Female/ male ratio*	/1000	*Female/ male ratio*	*ratio*
Fractures	10.4	*1.05*	6.4	*1.07*	***0.62***
Sprains,strains and (sub)luxations	77.6	***0.88***	29.7	***0.89***	***0.38***
Foreign body eye	6.8	***0.09***	3.1	***0.13***	***0.46***
Foreign body elsewhere	2.9	*0.80*	2.1	***0.75***	***0.73***
Burns	3.0	*1.01*	2.5	***1.20***	***0.82***
Concussion	3.1	*0.95*	2.3	*1.05*	***0.74***
Major injuries	4.7	***0.70***	2.7	*0.99*	***0.58***
Minor injuries	50.6	***0.74***	35.6	***0.87***	***0.70***
Poisoning	1.6	***1.52***	0.6	*1.13*	***0.35***
Other injury	6.9	***0.74***	1.8	***0.63***	***0.26***
All injuries	160.4	***0.78***	84.5	***0.86***	***0.53***

Bold p<0.05

11.3.3 Incidence rates of Fractures

Overall the incidence of fractures was 38% cent lower in 2001 compared with 1987 (6.4 vs 10.4 per 1000 and it was about the same for *males* and *females* (table 11.4).
In 1987 the *highest SES group* sustained more fractures than the lowest SES group (11.4 vs. 9.8 per 1000: p<0.0001). This is contrary to the general pattern. In 2001, we saw the usual pattern with a 40% higher incidence rate in the lowest SES group compared with the highest group.

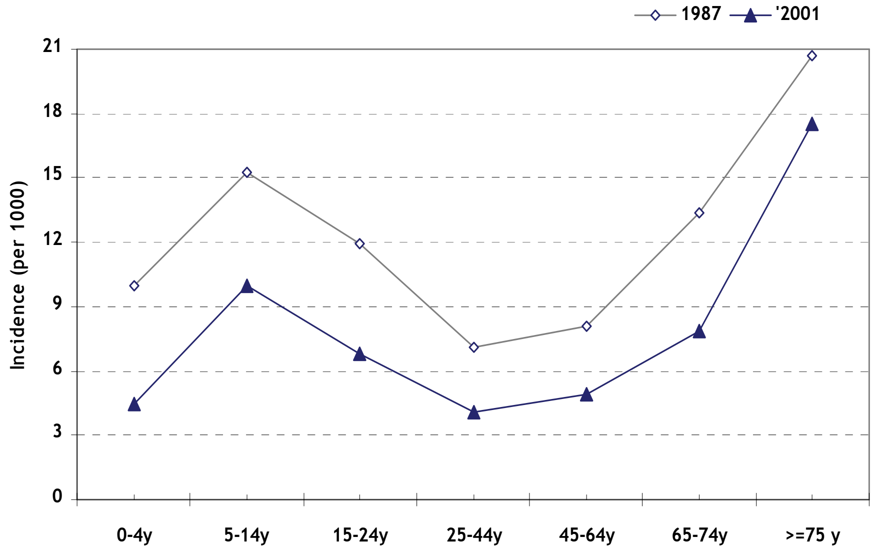
Table 11.4 Incidence rates of fractures in 1987 and 2001 by sex and SES; per 1000 per year

	1987 /1000	**2001** /1000	***2001/1987* ratio**
All	10.4	6.4	***0.62***
Sex			
males	10.0	6.2	***0.62***
female	10.5	6.6	***0.63***
Female/male ratio	*1.05*	*1.07*	
SES			
Lowest	9.8	8.1	**0.83**
middle	10.3	6.0	**0.53**
highest	11.4	5.8	**0.51**
Ratio lowest/highest SES	*0.86*	***1.41***	

Bold p<0.05

The incidence rates of fractures diminished between 1987 and 2001 in all age groups, however, in the oldest age group the difference between 1987 and 2001 was statistically not significant (figure 11.2).
The patterns across the age groups were similar in 1987 and 2001 with an early peak rate in the age group 5 to 14 and steeply rising rates in the two oldest age groups.
Males and females showed a similar pattern in 1987 and 2001: from 0 to 14 year olds the incidence rates did not differ statistically significantly from each other, in the age from 15 to 44 the rates in males were 41 to 49% higher than in females and from the age of 45 years onwards the rates were much higher in females.
Till the age of 44, the rate was higher in males, from 45 onwards the rate was higher in females.

Figure 11.2 incidence of fractures in 1987 and 2001 age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75 y
2001/1987	**0.45**	**0.65**	**0.57**	**0.57**	**0.60**	**0.58**	0.85
Female/male ratio							
1987	1.26	1.05	**0.53**	**0.56**	**1.56**	**2.18**	**2.66**
2001	0.77	0.86	**0.54**	**0.59**	**1.34**	**2.52**	**2.35**

Bold <0.05

11.3.4 Incidence rates of sprains, strains and (sub)luxations

In males and females the incidence rate was in 2001 approximately 60 per cent lower than in 1987. There was little difference between the rates of males and females (table 11.5).

The ratio between the lowest SES group and the highest SES group was 1.57 in 1987 and went down to 1.28 in 2001.

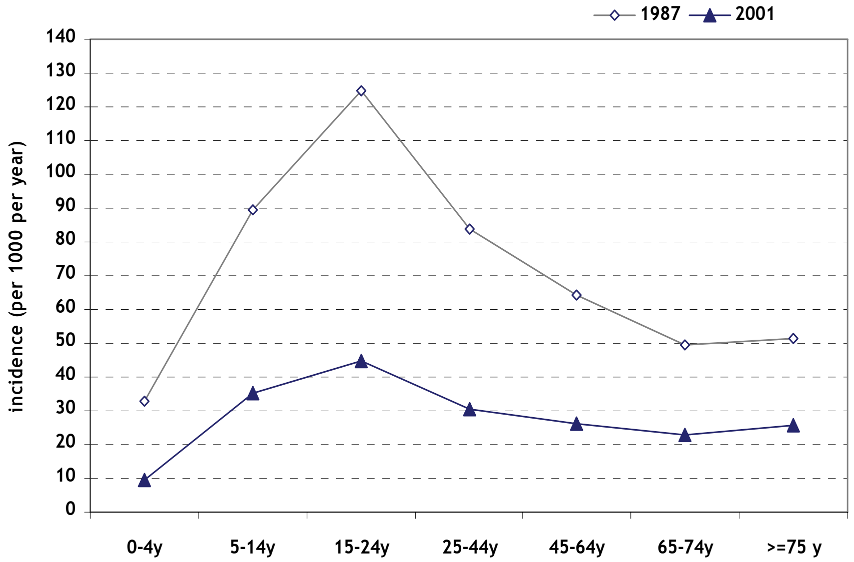
Table 11.5 Incidence rates of sprains, strains and (sub)luxations in 1987 and 2001 by sex and SES (per 1000 per year) and 2001/1987 ratios

	1987 /1000	**2001** /1000	***2001/1987*** *ratio*
All	77.6	29.7	***0.38***
Sex			
males	83.5	31.5	***0.38***
female	71.8	27.9	***0.39***
Female/male ratio	***0.86***	***0.89***	
SES			
Lowest	89.2	33.9	**0.38**
middle	76.6	31.3	**0.41**
highest	57.0	26.5	**0.47**
Ratio lowest/highest SES	***1.57***	***1.28***	

Bold $p<0.05$

In spite of the much lower incidence rates in 2001 in comparison with 1987, the distribution of the incidence rates across the age groups was quite similar (figure 11.3). There was a peak incidence in the age group 15 to 24, a gradual decrease in incidence in the older age groups with a slight elevation of the rate in the oldest age group. The distribution of the incidence rates across the age groups for strains, sprains and luxations showed another pattern than that of fractures (figure 11.2). The female/male ratios had the same pattern in 1987 and 2001. In the two youngest age groups there were hardly any sex differences in the incidence rates, in the age from 15 to 44 the rates were higher in males than in females, whereas from the age of 45 onwards the rates were higher in females than in males.

Figure 11.3 Incidence rates of strains, sprains and (sub)luxations by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75 y
2001/1987	**0.28**	**0.39**	**0.36**	**0.36**	**0.41**	**0.46**	**0.50**
Female/male ratio							
1987	1.04	**1.16**	**0.68**	**0.63**	**1.16**	**1.39**	**1.81**
2001	0.85	1.08	**0.71**	**0.72**	1.01	**1.51**	**1.48**

Bold <0.05

11.4 Discussion

Summary

- The number to the GP presented injuries was in 2001 nearly 50 per cent lower than in 1987.
- In the age from 0 to 44 more males than females presented injuries to the GP
- In the age from 45 to 64 males and females had the same incidence rates for injuries

- From the age of 65 years onwards the incidence rates of injuries were higher in females than in males, from the age of 75 years onwards even 1.5 higher.
- In nearly all age groups there is a gradient; the lower the SES, the higher the number of injuries

Reflections on the differences between 1987 and 2001

How to interpret the halving of the incidence rate of presented injuries to GPs. In previous chapters, we discussed changes in incidence rates between 1987 and 2001 in the framework of: real changes in incidence rate of the studied health problem, changes related to characteristics of the population, changes related to characteristics of general practice, changes related to characteristics of the health care system, and changes due to methodological issues.

From several sources we know that the number of injuries presented to accident and emergency departments were about similar in 1987 and 2001[4] .
We can conclude that the sharp decrease in injuries presented to GPs, does not indicate that the incidence rate of injuries was really halved between 1987 and 2001.
We have indications that patients more frequently bypassed the GP after sustaining an injury. As mentioned in the introduction, GPs are not gatekeepers in the case of injuries. Patients are allowed to go directly to an emergency department[2].
An indication that the fall in incidence was brought about by patients going directly to the emergency department thereby bypassing the GP, can be found when comparing the incidence figures of fractures of the two National Surveys with the incidence of fractures in the CMR Nijmegen. In general, the reasons for giving the diagnosis fracture will be rather sound. I don't expect many differences in interpretation between GPs. An important difference between the national Surveys and the CMR Nijmegen is that in Nijmegen all known morbidity is registered, whereas in the national Surveys only the morbidity presented to the GP is coded. In the CMR Nijmegen also the diagnoses of those patients were registered who bypassed the GP and about whom the GP received a report from the emergency department. In the CMR the annual incidence of fractures was about similar between 1986-1990 and 1999-2003 (13.5 and 13.1 per 1000). In our surveys the incidence in 1987 was 10.5 per 1000 and in 2001 6.4 per 1000. It seems justified to conclude that the lower incidence in 2001 can be attributed to the fact that patients bypassed their GP

more often in 2001 than in 1987.
GPs have been ambiguous in their attitude towards the perception of their role in the care for victims of injuries. Among GPs there was no consensus about their role in the treatment of injuries. Not all GPs regretted that patients bypassed them. During daytime injuries often disturb the daily routine, while in the out-of-hours services injuries create disturbance for the doctors on duty. However, other GPs considered the care and the treatment of injuries as an integral part of their job.
Our finding that in 2001 fewer injuries were presented to GPs than in 1987, must in the first place be interpreted as a change in the consultation behaviour from the side of patients after sustaining an injury. However, we can not exclude as additional factor, that also GPs themselves played a role in this proces.
In chapter 5 we demonstrated that the task scope with respect to psychosocial problems narrowed between 1987 and 2001, most likely as response on the high workload. It is conceivable that this applied also for injuries at least for a part of the GPs.

Other points of interest

When we extrapolate the incidence rate of 85 per 1000 in 2001 to the whole Dutch population in 2001 (abour 15,9ml), we can calculate that 1.351,500 new injuries were presented to GPs.
How does this relate to figures of other registrations of injuries? In the framework of “Ongevallen en bewegen in Nederland” (ObiN) [Injuries and movements in the Netherlands] a continuous representative survey is conducted among Dutch households.[1] From this source we extracted the following information. In the period 2000-2001, the average number of medically treated victims of injuries was 2 million. In this survey, it was calculated that GPs were 1.2 million times consulted for injuries. On top of this, one million people suffered injuries for which no medical treatment was sought.
According to this survey, GPs were involved in 58% of all injuries: for home and leisure-related injuries this was 67%, for sport-related injuries 50 per cent, for work-related injuries 61% and for traffic-related injuries 52%. Obviously, part of these injuries were referred to secondary care.

Overall, males suffered more injuries than females. Both in our data and in the data from the ObiN, the contribution of men to injuries was 55 per cent and

the contribution of women 45 per cent. However, the picture became differentiated when we consider age groups; males sustained more injuries till the age of 45, in the age group 45 to 64 the incidence of injuries was the same for both sexes, whereas from the age of 65 years onwards females presented more injuries.
At first sight, it is tempting to ascribe the surplus of injuries in older women to osteoporosis. Older women suffer more from osteoporosis than older men and osteoporosis brings about more fractures due to brittle bones.
Indeed, our data showed that women from 45 years and older presented more fractures than men. However, they did also present more "sprains and strains" and this can not be attributed to osteoporosis. Apparently, older women were involved in more activities that induced injuries than men.[3] Most likely these activities are connected with doing the household. Especially in 1987, we saw a peak in the incidence rate of injuries for men in the age from 15 to 24. These peaks for males disappeared completely in 2001. Possibly this indicates that males from this age group bypassed their GP more often than males from other age groups.
We found that persons from the lowest SES group had the highest incidence rates (ratio lowest/highest in 1987 1.55 and in 2001 1.27), however, between 1987 and 2001 in nearly all age groups the differences in incidence between the lowest and highest group became smaller; this was most pronounced in the age between 15 and 44.

11.5 Conclusion

In 2001, 58% of all injuries in the Netherlands were presented to GPs[1] . Though this is still a considerable contribution to the management of injuries, GPs are loosing ground to accident and emergency departments. In 2001, more patients were bypassing their GP than in 1987 after an accident.

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Chapter 12

Incidence of psychosocial problems in general practice in 1987 and 2001

12.1 Introduction

In this chapter the incidence rates of a heterogeneous group of psychological and social problems in general practice will be discussed.

These problems are categorised in the P (psychological) chapter and in the Z chapter (social problems) of the ICPC. To the psychological problems a category called "fear of diseases" will be added: this category is spread out over most of the ICPC chapters, under the ICPC rubrics -24 to -27. This group can be considered as a subcategory of the P chapter. As "umbrella" term for problems of the P and Z chapter and "fear of diseases", the term psychosocial problems will be used.

Psychosocial problems harbour very different types of disorders. In the psychological chapter (P) we find major psychiatric disorders like psychoses and mental retardation next to complaints and symptoms referring to emotions and feelings. In the Z chapter (social problems) there are problems referring to relationships with others and material conditions.

For a clear understanding of the difficulties in the interpretation of psychosocial complaints and symptoms in general practice , we have to realise how patients present their problems to the GP and, subsequently, how GPs interpret and code the presented problems into ICPC codes.

Patients may present directly with psychological or social complaints or symptoms; e.g. they can call themselves depressed, or overworked or refer to family problems. In those cases the GP will assign one of the ICPC codes of the P or Z chapter when coding a diagnosis.

However, patients may also present a variety of somatic complaints and symptoms for which no organic medical explanation can be found, either immediately or on the long term. Different terms are being used for this situation. A commonly used neutral label was "functional" complaints or symptoms. Nowadays symptoms that remain unexplained after an appropriate medical assessment are often designated as medically unexplained physical symptoms (MUPS). It is estimated that at least 20 per cent of the GP-patient contact concern a MUPS [1]

Studies of patients who repeatedly attended with MUPS, have found that a substantial proportion of these patients were showing evidence of psychological distress that was mostly not expressed during the consultation.[2]

If the number or the intensity of the complaints is disproportional to demonstrable somatic dysfunctions, the chance that they reflect an underlying psychological or social problem is high.

The judgment that a complaint is of psychosocial nature is then based on the absence of evidence for a medical explanation, and is consistent with Lipowski's definition of somatisation as a "tendency to experience and communicate somatic distress and symptoms unaccounted for by pathological findings, to attribute them to physical illness and to seek medical help for them".[3] Somatisation should not be confused with a somatisation disorder as defined by DSM-IV criteria. In the ICPC the somatisation disorder is placed under P75.

If a patient presents with one or more MUPS, the GP has to make the choice whether to classify it as a psychosocial problem or simply to classify it as a symptom. Given the uncertainty what should be considered as "disproportional", it is not surprising that this gives rise to a considerable interdoctor variation. This interdoctor variation will not be object of further discussion in this chapter.

In the light of the discussions about the role of GPs in diagnosing and treating mental health problems, we were interested in the incidence rates of the presented mental health problems in 1987 and 2001 in general practice.

In this chapter a number of diagnostic codes will be combined into coherent and meaningful clusters. In addition, we will present the incidence rates of ten common medically unexplained symptoms.

The following research questions will be addressed in this chapter

- What is the incidence of psychosocial problems in general practice in 1987 and 2001 (overall, by sex, age and SES) ?
- What is the incidence of clusters of psychosocial problems in general practice in 1987 and 2001 (overall, by sex,age, and SES) ?
- What is the incidence of medically unexplained symptoms in 1987 and 2001?

12.2 Methods

The following clusters will be addressed in this chapter:
- *"Anxiety"* : P01, P02, P74, P79
- *"Depression"* :P03, P73 P76
- *"Psychoses"* : P70, P 71, P72, P73,P98
- *Sexual problems* (P07-P09) *(X04-X24, Y07-Y08,Y24)*
- *Substance abuse* (P15-P19)
- *Behavioural problems of children* (P11-P13,*T06*, P21-P24)
- *Sleeping disturbance (*P06)
- *Ten common medically unexplained symptoms*

In appendix 12.1 the ICPC codes of the P and Z chapter are shown in combination with the ICPC "Fear of disease" codes.
In appendix 12.2 ten common medically unexplained physical symptoms, which will be used in paragraph 3.8 will be given.

12.3 Incidence rates of psychosocial problems

12.3.1 Psychosocial problems

In table 12.1 the distribution of the overall incidence rates of psychosocial problems is shown.
In 1987 115 new episodes of psychosocial problems occurred in 1000 patients, in 2001 87 episodes in 1000 patients, a reduction of 24% (table ..).
The incidence of psychological problems decreased by 30 per cent between 1987 and 2001; the incidence of social problems decreased by 39%, whereas the incidence of "fear of disease" rose by 39%.
In 1987, 65% of all psychosocial problems came from the P chapter, 24 per cent from the Z chapter, and 11% from the "fear of disease". In 2001, these figures were 60%, 21%, and 19% respectively.
The incidence in *females* was about one and a half times higher than in *males* both in 1987 and 2001.
The *lowest SES group* had in 1987 an 18% higher incidence rate than the *highest SES group*, in 2001 the difference increased to 48%.

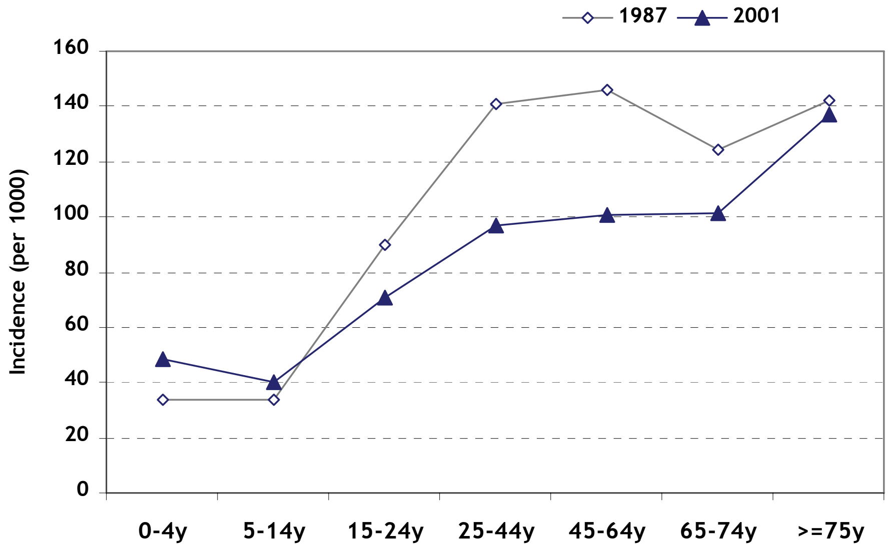
Table 12.1 Incidence rates of psychosocial problems by sex and SES; per 1000 per year

	1987 /1000	2001 /1000	2001/1987 Ratio
Psychological problems (P chapter)	74.6	52.5	***0.70***
Fear of disease	13.0	18.0	***1.39***
Social problems (Z chapter)	27.8	16.8	***0.61***
Psychosocial problems	115.3	87.4	***0.76***
Sex			
male	90.3	68.7	***0.76***
female	138.0	105.8	***0.77***
female/male ratio	***1.53***	***1.54***	
SES			
lowest	125.3	105.5	*0.84*
middle	114.5	81.7	*0.71*
highest	105.7	71.2	*0.67*
lowest/highest SES ratio	***1.18***	***1.48***	

Bold $p < 0.05$

Whereas the overall incidence rates were lower in 2001, in the youngest age group the incidence rose in 2001 with 44 per cent and in the next age group (5-14) with 18% (figure 12.1). The largest fall in incidence was in the age groups 25 and 64, while the rate in the oldest age group remained stable.
Overall, the incidence in females was 50% higher than in males both in 1987 and 2001. The situation was different in the two youngest age groups: in 1987 the difference between males and females was not statistically significant and in 2001 the incidence in males was more than 20% higher. In all other age groups the rate in females was higher.

Figure 12.1 Incidence of psychosocial problems in 1987 and 2001 by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75
2001/1987	**1.44**	**1.18**	**0.78**	**0.68**	**0.69**	**0.82**	0.97
Female/male ratio							
1987	1.25	1.00	**2.08**	**1.51**	**1.45**	**1.83**	**1.53**
2001	**0.78**	**0.73**	**1.91**	**1.78**	**1.47**	**1.56**	**1.33**

Bold p<0.05

12.3.2 Anxiety

Overall in 2001 the incidence of anxiety disorders was 37% lower than in 1987 (table 12.2).
Both in 1987 and 2001 the incidence rate in *females* was more than 80% higher than in *males*.
Persons of the *lowest SES group* had higher incidence rates than persons of the *highest SES group*: in 1987 their rate was 23% higher (P=0.01), in 2001 74% higher (P<0.001).
Looking at the diagnoses feeling anxious (P01) and anxiety disorder (P74) , it is remarkable that contrary to the general decline in incidence rates, the incidence of the more specific diagnosis of anxiety disorder was nearly three times higher in 2001 than in 1987, whereas the incidence of the symptom diagnosis feeling anxious (P01) went down by more than 40 per cent.

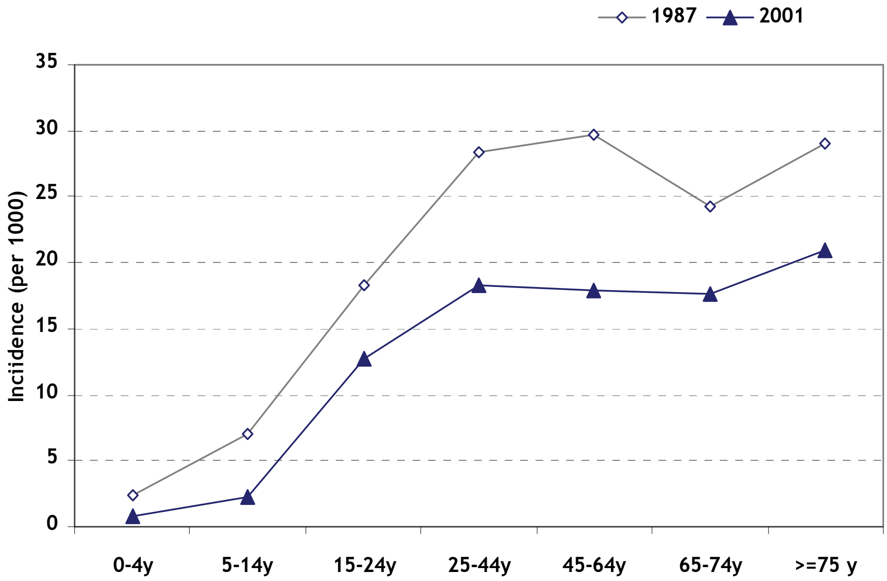
Table 12.2 Incidence rates of anxiety between 1987 and 2001 by sex and SES; per 1000 per year

	1987	**2001**	**2001/1987**
	/1000	/1000	ratio
Feeling anxious (P01)	13.3	6.9	**0.52**
Anxiety disorder (P74)	1.1	4.3	**3.91**
Compulsive disorder (P79)	1.7	2.9	**1.71**
Acute stress reaction (P02)	6.9	0.5	**0.07**
Anxiety	23.0	14.6	***0.63***
Sex			
male	16.0	10.2	*0.64*
female	29.3	19.0	*0.65*
female/male	***1.83***	***1.86***	
SES			
lowest	25.3	19.0	***0.75***
middle	22.8	13.3	***0.58***
highest	20.5	10.9	***0.53***
lowest/highest	***1.23***	***1.74***	

Bold p<0.05

In the two youngest age groups the incidence between 1987 and 2001 of anxiety disorders fell steeply by more than 60% (figure 12.2).
From the age of 25 onwards the incidence rates stabilized in both 1987 and 2001, although on different levels.
Neither in 1987, nor in 2001 there was a statistically significant difference in incidence between the *sexes* in the two youngest age groups. In all other age groups the rate in females was 61% to 178% higher than in males.

Figure 12.2 Incidence rates of anxiety by age; per 1000 per year



age	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75 y
2001/1987	**0.35**	**0.32**	**0.69**	**0.65**	**0.60**	**0.73**	**0.72**
Female/male ratio							
1987	0.66	1.31	**2.78**	**1.72**	**1.66**	**2.46**	**2.45**
2001	0.69	0.82	**2.14**	**1.93**	**1.61**	**2.31**	**1.92**

Bold $p<0.05$

12.3.3 Depression

The incidence rates of depressions went down by 14% between 1987 and 2001 (table 12.3).

The decrease in incidence between 1987 and 2001 was approximately similar for *both sexes*. The rate in females was about twice as high as in males

The gap between *the lowest and the highest SES group* increased between 1987 and 2001: in 1987 the lowest SES group had a 66% higher rate than the highest SES group, in 2001 the difference was 98%.

Table 12.3 Incidence rates of depressions between 1987 and 2001 by sex and SES; per 1000 per year

	1987 /1000	**2001** /1000	**2001/1987** ratio
feeling depressed (P03)	1.2	2.8	***2.42***
affective psychosis (P73)	0.8	0.2	***0.23***
depressive disorder (P76)	10.3	7.7	***0.79***
Depression	12.3	10.6	***0.86***
Sex			
male	8.1	7.2	***0.88***
female	16.2	14.0	***0.87***
female/male	***1.99***	***1.96***	
SES			
lowest	14.4	14.1	*0.98*
middle	12.5	9.8	***0.79***
highest	8.6	7.1	*0.82*
lowest/highest	**1.66**	**1.98**	

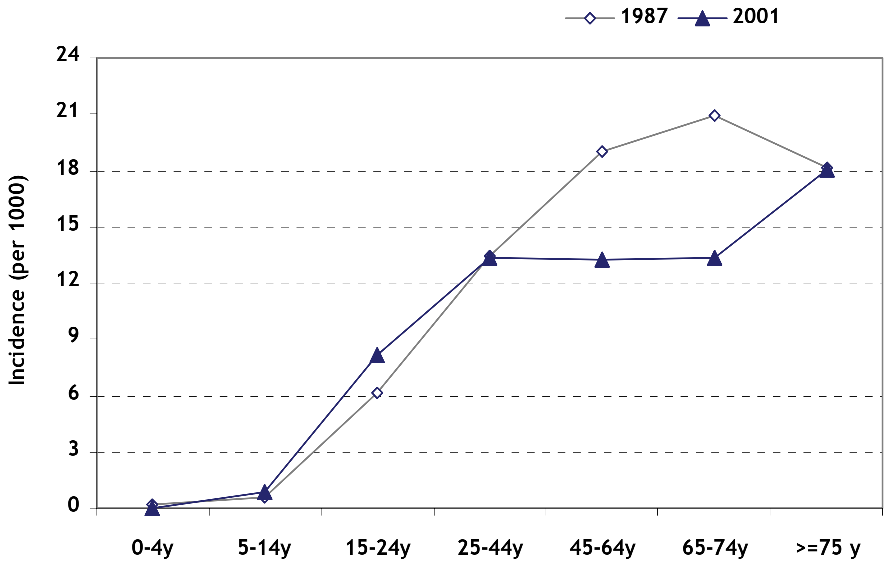
Bold p<0.05

Untill the age of 45, the pattern was similar in 1987 and 2001, a higher incidence rate with increasing age; *in 1987*, however, *from 45 years onwards* the rise in incidence rates continued up to 75 years and dropped in the oldest group from 22 per 1000 to 18 per 1000; *in 2001*, from 45 years onwards the incidence remained similar up to 75 years and rose in the eldest age group from 13 to 18 per 1000 (32%) (figure 12.3).

In 2001, in one age group (15 to 24) the incidence rate was statistically

significant higher than in 1987 (P=0.02); from 45 to 74 years the incidence in 2001 was more than 30% lower than in 1987.
In all age groups females presented far more new episodes of depression: in most age groups the ratio was higher than 2.

Figure 12.3 Incidence rates of depressions in 1987 and 2001 by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75 y
2001/1987	0.26	1.51	**1.32**	0.99	**0.70**	**0.64**	1.00
Female/male ratio							
1987		2.06	**2.36**	**2.22**	**1.83**	**2.10**	1.49
2001		**3.16**	**3.13**	**2.08**	**1.53**	**1.68**	**1.87**

Bold p<0

12.3.4 Psychoses

All types of psychoses were less frequently diagnosed in 2001 than in 1987 with the exception of organic psychosis, which rate was 49% higher, but because of the small number of cases, this was statistically not significant (Table 12.4).
The incidence of psychoses was in 2001 57% lower than in 1987. The fall in incidence was about the same for males and females.
In 1987, the difference in incidence between *males and females* was not statistically significant, in 2001 the incidence in females was 29% higher than in males.
In 1987 there was a non-statistically significant difference between the *lowest and the highest SES group*. However, in 2001 the rate in the lowest SES group was 159% higher than in the highest SES group.

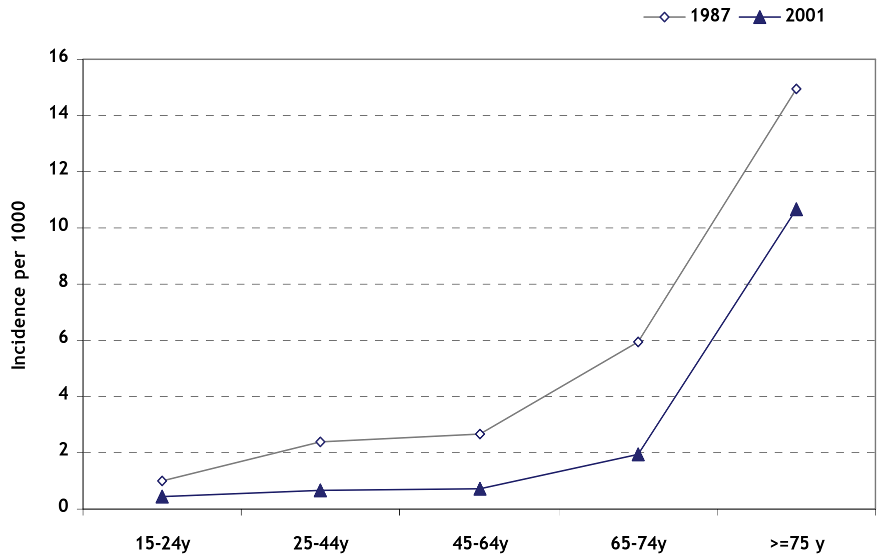
Table 12.4 Incidence rates of psychoses in 1987 and 2001 by sex and age; per 1000 per year

	1987 /1000	**2001** /1000	***2001/1987*** *ratio*
Dementia (P70)	0.9	0.4	***0.52***
Organic psychosis other (P71)	0.2	0.3	*1.49*
Schizophrenia (P72)	0.3	0.1	***0.27***
Affective psychosis (P73)	0.8	0.2	***0.21***
Psychosis other (P98)	0.6	0.2	***0.33***
Psychoses	2.8	1.2	***0.43***
Sex			
male	2.6	1.0	***0.40***
female	3.0	1.4	***0.46***
female/male	*1.14*	***1.29***	
SES			
lowest	3.1	1.7	***0.55***
middle	2.2	0.9	***0.43***
highest	2.5	0.7	***0.27***
lowest/highest	*1.27*	***2.59***	

Bold p<0.05

The pattern of distribution across the age groups was similar in 1987 and 2001 with overall a lower incidence level in 2001 (figure 12.4).
Unsurprisingly, the highest incidence was found in the eldest group, definitely because of dementia.
The difference in incidence between males and females was not statistically significant in 1987 and 2001 with the exception of the age group 25 to 44 in 1987.

Figure 12.4 Incidence rates of psychoses in 1987 and 2001 by age; per 1000 per year



	15-24y	25-44y	45-64y	65-74y	>=75 y
2001/1987	**0.44**	**0.29**	**0.27**	**0.33**	**0.71**
Female/ male ratio					
1987	0.52	**1.69**	0.76	1.83	0.98
2001	0.98	1.08	0.98	0.77	1.07

Bold p< 0.05

12.3.5 Sexual problems

The overall incidence rate of sexual problems was exactly similar in 1987 and 2001. Sexual problems related to the P chapter decreased between 1987 and 2001, whereas sexual problems related to the ICPC X and Y chapter increased (table 12.5) .
The overall incidence rate harbours a considerable increase in the rate of *males* between 1987 and 2001, and a similar decrease in the rate of *females*. Between the *three SES groups*, the rates were not significantly different.

Table 12.5 Incidence rates of sexual problems in 1987 and 2001 by sex and SES; per 1000 per year

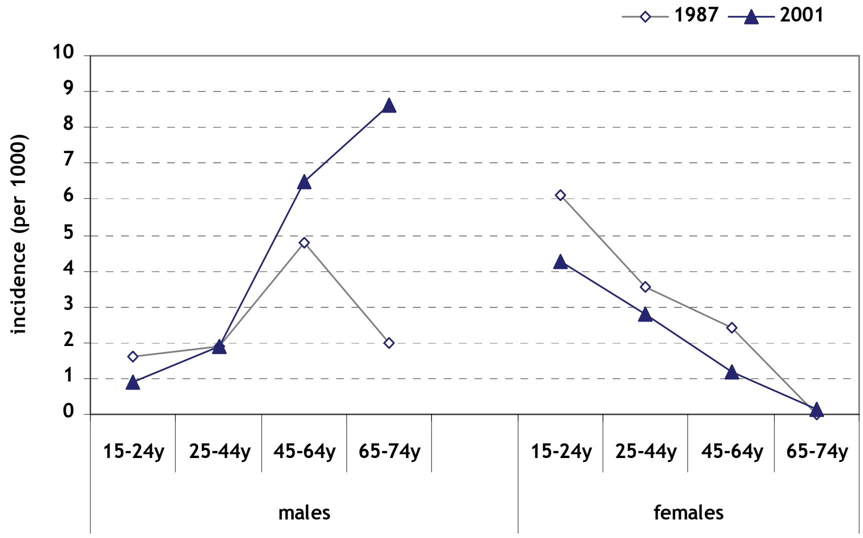
	1987 /1000	**2001 /1000**	**2001/1987 ratio**
Sexual desire reduced (P07), Sexual fulfilment reduced (P08), Sexual preference concern (P09)	1.50	0.78	***0.52***
Painful intercourse female (X04), Fear of sexual dysfunction female (X24), Complaints potency male, (Y07) Other Sexual dysfunction male (Y08), Fear of sexual dysfunction male (Y24)	0.88	1.60	***1.81***
Sexual problems	2.38	2.38	*1.00*
Sex			
male	2.17	3.06	***1.41***
female	2.61	1.72	***0.66***
female/male ratio	*1.20*	***0.56***	
SES			
lowest	2.22	2.41	*1.09*
middle	2.61	2.34	*0.90*
highest	2.59	2.32	*0.89*
lowest/highest SES ratio	*0.86*	*1.04*	

Bold P<0.05

Because males and female showed different patterns, we provided separate figures for males and females across the different age groups (figure 12.5).

In *males* there is a different pattern in 2001 compared with 1987. In the age group 25 to 44 the incidence rates of both years was similar, in all older age groups the rates in 2001 were higher than in 1987. It is striking that the peak incidence in 2001 occurred in the age-group 65 to 74, whereas in 1987 the peak was in the age group 45 to 64. The incidence in the 65 to 74 years age group was in 2001 more than four times higher than in 1987.
In *females* we saw the same pattern in 1987 and 2001 with a lower incidence rate in 2001 across all age groups. Both in 1987 and 2001, up to the age of 45 years the incidence in *females* was higher than in *males*, from the age of 45 years onwards the rates in males were higher.

Figure 12.5 The incidence rates of sexual problems by sex and age; per 1000 per year



2001/1987	15-24y	25-44y	45- 64y	65-74y
Male	**0.57**	1.00	**1.35**	**4.30**
female	**0.70**	**0.78**	**0.48**	**0.18**
Female/male				
1987	**3.83**	**1.86**	**0.51**	0.46
2001	**4.65**	1.45	**0.18**	**0.02**

Bold P<0.05

12.3.6 Substance abuse

Looking at the various substances, we noticed an increase in the incidence of medication abuse and drug abuse between 1987 and 2001, and a decrease in alcohol abuse (table 12.6). Overall, the incidence rate of substance abuse remained stable between 1987 and 2001.
The incidence in *males* was higher than in *females* in 1987 as well in 2001.
In 2001 the difference in incidence between the *lowest and highest SES group* reached statistical significance, in 1987 there was no difference.

Table 12.6 Incidence rates of substance abuse in 1987 and 2001; per 1000 per year

	1987	**2001**	***2001/1987***
	/1000	/1000	*ratio*
Chronic alcohol abusus (P15)	1.3	0.5	***0.39***
Acute alcohol abusus (P16)	0.2	0.1	***0.61***
Tobacco abuse (P17)	1.8	2.1	*1.16*
Medication abuse (P18)	0.1	0.3	***2.55***
Drug abuse (P19)	0.1	0.3	***2.81***
Substance abuse	3.6	3.4	*0.94*
Sex			
male	4.5	3.7	***0.83***
female	2.8	3.1	*1.10*
female/male	***0.62***	***0.82***	
SES			
lowest	4.2	4.2	*1.00*
middle	3.2	2.8	*0.87*
highest	2.9	2.7	*0.93*
lowest/highest	1.46	**1.57**	

Bold p<0.05

Sex differences

Under substance abuse various types of addiction are grouped. Because we expect that the pattern of abuse of each substance are different for males and females, we added a paragraph, in which for each substance the incidence rates in males and females is presented.
In table 12.7 the differences in incidence rates in males and females between 1987 and 2001 for the abuse of specific substances are presented. The incidence rate of alcohol and drug abuse was higher in males, the rate of medication abuse higher in females, whereas no difference was found in tobacco abuse. Both in 1987 and 2001 medication abuse occurred more frequently in females, however, in 1987 the female/male ratio was 7.3 against 1.5 in 2001.

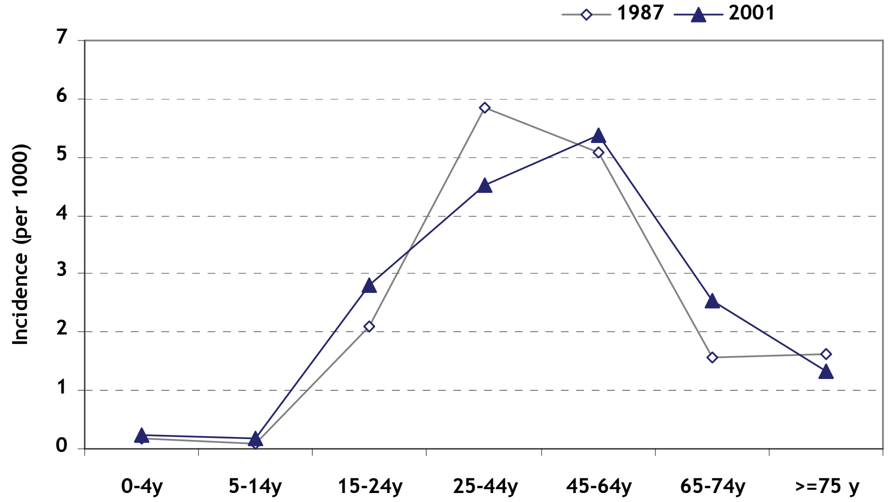
Table 12.7 Incidence rates of substance abuse for each specific substance by sex in 1987 and 2001; per 1000 per year

	1987 Incidence /1000		2001 Incidence /1000		*2001/ 1987*		1987 female	2001 female
	male	female	male	female	*male*	*female*	/male	/male
chronic alcohol abuse (P15)	**2.08**	**0.62**	**0.80**	**0.23**	***0.38***	***0.37***	**0.30**	**0.28**
acute alcohol abuse (P16)	**0.38**	**0.08**	**0.17**	**0.11**	***0.44***	*1.34*	**0.22**	0.67
Tobacco abuse (P17)	**1.89**	**1.79**	**2.06**	**2.18**	*1.09*	***1.22***	0.95	1.06
Medication abuse (P18)	**0.03**	**0.22**	**0.28**	**0.41**	***9.04***	***1.82***	**7.26**	**1.46**
Drug abuse (P19)	**0.12**	**0.10**	**0.44**	**0.16**	***3.67***	*1.67*	0.70	**0.36**
all	4.5	2.8	3.7	3.1	***0.83***	*1.10*	**0.62**	**0.82**

Bold p<0.05

The incidence pattern across the age groups showed a similar pattern in 1987 and 2001 (figure 12.6). The highest rates were seen between the age of 25 and 64.
Males had higher incidence rates than females in all age groups: this difference was largest in the age group 65 to 74.

Figure 12.6 Incidence rates of substance abuse by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75 y
2001/1987	1.28	1.81	1.34	**0.77**	1.06	1.61	0.83
Female/male ratio							
1987			0.62	**0.73**	**0.53**	**0.22**	0.43
2001	1.62	1.05	0.73	**0.80**	0.98	**0.50**	0.76

Bold P<0.05

12.3.7 Behavioural problems

Because more than 80% of all cases of behavioural problems occur in the age from 0 to 24, we will restrict ourselves to these age groups.
The incidence rates of behavioural problems went up by 69% between 1987 and 2001 (table 12.8).
In 2001, the incidence of behavioural problems in *males* was two times higher than in 1987. Whilst in 1987 the incidence rates in *males* and *females* were about similar, in 2001 the rate in males was 40% higher than in females.
The difference between the *lowest SES group* and the *highest SES group* was in 1987 not statistically significant, while in 2001 the rate in the lowest SES group was 25% higher than in the highest SES group.

Because the conditions in the cluster behavioural problems are heterogeneous, we present in table 12.8 also the rates for the individual conditions of this cluster to pinpoint more precisely at which level the changes between 1987 and 2001 took place. The largest proportional differences between 1987 and 2001 were observed in eating problems (ICPC codes P11 and T06), hyperkinetic disorder/overactivity (P21) and specific learning problems (P24). In eating problems the change between 1987 and 2001 occurred only in males: the rate rose from 0.12 per 1000 to 2.00 per 1000. The rates for learning problems were about similar in males and females in 1987, in 2001 the rate in males multiplied by a factor 9.6 and in females by a factor 4.

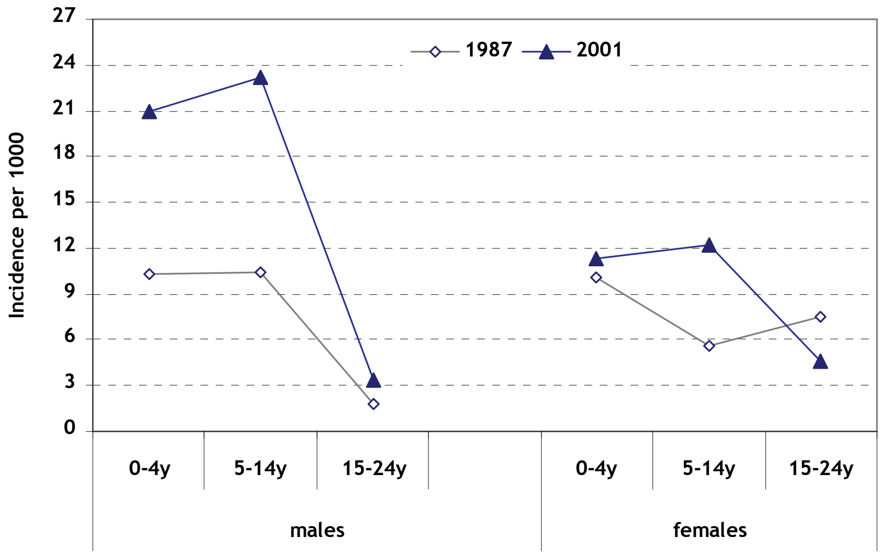
Table 12.8 Incidence rates of behavioural problems in persons < 25 years in 1987 and 2001 by sex and SES; per 1000 per year

	1987 /1000	2001 /1000	*2001/1987 ratio*
male			
Eating problem (P11, T06)	0.12	1.46	***12.44***
Bedwetting/enuresis (P12)	2.93	2.76	*0.94*
Encopresis/bowel training problem (P13)	0.57	0.22	*0.39*
Hyperkinetic disorder /overactivity (P21)	0.43	1.73	***4.05***
Child behaviour symptom/complaint (P22)	1.78	3.26	***1.83***
Adolescent behav. Symptom/complt (P23)	0.56	0.60	*1.07*
P24 Specific learning problem (P24)	0.50	4.86	***9.63***
female			
Eating problem (P11, T06)	2.00	2.24	*1.12*
Bedwetting/enuresis (P12)	2.58	1.57	***0.61***
Encopresis/bowel training problem (P13)	0.30	0.18	***0.59***
Hyperkinetic disorder /overactivity (P21)	0.20	0.37	***1.82***
Child behaviour symptom/complaint (P22)	1.00	1.97	***1.98***
Adolescent behav. Symptom/complt (P23)	0.57	0.41	*0.71*
P24 Specific learning problem (P24)	0.53	2.15	***4.05***
Behavioural problems (male and female)	7.07	11.93	***1.69***
Sex			
male	6.90	14.90	***2.16***
female	7.18	8.88	***1.24***
female/male ratio	*1.04*	***0.60***	
SES			
lowest	6.97	12.96	***1.86***
middle	6.28	13.88	***2.21***
highest	6.12	10.34	***1.69***
lowest/highest SES	*1.14*	***1.25***	

Bold p<0.05

Because the patterns changed in males and females between 1987 and 2001, we present in figure 12.7 the incidence rates in the several age groups separately for males and females.
In *males,* in all three age groups the incidence rates were approximately two times higher in 2001 than in 1987.
In *females*, the overall rates were 40% lower than in males, however, the distribution across the age groups was different from males: in the 0 to 4 group, the difference between 1987 and 2001 was not statistically significant; in the age group 5 to 14 the rate was about twice higher in 2001 than in 1987, whereas the rate in the 15 to 24 years group was 39% lower in 2001 than in 1987.
The female/male ratio changed between 1987 and 2001. In 1987, in the youngest age group there was no difference between males and females, in the age group 5 to 14 the incidence in males was 47% higher than in females, however, in the age group 15 to 24 the incidence in females was more than four times higher than in males. In 2001, the female/male pattern changed; in the youngest age group the incidence in males was 46% higher than in females, in the age group 5 to 14 years the rate was 47% higher than in females. In the age group 15 to 24 years the incidence in females was higher 37% than in males; however, compared with 1987 males and females came much closer. The higher incidence rates in females of this age group were brought about by the higher incidence of eating problems.

Figure 12.7 Incidence rates of behavioural problems in persons < 25 years by sex and age; per 1000 per year



	Male				Female		
	0-4y	5-14y	15-24y		0-4y	5-14y	15-24y
2001/1987	**2.04**	**2.21**	**1.90**		1.13	**2.20**	**0.61**
Female/ male ratio							
1987	0.98	**0.53**	**4.29**				
2001	**0.54**	**0.53**	**1.37**				

Bold $p<0.05$

12.3.8 Sleep disturbances

The incidence of sleeping disturbances was in 2001 twice as high as in 1987 and this applied for *males* and *females* (table 12.9). The incidence in females was about one and a half times higher than in males.
The difference in incidence between *the lowest and highest SES group* was in 1987 statistically not significant (ratio 1.28), but in 2001 with a ratio of 1.60 highly statistically significant (P<0.001).

Table 12.9 Incidence rates of sleeping disturbances by sex and SES; per 1000 per year

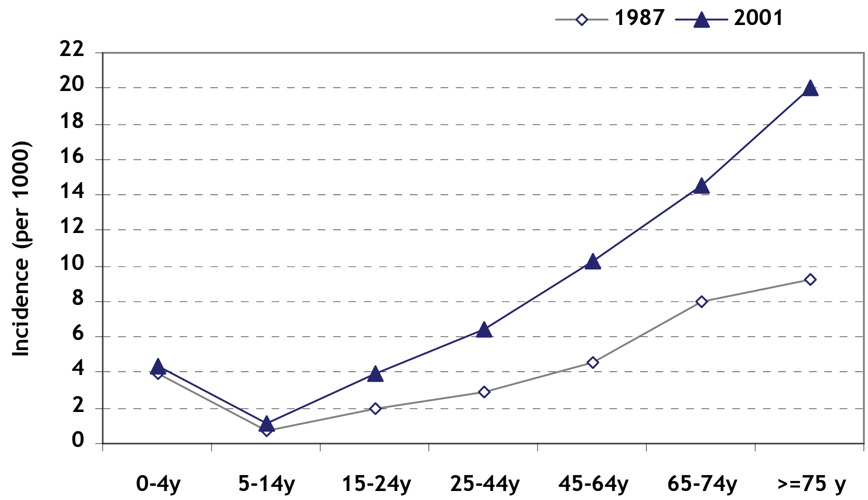
	1987	**2001**	**2001/1987**
	/1000	/1000	ratio
Sleeping disturbances	3.7	7.6	***2.05***
Sex			
male	2.7	6.0	***2.19***
female	4.5	9.3	***2.04***
female/male	***1.66***	***1.54***	
SES			
lowest	4.4	9.9	***2.24***
middle	3.6	6.9	***1.89***
highest	3.4	6.2	***1.79***
lowest/highest	*1.28*	***1.60***	

Bold p<0.05

In all age groups the incidence of sleep disturbances was higher in 2001 than in 1987 (figure 12.8). In the two youngest age groups the difference between 1987 and 2001 was not statistically significant. From the age group 5 to 14 onwards, each neighbouring age group had a higher incidence rate both in 1987 and 2001; the peak rate occurred in the oldest age group.
In general, females had higher rates across the age groups. In 1987 this difference was statistically significant in the youngest age group and from the age of 65 years and older onwards.
In 2001, in the two youngest age groups the incidence in males was higher (in

the 0 to 4 years group statistically not significant) and between 15 and 74 years the rates were higher in females. In the oldest age group the difference between females and males was not statistically significant (female/male ratio 1.07) in 2001, whereas there was a statistically significant difference in rate in 1987 (female/male ratio 2.30; p=0.03).

Figure 12.8 Incidence rates of sleeping disturbances by age; per 1000 per year



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75 y
2001/1987	1.10	1.56	**2.01**	**2.19**	**2.25**	**1.82**	**2.18**
Female/ male ratio							
1987	**2.80**	0.34	1.97	1.39	1.49	**2.17**	**2.30**
2001	0.75	**0.56**	**1.69**	**1.48**	**1.82**	**1.41**	1.07

Bold p<0.05

12.3.9 Medically unexplained physical symptoms .

The incidence rates of all medically unexplained physical symptoms (MUPS) was higher in 2001 than in 1987. For all ten together the incidence was almost 40 per 1000 higher in 2001 than in 1987, an increase of 73%. Absolutely and proportionally the highest increase occurred in neck problems.

Table 12.10 Incidence rates in 1987 and 2001 of ten medically unexplained physical symptoms; per 1000 per year

	1987 /1000	**2001** /1000	***2001/1987* ratio**
Fatigue (A04)	7.4	18.6	***2.50***
Abdominal pain (D01)	7..7	6.2	***0.80***
Epigastric pain (D02)	2.5	5.1	***2.05***
Nausea (D09)	0.9	2.9	***3.23***
Heart pain (K01)	0.3	1.6	***4.98***
Palpitations (K04)	1.0	3.0	***3.03***
Neck problems L01)	3.0	15.5	***5.26***
Low back pain L03)	30.3	26.7	***0.88***
Headache N01)	5.5	8.7	***1.60***
Pruritus (S02)	3.3	5.3	***1.61***
Total	54.2	93.6	***1.73***

Bold p<0.05

12.4 Discussion

In this discussion we start with a summary of the main results and subsequently three subjects will be reviewed and debated. The first subject is to compare the results from the two Dutch National Surveys with other sources from general practice. The second subject is to discuss the differences between 1987 and 2001. The third is to address the differences between population-based and psychiatric studies on the one side, and our results on the other side.

12.4.1 Summary

- In 2001 the incidence of psychosocial problems was 24% lower than in 1987.
- The gap between the lowest and highest SES group in the incidence rates of psychosocial problems became larger between 1987 and 2001.
- The incidence rate of anxiety decreased by 37% between 1987 and 2001.
- The incidence of rate depression decreased by 14% between 1987 and 2001.
- The incidence rate of sexual problems was in 2001 in males more than two times higher than in females, whereas there was in 1987 not a statistically significant difference.
- The incidence rate of behavioural problems in persons younger than 25 years increased by 69% when comparing 2001 with 1987.
- The incidence rate of sleep disturbance was more than two times higher in 2001 than in 1987.
- The incidence rate ten medically unexplained physical symptoms was 73% higher in 2001 than in 1987.

12.4.2 Comparison with other studies from general practice

For this purpose we made use of the data of two Dutch registration systems from general practice and of two British studies.
The data of the Dutch registration systems come from the “Transition project” and from the CMR Nijmegen.

Table 12.11 incidence rates of several primary care systems

	CMR 1986-1990	CMR 1999-2003	Transition project 1995-2004	1987	2001	4th NS 1991-1992	B'ham 1996	B'ham 2001
All psychological problems	122	98	74	88	71	61		
Z chapter	1	1	31	28	17			
All (psychosocial)	123	99	105	115	87			
Depression	2.7	6.3	13.1	12.3	10.6	11.2	17.8	12.9
Anxiety	0.3	2.3	16.9	23.0	14.6		12.0	12.6

The Transition project is using the ICPC as classification system. This makes a comparison with our results straightforwardly. The figures of the Transition project represent the average yearly incidence rate between 1995 and 2004.
Compared with our 2001 survey, the figure of the Transition project for psychological problems was rather similar (69 per 1000 in our study and 74 per 1000 in the Transition project (Table). The incidence of social problems (Z chapter) was considerably higher in the Transition project (31 per 1000 as against 17 per 1000 in our survey). The detection of "problem behaviour" was one of the spearheads of this registration system.

When comparing our results with *those of the CMR*, one should be aware that this registration system did not use the ICPC classification, but the socalled E-list, a modification of the old Eimerl list [*]. This modified E-list has some peculiarities. The most important is a code for nervous-functional symptoms. Symptoms have to fulfil two criteria before being classified as nervous-functional: "there should be found no organic cause which could explain the symptoms, and there should be positive indications of stress in life or at work to explain the symptom". The importance of this code in the CMR becomes clear on seeing that two third of all codes (64 out of 98 per 1000 in the period 1999-2003) from the P chapter of the Elist concerns this nervous-functional

[*] This Eimerl list was developed by the Royal College of General Practitioners and derived from the ICD-7. The list was translated and adapted by the Dutch college of General Practitioners for use in the Netherlands and later on adapted in the CMR.

code (code 1359). Another difference with the ICPC classification is that there is only one code for social problems (5290). Social problems were hardly ever registered (1 per 1000) within the CMR (Table). This reflects the underlying philosophy of the CMR to register morbidity and no social problems.

In the CMR there was a 20 % decrease in the incidence of psychological problems between the period 1986-1990 and 1999-2003 (from 122 per 1000 to 98 per 1000). Exactly the same proportional decline occurred in our two Dutch National Surveys between 1987 and 2001 when combining the incidence rates of the ICPC P chapter and the "Fear of diseases"codes.
Assuming that compared with the two National Surveys and the Transition project, in the CMR some substitution took place between social problems and psychological problems, it appears justified taking as point of comparison all psychosocial problems together. This reduces the difference between the two systems to 13 %. (99 per 1000 vs. 87 per 1000).
The rates for depression and anxiety appear to be very low in the CMR, although both disorders increased considerably between 1986-1990 and 1999-2003. However, it should be kept in mind that the rates of the two national surveys in 1987 and 2001 for anxiety and depression were "cluster" rates i.e. that symptom codes contributed heavily to the final rates. It is plausible that in the CMR these symptom codes were registered under the code for nervous-functional symptoms. After subtracting the incidence of symptom codes in the second national survey (2001) the resulting incidence for depression would be 10.1 per 1000 and for anxiety 4.4 per 1000. This is still higher than in the CMR (with 6.3 per 1000 for depression and 2.3 per 1000 for anxiety), but the gap has become considerable smaller.

In the fourth national morbidity study, carried out by the Royal College of General Practitioners in the UK in 1991 and 1992 the overall rate of psychological problems was 61 per 1000. As classification system the ICD-9 (international classification of Diseases) was used. In this morbidity system there were no codes for social problems. In this system it is difficult to distinguish anxiety. Persons with an anxiety disorder are hidden in code 300 (neurotic disorders), 308 (acute reaction to stress) and in code 309 (adjustment reaction).

In 2001, in the *Weekly Returns Service of the Royal College of General Practitioners* the incidence of depression and anxiety was 12.9 and 12.6 per 1000; these rates were lower than those in 1996. For both conditions the rates agree reasonable well with those of the second Dutch National Survey.

This comparison with other systems from general practice, demonstrated that the results of the two national Dutch Surveys were largely consistent with the results of other primary care sources. The 20 % decline in psychosocial problems between 1987 and 2001 in the two Dutch National Surveys, is mirrored in the CMR with a decrease of 20 % between the periods 1986-1990 and 1999-2003.
The fact that both systems were producing quite similar incidence rates and were showing the same trend over time, made the results robust; this means that we can say with more confidence that the results are a true reflection of what happened in general practice in these time periods with psychosocial problems.

12.4.3 Differences in incidence between 1987 and 2001

When we are confronted with differences in the incidence rates between 1987 and 2001, we try to interpret these differences. We consider the following possibilities. There can be a “real” change, or the difference between the two time periods can be caused by changes in the characteristics of the population, changes in the characteristics of general practice, changes in the health insurance care system, or differences can be caused by methodological.

As indicated the overall incidence rate of psychosocial problems dropped between 1987 and 2001. Does this imply that the number of psychosocial problems really decreased during that period?
Verhaak found that mental health as indicated by GHQ-12 was worse in 2001 than 1987. [4] When the cut-off point of the GHQ-12 was laid between 1 and 2, 16.8% of the responders scored above threshold in 1987, while this figure was 22.8% in 2001. The increase in the percentage of persons scoring above GHQ cut-off score could be observed in all sociodemographic categories. This makes it unlikely that the decrease in the incidence rate of psychosocial problems can be ascribed to a “real” change.

The decrease in psychological diagnoses may indicate a decrease in patients’ tendency to attend their GPs for psychological problems. But this is difficult to

bring in line with the increased demand for help in the ambulant mental care; we know that the number of contacts in institutions of ambulatory mental health care increased by more than 21 % between 1989 and 1996. [5] However, we saw overall a reduction in incidence rate for most of the ICPC chapters, so we can't exclude that patients were less inclined to present psychosocial problems to their GP.
An alternative explanation, from the side of GPs, might be a reduced "task perception" of GPs with regard to psychosocial problems between 1987 and 2001.[6] In chapter 5 we discussed this item. The reduced task perception can be considered as a defence mechanism to clamp down on the workload. GPs complained a lot about increasing workload and insufficient patient time, a development that appeared to be international.[7,8] GPs reacted in two ways. At the entrance to the primary care filter, they seem to have become more reluctant to recognise psychological problems as such, and at the exit they choose to increase referrals . The mental health referrals were about 4.5 times as high in 1995 as they were in 1975. [9]
In this chapter we took the output of all GPs together en did not focus on differences between GPs. But we are aware that there are huge variations in work style and task perceptions between GPs. The finding that GPs' perceptions of their role towards mental health care is reflected in the diagnoses they make, agrees with earlier studies in which it is shown that GPs' attitudes toward mental health care affect their work.[10,11] This means that a doctor who wants to see a patient's mental health problems, will have a greater chance of finding them than GPs with a more limited perception of their role towards mental health problems.

An indication that GPs were less inclined to assign psychological code to the complaints of patients was the increase of 73% in the incidence rate of ten common medically unexplained physical symptoms (from 54 to 94 per 1000).
Apparently, GPs were in 2001 more hesitant to classify and code somatic complaints and symptoms as psychosocial than in 1987.
How did this apply to clusters of diagnoses or specific diagnoses.

Anxiety

The incidence rate of the the cluster anxiety was in 2001 37% lower than in 1987. The incidence and prevalence rates in general practice are much lower than rates from community-based research.[12,13] Patients with anxiety disorders present usually with somatic complaints. Apparently GPs register those

complaints not as a disease, but as a symptom.[14] We demonstrated that the tendency of GPs to use symptom codes increased between 1987 and 2001.
Besides somatic symptom diagnoses, other symptom diagnoses from the P chapter can have been used. Examples are P04 (feeling irritable) and P06 sleeping disorders (doubled in 2001) . In addition, instead of a code for anxiety it is likely that more often a "fear of disease" code was given. Whereas in 1987 13 per 1000 patients received a "fear of disease" code, this was 18 per 1000 patients in 2001. If we would have considered the "fear of disease" code as part of the anxiety cluster, the incidence of 1987 and 2001 would have been very close to each other.
In spite of lower incidence of the cluster "anxiety", the specific diagnosis anxiety disorder (P74) was nearly three times higher in 2001 than in 1987 whereas the incidence of the "symptom diagnosis "feeling anxious" (P01) went down more than 40 %.
This is in contrast with the general trend that the number of symptom codes in 2001 was considerable higher than in 1987. Likely, this is the effect of the guidelines of the Dutch college of General Practitioners about anxiety disorders, which was issued in 1997.[15] The description and the definitions of anxiety disorders presumably convinced GPs to classify a case more often as an anxiety disorder.

Depression

For the *cluster depression*, there was an opposite situation. The incidence of the specific diagnoses like depressive disorder (P76) and affective psychosis declined, whereas the incidence of the symptom code "feeling depressed (P03) more than doubled. In 1994 the Dutch College guideline for depressive disorders was issued [16] . This guideline had a different effect on the classifying and coding behaviour than the guideline of anxiety disorders.
A possible explanation could be that GPs caught up with anxiety disorders after the guideline about anxiety disorders was issued, because before that period they did not feel confident in diagnosing these disorders [17], whereas GPs were already confident with the diagnosis depression before the issuing of the guideline depressive disorders; the guideline made them more critical in assigning this diagnosis.
The communal factor in these seemingly conflicting trends, could be that thanks to the guidelines the diagnostic acumen of GPs improved.

Substance abuse

For the several types of substances we saw different female/male patterns. Medication abuse was more common in females than in males, whereas alcohol and drug abuse was much more common in males. Taken all substance abuse together, females and males approached each other between 1987 and 2001 (female/male ratio in 1987 0.62 and 0.82 in 2001). Partly, this may be attributed to an increase in tobacco abuse (+ 27 %) in females.

Behavioural problems

The incidence of *behavioural problems* was 69% higher in 2001 as compared with 1987. The rise occurred in particularly in males and was most marked in boys from 5 to 14 with a rise from 10 to 23 per 1000.

In the age group 15 to 24, the incidence rates in females were higher than in males attributable to more eating problems in females. However, the rates in females and males of this age group, were much closer in 2001 than in 1987.

The increased incidence between 1987 and 2001 in males was mainly caused by eating problems (P11 and T06), hyperkinetic disorders (P21), and specific learning problems (P24).

With *hyperkinetic disorders* (P21) is mainly meant the attention-deficit hyperactivity disorder (ADHD). This term came in use in the early nineties; before that time persons with hyperkinetic disorders were often defined as minimal brain damage or minimal brain dysfunction. The disorder is frequently diagnosed in children with hyperactive behaviour, poorly focused attention, and impulsive excitability in different mixtures, and the affected children often underachieve at school [18].

We found in males a fourfold increase in the incidence rate of hyperkinetic disorders between 1987 and 2001 (table 12.8), in 2001 the rate was in males five times higher than in females.

In the nineties the number of children which got the label ADHD increased tremendously. This had a number of reasons. Firstly, in 1992 the International Classification of Diseases, 10th revision (ICD-10) included a definition of "hyperkinetic disorder" that was more explicit than previous versions.[19] Secondly, methylphenidate came in vogue as treatment and thirdly , pressure from parents' support groups has forced increased professional recognition.

A steep increase in the utilisation of these drugs has been documented in the US [20]. The use of stimulant drugs – in most cases methylphenidate – increased fourfold from 1987 (0.6%) to 1996 (2.4%) among subjects 18-year-old and younger in the U.S [21]. In 2001 from the 80 million children below 18 years between 4 and 5 million were using methylphenidate.

In the Netherlands the use of stimulants in children is much lower than in the U.S., however the prevalence of the use of stimulants in children from 0 to 19 years increased from 1.5 per 1000 in 1995 to 7.4 per 1000 in 1999. In 1987 no methylphenidate was prescribed whereas in 2001, methylphenidate was used in males in the age from 5 to 14 years by 13.7 per 1000 and in females from this age group it was used by 1.9 per 1000; in the youngest age group (0 to 4 years) it was hardly prescribed (males 0.4 per 1000, females 0.3 per 1000) and in the age from 15 to 24 years in males 3.3 per 1000 and in females 0.5 per 1000.

The incidence of *specific learning problems* (P24) was in males 9 times higher in 2001 than in 1987 and in females 4 times higher. A possible explanation might be that the combination of spending cuts on Education and experiments with new forms of learning, has resulted in a higher drop-out of less-abled pupils.

12.4.4 Differences between data from general practice on the one side and epidemiological and psychiatric data on the other side

Our next step is to discuss the differences between primary care studies and studies from epidemiological and psychiatric side. GPs are often being criticised that they are missing a substantial portion of the presented mental problems.

Box 12.1

Taking health questionnaires and health interviews as gold standard, then psychiatric disorders are much more prevalent in the community than statistics from our surveys
would suggest. A large WHO-consortium [22] (WHO, 2004) reported recently prevalences according to DSM-IV diagnoses in 14 countries all over the world. One-year prevalences of any psychiatric disorder, measured among more than 60,000 community adults between 2001 and 2003, varied between 5% and 26% with 14.9% for the Netherlands [23]. For the Netherlands prevalence rates of anxiety disorders were assessed at 8.8 % and prevalence rates of mood disorders at 6.9 %. Earlier population studies in the nineties, with a comparable design, using DSM-III compatible diagnoses, reported comparable ranges and prevalences[23]. The results of this WHO study can't be compared directly with our study, because the WHO study represents prevalence rates. The overall prevalence rate of all psychiatric conditions in the second Dutch National Survey was 4.7 %.

The large number of patients, seemingly unnoticed in general practice is a subject of study since years. [17 24 25] There are some characteristics of patients and their psychiatric disorder that may boost their chances of being diagnosed as having psychological or social problems.[26] Females and patients well known to their GPs have a better chance of being recognized as suffering from mental illness. [27] Characteristics of the disorder may play a role as well; depression is better recognized than anxiety disorder; [17] more severe disorders are better recognized than milder forms. [4 25]
We will make some remarks about the studies that claim that GPs miss the majority of the psychosocial problems.
Firstly, the notion that GPs fail to detect mental problems is mainly based on cross sectional studies, while the trademark of the GP is the longitudinal element in his relation with the patient. In many cases the GP is aware of mental problems, but in the present consultation he gives priority to the request for help. If a depressive patient consults his GP for an ingrown toe nail, he will get a code for this ailment and not for his depression.
This touches upon an important core value of general practice. Most consultations in general practice are initiated by the patient. The content of the primary care consultation and its outcome will be influenced by what the patient chooses to present and how he or she chooses to present it .[28] Patients are autonomous individuals, who have their own reasons for coming to the surgery, and who by merely visiting do not consent in unsolicited advice, or

unwarranted medical interventions .[29]
Kessler [30] demonstrated that although many patients with depression did not receive a diagnosis at a single consultation, most were given a diagnosis at subsequent consultations or recovered without a general practitioner's diagnosis.

Secondly, the belief that GPs are failing to recognise mental illness, is based mainly on comparisons between GPs' diagnoses and the "gold standard" of standardised psychiatric screening instruments, such as the general health question nary. The GHQ has been developed as a screener for psychiatric disorders in community setting.
The “gold” standard is by definition always right, whatever its intrinsic weak points.
The MaGPIe Research Group calculated the sensitivity, specificity and predictive value of the GHQ, whereby a ‘case’ was defined as a somscore of three or higher. [31] f as cut off point a sum score of 3 was used, the sensitivity was 66%, the specificity 72% and the positive predictive value 34%. In many studies a sum score of 2 has been used as case definition.
Bensing et al. stated that the differences between the GHQ and the judgment of the GP can be brought back to a methodological question.[32] The GHQ measures the general probability on mental problems, whereas the GP assesses whether mental problems play a role in the present consultation; these are two different things.
The GHQ is a well-validated instrument that is meant to replicate psychiatric judgement. Lack of concordance between GPs and the GHQ therefore represents a conflict between GPs and psychiatrists about what is a ‘real’ case of mental illness. GPs and psychiatrists see a very different morbidity spectrum and show different approaches to illness management, so it might be expected that definitions might differ and by reconstructing GPs’ diagnostic criteria
in terms of GHQ items the basis for the mismatch between the two can be made clearer.
On this point we will elaborate. Psychiatrists base their diagnoses on the DSM IV. This established psychiatric diagnostic system was developed to classify the psychological and behavioural disease found among psychiatric inpatients. Although their scope has broadened with successive revisions, they remain more applicable to the 2% of the population who are seen by psychiatrists than to the much larger proportion who are considered to have mental health

problems by their general practitioner.
Contrary to the psychiatrist who may devote himself to clear cut psychiatric problems, the GP has to deal with patients who frequently present with vague and ill-defined somatic complaints and symptoms. These complaints and symptoms occur with varying degrees of severity and appear to exist on a continuum, blending with normal behaviour. This results in less classical psychiatric clinical presentations and in symptom patterns and deviant behaviours, which do not fit readily within the DSM IV system.

Thirdly, even when GPs suspect a psychosocial origin in patients who present MUPS, they are often reluctant in classifying and coding this into an ICPC code of the P or Z chapter.
This happens especially when a patient after being questioned by the GP, doesn't concede the existence of psychological or social problems. As mentioned above, the patient as an autonomous individual may play a role in the label the GP assigns to the presented MUPS. A GP can often afford to take his time, and not be too eager to take initiatives because of the typical characteristic of continuity of family practice: GP and patient will meet again.
Furthermore, Huygen remarked that seeking psychosocial causes unasked, may evoke undesired side-effects [33] and that many psychosocial complaints fade of their own accord. This was confirmed in a study of Schilte [34]. In this study an intervention focusing on disclosure of traumatic experiences for patients with somatisation in primary care was conducted. The effect of adding the disclosure intervention to regular care on use of medical services, subjective health, and sick leave was studied. The intervention had no effect on the main outcome measures at any point.

12.5 Conclusion

When comparing 1987 with 2001 psychosocial problems were less often registered. This same phenomenon was found in other morbidity registrations from general practice.
The higher scores in 2001 on GHQ-12 (indicating more mental problems) and the increased inflow of patients to institutions of ambulatory care, suggest that that overall mental health was worse in 2001 than in 1987.
This makes it plausible that a reduced task perception concerning psychosocial problems is an important reason for the found lower incidence rate of psychosocial problems in 2001.
The rates found in psychiatric-epidemiological studies can't be directly compared with rates from general practice; in the former the emphasis is on the probability of a mental problem, in the latter the question is whether mental problems play a role in the present consultation.
There is some disagreement between GPs and psychiatrist about the desirability to recognise potential self-limiting psychosocial problems in an early stage.

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Part 3 Interventions in general practice in 1987 and 2001

13 An introduction to interventions in general practice

13.1 Introduction

As was stated in the introduction of this thesis, part of our aim was to describe changes in interventions of GPs with regard to the presented health problems between 1987 and 2001.
In part two we reported about the changes in morbidity patterns, in this part we will present data about changes in interventions in general practice between 1987 and 2001.
We define interventions as any procedure carried out by GPs in reaction to a presented health problem. In this way defined, it is a broad concept, involving the most important activities of a GP. We divide interventions in two main categories: *diagnostic* and *therapeutic* interventions.

Diagnostic interventions comprise *history taking, physical examination, and additional investigations*.
Therapeutic interventions are subdivided into:

- *Education, advice and counselling*
- *Medical technical interventions (e.g. minor surgery)*
- *Prescribing drugs*
- *Referrals to other primary and secondary health care professionals*

13.2 Diagnostic interventions

The diagnostic process includes history taking, physical examination, and additional investigations.
Within primary care history taking and physical examination are the most important aspects of the diagnostic process.
In a study in which the contribution of history taking was assessed in establishing a diagnosis, it was found that 69% of all cardiovascular conditions and 29% of all gastrointestinal conditions could be diagnosed solely by careful history taking.[1] The distinction between organic and non-organic gastrointestinal conditions can be made largely on the basis of the history of the patient. [2]
Physical examination in general is realised with simple means. Besides using their senses, GPs make use of simple devices like a stethoscope, a sphygmometer, and a percussor.

In many cases, the diagnostic process in general practice is not aimed at the determination of a particular diagnostic entity.[3] In case of a common disease of a self-limiting nature [4] the prognosis for the patient estimated by the doctor is much more important than the diagnosis itself. 'Watchful waiting' – monitoring a health problem to see how it develops, in the expectation that it will not become serious, while remaining alert to the appearance of unexpected symptoms are valuable elements of the diagnostic repertoire in general practice.[5] Unnecessary diagnostic examination has to be avoided, in order to prevent medicalisation and somatic fixation. [6]
However, another important diagnostic challenge in general practice is to identify the small number of cases of severe illness with few specific signs and symptoms among the much more common 'conditions with similar clinical presentations. To achieve this, GPs will regularly resort to additional investigations. The main diagnostic technologies employed in general practice cover a broad range of investigations ranging from simple urine dipsticks to more elaborate investigation such as echocardiography. It is part of the GPs' professional skills to find a balance between the Charybdis of too few diagnostic efforts and the Scylla of too many.

In this book we will not present empirical information about the diagnostic process, because of the very limited data available about diagnostic interventions in 2001. Instead we will focus on the therapeutic interventions.

13.3 Therapeutic interventions

Background

GP's treatment is closely tied in with information provision: the treatment process initially involves giving information about the possible ways of treating the problem in question. This is followed by a decision making process, in which patient and GP each play a particular role, and then by implementation of the chosen treatments : e.g self-care (the introduction of lifestyle changes), pharmacotherapy, physical exercise therapy, therapeutic counselling, social support or medical intervention. The active guidance of patients through the chosen therapy, anticipating possible problems, is an integral element of the treatment process.
We distinguished the following therapeutic interventions: education, advice and counselling; medical-technical interventions; prescribing drugs; referrals

to other primary and secondary care health professionals.

Education, Advice and Counselling (EAC)

The term doctor means teacher (in Latin docere means to teach). In any consultation a mixture of education, advice and counselling takes place. This process of information giving is an important element in the provision of care. Patients need information in order to understand their condition; to acquire a feeling of control, necessary for successful self-management; and to participate in medical decision-making. [7,8]

Because EAC is implicitly connected with the whole consultation process, any recording of EAC in a general morbidity survey is unreliable. This makes figures about education, advice and counselling in general surveys futile. However, it is possible to obtain more objective information about EAC by using video registrations of the consultations between doctors and patients.

Bensing et al. studied how societal changes over time were reflected in the interpersonal interaction between general practitioners and their patients; for this purpose they studied communication patterns between GPs and patients in 1986 and 2002 by assessing videotaped consultations with hypertension patients.[9]

They found that GPs had a more task-oriented communication style in 2001 compared to 1987: they were giving more information. However, the 2001 physicians were less engaged in partnership building, for instance by asking for patients' opinions, asking for clarification of patients' words. Patients did not become more active participants in the consultation: patients talked less, asked fewer biomedical questions and showed fewer concerns. Contrary to the expectations, a shift to a more egalitarian relationship in general practice was not found. As a possible reason Bensing et al. mentioned the introduction of the computer into the consultation room. None of the GPs in 1987 were using a computer, while in 2001 all of the GPs were using a computer and they were spending a considerable amount of time on computerised record-keeping.

As one of the explanations they suggested that GPs were not yet completely used to computerized record-keeping, and needed some time to adjust to this new 'third party' in the consultation room. However, they advocated that both research and education should pay more attention to the influence of the use of the computer on the course of medical consultations in order to minimize the disruptive and maximize the beneficial effects of this new “companion” of doctor and patient.

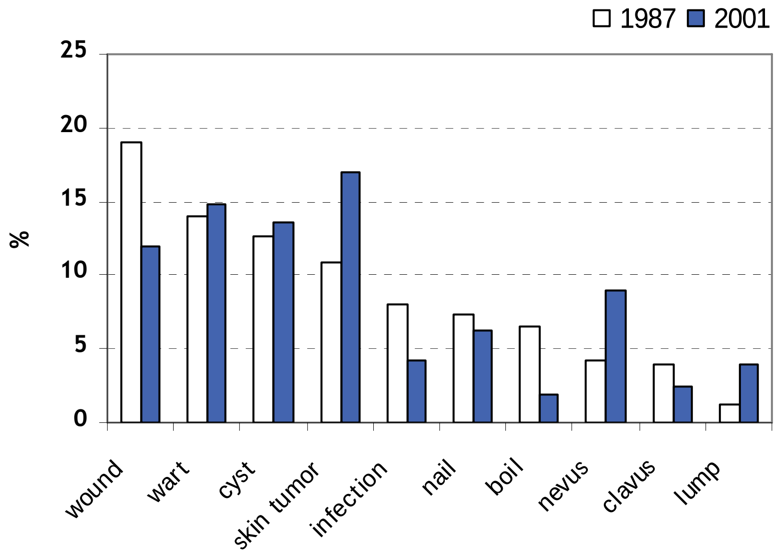
Medical-technical interventions

Medical-technical interventions involve a variety of activities such as incisions, excisions, wound repair, removing corpora aliena, cryotherapy, electro-cautery, curettage, injections and aspirations. Together they fall into the category minor surgery. There is evidence from the UK and other countries that minor surgical procedures carried out by general practitioners in general practice premises compared to hospitals result in less complications, high levels of patient satisfaction and are highly cost-effective.[10,11]
In the next section, data about minor surgical procedures from the two national surveys will be presented.

Minor surgery in general practice in 1987 and 2001

Marquet studied the number and nature of minor surgical procedures performed in general practice in 1987 and 2001. [12]
The number of minor surgical procedures in general practice per 1000 patients per year remained similar: in 1987 43.6 per 1000 and in 2001 41.6 per 1000.
About two thirds of the procedures were related to skin problems (in 1987 67%, in 2001 64%); procedures related to the musculoskeletal system comprised 5% of the procedures in 1987 and 8% in 2001; eye problems comprised 4% of all procedures in 1987 and 2.5% in 2001.
Between 1987 and 2001 the nature of the surgical procedures shifted from treating wounds (ranked first in 1987 with 19%) to removing skin tumours (ranked first in 2001 with 17%) (figure 1).
Warts were ranked second both in 1987 and 2001. Removal of sebaceous cysts was on the third place with 12.6% and 13.6% respectively in 1987 and 2001.
It is striking that the excision of skin tumours and nevi doubled between 1987 and 2001, whereas surgical treatment of wounds went down. There was a steep decline in the surgical treatment of boils from 6.5% to 1.9%.
Marquet hypothesised that the public education programmes about skin cancer has resulted in a greater alertness of patients and doctors to skin tumours and nevi.

Figure 13.1 Most common surgical procedures of skin



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14 An introduction in drug prescriptions in general practice in 1987 and 2001

14.1 Introduction

Prescribing medicines is one of the most important interventions carried out by GPs. In this chapter we start with background information on several aspects regarding the prescribing activities in general practice.
First we explain why we should study prescription patterns in general practice and subsequently we discuss three aspects of the prescribing process:

- prescribing as intervention
- choice of medication and
- organisational aspects of prescribing.

Thereafter, we continue with a methodological section. *Finally*, we will introduce the following chapters in which we study prescription patterns from different perspectives:

- the volume: how many prescriptions were issued, which proportion of the population has at least one prescription
- the type of drugs: which types are prescribed most frequently
- the disease: what is the proportion of patients that were prescribed
- the recommended medicines for that particular (group of) disease(s).

In the following chapters we will make use of all these three perspectives.

14.2 Relevance of studying drugs prescribing

The majority of drug prescribing takes place in general practice.[1] Florentinus [2] established that at least 85% of all medicines a patient received were prescribed by GPs. According to the Foundation for Pharmaceutical Statistics (Stichting Farmaceutische Kengetallen, SFK) in 2001 136 million prescriptions were issued to Dutch inhabitants: 81% by GPs, 16% by medical specialists and the other 3% by dentists, midwifes and other medical professionals. Pharmacological treatment initiated by medical specialists is often continued by GPs in the form of repeat prescriptions. This means that the prescription figures in general practice provide insight into the prescription behaviour of GPs and in the drug use of the Dutch population.
Research into pharmaceutical care is important in order to optimise the use of medication. We were able to study prescription patterns in general practice, because we had at our disposal the data of two national surveys conducted in 1987 and 2001. The design of these surveys was extensively described in

chapter 6. An important characteristic of these surveys is that prescription data could be linked to the indication or diagnosis.

14.3 The different aspects of prescribing

Medication as intervention

Prescribing medicines is the most common intervention of GPs as reaction to presented health problems. However, when a patient presents a health problem, pharmaceutical therapy is just one of the possible treatment options. Prescribing medicaments can be substituted by or complemented with advice; e.g. the most effective intervention for a patient with chronic obstructive airway disease is to stop smoking, and muscle strengthening exercises for patients with low back pain will prevent recurrences more effectively than drugs.[3]

Many illnesses are self-limiting. No therapy in the form of “watchful waiting” is in those cases an option as well. Compared to GPs in other European countries Dutch GPs show restraint in prescribing drugs. In 2001, Dutch GPs prescribed medication in 57% of all consultations (including face-to-face consultations, telephone consultations and visits) [4] , whereas in France and Italy more than 90% of the consultations ended with a prescription. In 2001, the average costs of prescribed drugs was € 235 per person; this amount is 25% to 40% below the costs in countries such as Germany (€ 304), Belgium (€ 346), and France (€ 381).

Choice of medication

Once the decision to prescribe medicines has been made, GPs are free in their choice of medicines. However, this choice is limited by a number of factors. Logically, in the first place it is dependent on the presented health problem. However, similar health problems don’t result always in similar actions by the GP.

The pharmacotherapeutical decisions of GPs are influenced and guided by various parties like guidelines issued by own professional organisations, colleagues, pharmacists, health insurers, pharmaceutical industry, government and patients

Haaijer-Ruskamp and Denig [5] developed a model in which the influences on therapeutic decisions of doctors were distinguished at two different levels.

On the first level, a doctor uses his professional expertise to form a personal choice set. The second level of decision making concerns the practical decision to apply the expertise to the personal choice set in order to arrive at a therapy choice for an individual patient.
The first sets are probably formed when students copy the behaviour of their teachers. Later, the sets are modified by elements mentioned in table 14.1.

Table 14.1 Model of GPs prescribing behaviour

Level 1: Doctor's choice set	**Level 2: Decision per patient**
education	individual patient characteristics
standards and other guidelines	electronic prescription system
meetings with pharmacist (FTO)	advice (colleague, specialist, pharmacist)
the pharmaceutical industry	therapeutic goal
regulation (by government and insurers)	medication surveillance
personal experience	intuition
medical specialists and other colleagues	doctor's emotions

Source Haaijer-Ruskamp and Denig [5]

We will clarify some of the elements in the table. GPs are supported in their prescription choice by *pharmacotherapeutical guidelines*. The most authoritative guidelines were issued by the NHG (the Dutch College of General Practitioners). Since 1989, the NHG developed guidelines for the diagnosis and treatment of more than 80 frequently occurring health problems. The NHG guidelines are updated on a regular base in order to address new developments.
Another element for promoting good prescribing are the *pharmaco-therapeutic consultancy* meetings between a pharmacist and GP's in his region, the so-called FTO meetings (farmaco-therapeutisch overleg). During these regular peer review meetings, pharmacists give GPs feedback about their prescriptions, and pharmacists and GPs exchange information about new pharmaceuticals, discuss therapy alternatives for specific diseases.
Medical specialists play a special role in the prescription behaviour of GPs. Specialists regularly initiate a pharmaceutical therapy, which is often

continued by the GP.
The *pharmaceutical industry* influences prescription behaviour in several ways. In the first place, by journal advertising and person-to-person promotions. However, pharmaceutical companies also organise and sponsor courses for GPs. Van der Linde gives several examples of health problems appearing frequently in courses after introduction of a new product for this health problem. [6]
The Government and healthcare insurers exerted their influence on prescription behaviour by determining which drugs are covered by the health insurance and by stimulating generic prescription. In addition, the government promoted the use of guidelines – for instance by promoting the use of a centralised electronic prescription system – and financially stimulated *pharmaco-therapeutic consultancy* meetings with pharmacists (see above). Several health insurers also had agreements/contracts with GPs concerning their prescribing behaviour.

Patients exert their influence at several levels. GPs' perceptions of patients' expectations for prescriptions have been shown to influence prescribing decisions in such a way that patients, being perceived as expecting prescriptions, are much more likely to receive them than those who are not perceived as expecting prescriptions.[7] These perceptions may however be based on guesses and assumptions and are not necessarily accurate.[8]

Ideally, the choice of medication should be guided by maximising effectiveness, by minimising risks and costs, and by respecting patients' preferences.[9] In some consultations all four aims will be achieved. Nevertheless, conflicts may occur; the two commonest being between effectiveness and risk, and balancing between patients choices and evidence-based prescribing.

Organisational aspects of prescribing

More and more drugs are used for many years or lifelong; e.g. for diabetes mellitus and the treatment of risk factors to prevent cardiovascular diseases in the future.
Many patients receive their long-term medication with repeat prescriptions. We use the term "repeat prescription" for medicines that are supplied to a patient without a consultation . It is usually requested by letter, attendance or telephone call to reception staff; and the prescription, after being signed by the GP, is either collected by the patient from the surgery or posted to the

patient, or sometimes directly sent to the pharmacy. It is customary with regard to repeat prescriptions to give a patient who is on stable long-term medication a 3-months supply. Every time GPs place their signature under a repeat prescription, they should ask themselves whether continuation of treatment is still necessary.[10] In Dutch general practice 55% of all prescriptions concern a repeat prescription.[11] In the case of lipid lowering agents, beta-blockers and antidepressants the proportion of repeat prescriptions is even higher than 90%.[12]

14.4 Methods

The first and second Dutch National Survey of General Practice (NS1 and NS2) have combined registration data on morbidity and prescription, making it possible to unravel diagnosis-specific prescription behaviour of general practitioners (GPs). During all face-to-face encounters, the diagnosis, referrals and prescribed medications were systematically registered and in 2001 electronically recorded. All prescriptions written after telephone contact with the practice assistant were also registered. In the NS1 a correction factor was applied, because repeat prescriptions were registered for only half the period.
All prescribed drugs were automatically coded according to the Anatomical Therapeutic Chemical (ATC) classification system.[13] Both in 1987 and in 2001, in 92% of all prescriptions an ATC code could be assigned. 62% of all prescriptions were labelled with a diagnosis, coded according to the International Classification of Primary Care (ICPC).
As base population, we took all patients who remained enlisted during the whole registration period in 1987 and 2001. As stated earlier, in 2001 data of eight practices were excluded because of inadequate registering discipline, leaving us with data from 96 practices. For studying the prescription data we had to exclude two more practices; in one practice the extraction of prescription data failed (1897 patients excluded) and one practice was excluded because no ATC codes were assigned (2605 patients). This resulted in a base population of 334,007 persons in 1987 and a population of 348,535 persons in 2001.
A prescription refers to a single item prescribed on a prescription form. A prescription is an order issued by a qualified health care professional to a pharmacist for a medicament to be provided to their patients. Every time the patient needs an order to obtain a drug counts as one prescription.

We distinguished between new and repeat prescriptions. A new prescription is a prescription that was prescribed for the first time during the registration period and that was not prescribed in the half year before the registration started.
To compare the prescription volumes of 1987 and 2001, we applied a weight factor to correct for differences in the registration periods.
The same drug can be prescribed to a patient for several indications. For example, beta-blocking agents are prescribed to patients with hypertension and to patients with coronary heart disease (CHD). However, in a prescription base each prescription can be linked to only one ICPC code. To overcome this, we merged separately the ATC codes and the ICPC codes to the base population. In this way, we could select all patients with hypertension who used a beta-blocker, irrespective of whether in the prescription the beta-blocker was linked to hypertension or CHD.

Although the major part of the prescriptions patients receive are issued in general practice, part is issued by other prescribers; these prescriptions are not registered in the electronic medication record of the GP. Florentinus et al. [2] examined the degree to which GP prescription data covered actual drug exposure in patients. They searched for prescriptions dispensed by the pharmacy, which were not found in the prescription data of the GP. The proportion of missing drugs in the medical file of the GP, varied per drug class (table 14.2).

Table 14.2 Proportion "missing" drugs in medical file of GP

Top ten drug classes received from other health care providers		
S01	Opthalmologicals	9.0%
N05	Anxiolytics	8.4%
R03	Anti-asthmatics	5.1%
B01	Antithrombotics	5.0%
N06	Antidepressants	4.9%
C07	Betablockers	3.7%
M01	NSAIDS	3.4%
C09	RAAS inhibitors	3.2%
C10	Lipid lowering	3.1%
J01	Antibacterials	3.0%

Source: Florentinus et al [2]

One should not conclude that because of these "missing" prescriptions the GP didn't know that the patient used this type of drug. It is quite possible that at another moment during the registration period, the GP issued a repeat prescription for such a drug. The proportion of patients using drugs GPs are not aware of will be lower than the proportion of missing prescriptions.

14.5 The next chapters

In the next chapters we will make use of the three perspectives mentioned in the introduction.

- In chapter 15 we present data about the prescription volumes in 1987 and 2001.
- In chapter 16, 17 and 18 we take the perspective of the disease. Consecutively, we describe and analyse prescription patterns in 1987 and 2001 in hypertension, coronary heart disease and in heart failure. These disorders were selected on the same grounds as stated in the previous paragraph; the concept of treating changed between 1987 and 2001. These changes were captured in NHG guidelines issued for these three disorders.

- In chapter 19 we concentrate on antidepressant medication. In this chapter we discuss the prescription volume of all antidepressants and we establish the use of antidepressants for a number of psychiatric conditions.
- Finally, in chapter 20 referrals to various medical specialists will be described.

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15 Volume of drug prescriptions by GPs in 1987 and 2001

15.1 Introduction

In this chapter we present the analyses on the volume of prescriptions per person in 1987 and 2001.

For studying the volume of prescriptions we formulated the following research question:

- What is the mean number of prescriptions per patient on annual base in relation to sex, age and SES in 1987 and 2001?

As stated in chapter 13, we applied a weight factor to correct for differences in the registration periods in 1987 and 2001.Also, we standardised our results for age according to the age composition of the Dutch population on 1-1-2001.

15.2 Results

In 1987, on average 3.9 prescriptions per person were issued; in 2001, the average number of prescriptions was 5.3 (table 15.1). There was an enormous dispersion of prescriptions per person; in 1987 the highest number of prescriptions for one male was 260 and for one female 244; in 2001 this was 292 and 494 in one year respectively.
Both in 1987 and 2001, the mean number of prescriptions was higher in *women* than in *men* (in 1987 37% higher, in 2001 47% higher).
Looking at the different *socioeconomic* groups, we found that in 1987 on average the number of prescriptions in the lowest SES group was 72% higher than in the highest SES group; in 2001 this was 51%.

The mean number of prescriptions was rising with increasing age (figure 15.1). Below the age of 15 the mean number of prescriptions was lower in 2001 than in 1987; in the age group 0 to 4 the mean was 26% lower, in the age group 5 to 14 it was 6% lower. From the age of 15 onwards the mean number of prescriptions was higher in 2001 than in 1987; in each older age group the difference between 1987 and 2001 increased.

Table 15.1 Number of prescriptions per patient per year in 1987 and 2001 in relation to sex, SES (means and ratios)

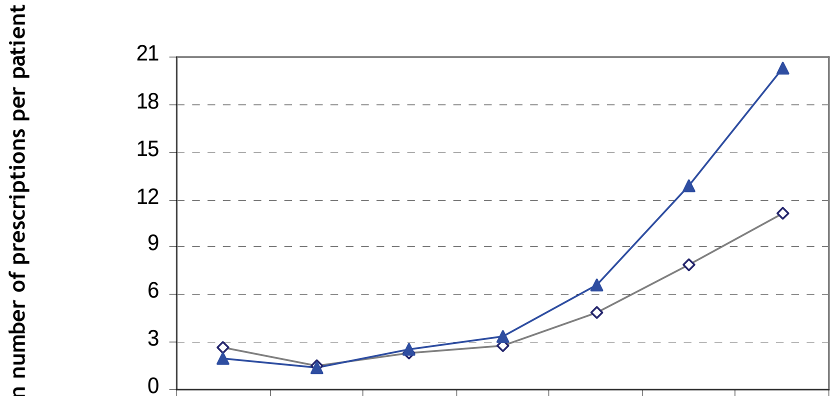
	1987 Mean no. of prescr	2001 Mean no. of presc	*2001/1987* *Ratio*
All	3.9	5.3	***1.38***
Sex			
Male	3.2	4.2	***1.33***
Female	4.4	6.9	***1.42***
Female/male ratio	***1.37***	***1.47***	
SES			
Lowest	4.6	6.4	***1.38***
Highest	2.7	4.2	***1.57***
Lowest/highest SES ratio	***1.72***	***1.51***	

Bold p<0.05

Both in 1987 and 2001, below the age of 15 the prescription rate was about similar in males and females; between the age 15 to 64 the rate was much higher in females than in males, particularly in 2001; from the age of 65 years onwards the rate was about 20% higher in females than in males.

The mean number of prescriptions was rising with increasing age (figure 15.1). In 1987 and 2001, below the age of 15 years the mean number of prescriptions was lower in 2001 than in 1987; in the age group 0 to 4 the rate was 26% lower, in the age group 5 to 14 this was 6% lower. From the age of 15 onwards the mean number of prescriptions was higher in 2001 than in 1987; in each older age group the difference between 1987 and 2001 became larger.
Both in 1987 and 2001, below the age of 15 the prescription rate was about similar in males and females; between the age 15 to 64 the rate was much higher in females than in males particularly in 2001; from the age of 65 years onwards the rate was about 20% higher in females than in males.

Figure 15.1 mean number of prescriptions per age group



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75 y
1987	**2.7**	**1.5**	**2.3**	**2.7**	**4.9**	**7.9**	**11.1**
2001	**2.0**	**1.4**	**2.6**	**3.3**	**6.6**	**12.9**	**20.3**

age	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75 y
2001/1987	**0.74**	**0.94**	**1.11**	**1.22**	**1.36**	**1.63**	**1.82**

Female/ male ratio

1987	**0.93**	**1.11**	**2.03**	**1.64**	**1.35**	**1.19**	**1.23**
2001	**0.92**	1.01	**2.77**	**2.10**	**1.46**	**1.19**	**1.19**

Bold p<0.05

15.3 Discussion

The increase in the mean number of prescriptions between 1987 and 2001, was highest in the oldest age group (65 years and older), whereas the prescription rates in the youngest groups (0 to 14) was even lower in 2001 than in 1987.
The increase between 1987 and 2001 was equally distributed across the sexes. Females received in both years more prescriptions than males. The difference in prescription rate in males and females was largest in the fertile years of women. This difference can be attributed to the use of the contraceptive pill; in 2001, community pharmacies dispensed the pill 3.9 million times. This corresponds with 5% of all prescriptions to women.

The increase in the volume of prescriptions between 1987 and 2001 most likely emanates from the recommendations in the guidelines of the NHG concerning the treatment of a number of chronic conditions like diabetes mellitus, hypertension, coronary heart disease and heart failure. The most notable changes in pharmacotherapeutical treatment brought about by the NHG guidelines, was a shift from a predominantly symptomatic treatment to the treatment of both symptoms and risk factors. This resulted in the prescribing of preventive drugs like , for example, statins for lowering serum cholesterol. In chapter 16, 17 and 18 we will explore in more detail the changes in the treatment of hypertension, coronary heart disease and heart failure.

The rise in volume of prescribed drugs is one of the factors explaining the increased costs of pharmacotherapy.
It can be stated that the continuous growth in expenditure on pharmaceutical aid is mainly attributable to six structural growth factors [1] , namely:

- growth of the Dutch population;
- ageing of the Dutch population;
- shift in health care services from the hospital to the home;
- shift in consumption pattern to newer, often more expensive drugs;
- admission of new drugs to the statutorily insured drug package;
- changed prescription and consumption behaviour.

Growth of the Dutch population

Obviously, an increase of the populaton results in a higher prescription volume, and thus in more costs.

Ageing of the Dutch population

Research from the Foundation for Pharmaceutical Statistics (Stichting Farmaceutische Kengetallen, SFK) from 1990 onwards, showed that that the ageing of the Dutch population led to an annual increase of 0.6% regarding the amount spent on pharmaceutical aid. [1]

Shift in health care services from the hospital to the home

Despite an average population growth of 0.6% per annum, the total number of days spent in hospital has dropped by almost 23% since 1990. More than ten years ago, the Netherlands had a hospital capacity of 47 beds per 10,000 inhabitants; in 2000, this capacity had been reduced to 35 beds per 10,000 inhabitants. This development led towards a shift in health care from the intramural to the extramural sector. The effect of this shift on the increase in extramural drug consumption is estimated at 3% per year.

Shift in consumption pattern to newer, often more expensive drugs

The drug costs per prescription have increased from an average of € 15.18 in 1992 to an average of € 23.46 in 2001. This corresponds with an average annual increase of 5.0%. It has to be taken into consideration that at the pharmacies, the average price level of prescription drugs has dropped by 26% over the last five years, partly under pressure of the Drug Price Act and the introduction of the 'claw back' measure. If these measures had not been introduced, the average costs of a drug would not have been € 23.46 but € 29.56 in 2001. Or, in other words, without outside interference, the average costs per supplied drug would have doubled over a ten-year period.
The increase per prescription is partly caused by the introduction of new drugs. The SFK has ascertained that drugs put on the market since 1 January 1995 accounted for 20% of the total costs of prescription drugs in 2001. New drugs in general have a high cost price. With an average € 68 per prescription, the cost price of drugs introduced since 1995 is more than three times as high as the average cost price for the total group of drugs. Because of this, new treatment options lead to an increased expenditure on pharmaceutical aid. [1]

Admission of new drugs to the statutorily insured drug package

Since 1999 the Ministry of Health has slackened the admission policy on certain expensive drugs, which are considered therapeutically unique by the Ministry and are fully reimbursed by health insurance companies; It includes for example combination preparations of directly working antiviral drugs (for aids/HIV), interferon; beta-1a (for multiple sclerosis), etanercept (for rheumatism) and terbinafine (for fungus on skin or nails). Although these drugs are not widely used, their high costs have an increasing effect on the total drug expenditures.

Changed prescription and consumption behaviour

The higher prescription volume can partly be explained by the fact that drugs are supplied for an increasingly longer period of time. In 2001, patients on average received a drug supply for almost 46 days, while only an average supply for 38 days was issued in 1991. [1]

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16 Medication for treating Hypertension in 1987 and 2001

16.1 Introduction

The attention for hypertension has increased since 1987. Large epidemiological studies have established that it is an important risk factor for cardiovascular damage: in particular the risk for stroke is increased in hypertensive patients.
Since 1987 important changes have taken place in the evidence-based treatment of hypertension. New cardiovascular drug groups like the calcium channel blockers and renin-angiotensin-aldosterone system (RAAS) inhibitors were developed in the late seventies and found their final place in the treatment of hypertension.
In 1991, the Dutch College of General Practitioners (NHG) issued a guideline for the management of hypertension and in 1997 a revised edition was published.[1,2] These guidelines provided GPs with evidence-based recommendations about the pharmacotherapeutical treatment of hypertension.
How has this affected the way GPs treated patients with hypertension? For this purpose we compared the treatment of hypertension in 1987 and 2001.
We selected the following groups of medicines:

- Anti-adrenergic agents like methyldopa and reserpine (ATC class C02);
- diuretics (C03 and various other ATC codes);
- beta-blockers (C07);
- calcium channel blockers (C08);
- RAAS inhibitors (C09).

For each patient the optimal medication has to be found. Sometimes the desired normalisation of the blood pressure can be achieved with a drug from one class, sometimes a combination of drugs from several classes is necessary.
For studying the treatment of hypertension we formulated the following research questions:

- What is the mean number of prescribed drugs per patient for the treatment of hypertension in 1987 and 2001?
- What is the proportion of patients in 1987 and 2001 in relation to sex, SES and age using
    - no medication,
    - one type of drug
    - two types of drugs
    - three or more types of drugs ?
- What is the proportion of hypertensive patients using Antiadrenergic agents ; diuretics; beta-blockers; calcium channel blockers ; RAAS inhibitors ?

16.2 Results

Because the registration period was shorter in 1987 (three months) than in 2001 (twelve months), we examined whether it is possible to compare the percentage of patients receiving medication for hypertension in 1987 and 2001. For this, we calculated how many days elapsed between the date of the first recording of the diagnosis and the date of the first prescription of an antihypertensive drug. We computed this for diuretics and betablockers.
When a diuretic drug was prescribed, it was prescribed in 92% of all episodes of hypertension within 30 days (Table 16.1). When a betablocking agent was prescribed, it was prescribed in 84% of all episodes of hypertension within 30 days.
So, the vast majority of patients with hypertension received their prescription within a month after the first contact for hypertension in the observation period. On the base of this finding, we conclude that we can compare the proportion of patients being prescribed an antihypertensive treatment in 1987 and 2001 despite the difference in observation periods. .

Table 16.1 Period (in days) between the first contact for hypertension in the registration period and the prescribing of a antidepressant drug; percentages

	1987		2001	
days	diuretics	betablockers	diuretics	betablockers
	%	%	%	%
0 -14	86.3	88.1	77.4	81.2
15-29	4.5	4.0	3.1	2.9
30-44	3.9	3.3	2.8	2.8
45-89	5.3	4.6	5.9	5.4
>=90	-	-	10.8	7.5
	100.0	100.0	100.0	100.0

In In 2001, the proportion of patients with hypertension treated with medicines was higher than in 1987 (91% vs. 72%). The mean number of drugs for all hypertension patients (including hypertensive patients who were not treated with medication) was 1.0 in 1987 and 1.6 in 2001; when we consider solely the pharmacologically treated patients these figures were 1.4 and 1.8 respectively in 1987 and 2001. In 1987, two thirds of the patients under treatment was using one drug; in 2001 this was less than half of the patients.

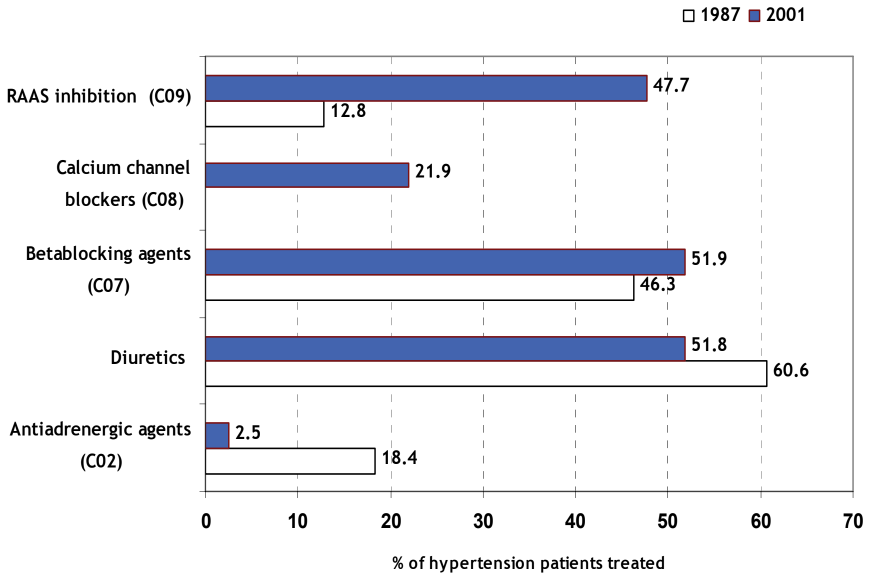
Table 16.2 Treatment of hypertension: proportion of patients under treatment and mean number of drugs per patient

	1987 (N=16487)	2001 (N=22502)
Mean no. of drugs (all hypertension patients)	1.0	1.6
Mean no. of drugs (hypertension patients on pharmacological treatment)	1.4	1.8
If medication	%	%
Monotherapy	65.8	43.1
Two drugs	30.5	37.7
Three drugs or more	3.7	19.1

From the drug classes , that were already firmly established in 1987, diuretics and antiadrenergic agents were prescribed in 2001 less frequently than in 1987; the percentage patients receiving a beta-blockers remained about the same in 1987 and 2007 (46.3% and 51.9% respectively).

When we compare 1987 and 2001, diuretics went up from 44 to 51%, beta-blockers from 33 to 47%. Antiadrenergic agents (e.g. methyldopa) became obsolete (figure 16.1).
From the newly introduced classes RAAS inhibitors captured a prominent position: in 1987, 12.8% of the patients under treatment for hypertension received a RAAS inhibitor, against 47.7% in 2001. Calcium channel blockers were not yet prescribed in 1987 and in 2001 in 21.9% of the treated cases.

Figure 16.1 Number of hypertensive patients on medication by pharmacotherapeutic class in 1987 and 2001; percentages



Sex

The proportion of males not using any medication was in both years a little higher than in females (table 16.3).

Both in 1987 and 2001, there was no significant difference between males and females in the mean number of antihypertensive drugs prescribed.

Table 16.3 Treatment of hypertension by sex: number of patients with treatment in 1987 and 2001 (percentages and female/male ratios)

	1987			2001		
	male %	female %	*f/m ratio*	male %	female %	*f/m ratio*
No medicines	30.8	26.5	***0.86***	9.7	8.7	***0.90***
If treatment						
Monotherapy	46.5	47.8	*1.03*	43.9	42.7	*0.97*
Two	19.9	23.1	*1.16*	36.1	38.8	*1.07*
Three	2.6	2.4	*0.92*	16.1	15.0	*0.93*
>Three	0.2	0.1	*0.50*	3.9	3.4	*0.87*

Bold: P<0.05

Because the mean age of female patients with hypertension was higher than the mean age of male patients, we performed logistic regression analyses to establish male-female differences in the use of different medication classes in 1987 and 2001, while adjusting for age and SES. (table 16.4).
In 1987, a higher proportion of males than females suffering from hypertension used no medicines. However, with the exception of diuretics, relatively more males used antiadrenergic agents, diuretics, betablocking agents and RAAS inhibition agents in 1987. In 2001, males and females merely differed in the use of diuretics (relatively more females) and RAAS inhibitors (relatively more males).

Table 16.4 Male-female differences in the use of antihypertensive drugs by drug class in 1987 and 2001: Odds ratios and 95% Confidence Intervals (CI) (male is reference) adjusted for age and SES

	1987		2001	
	Odds ratio	*95% CI*	Odds ratio	*95% CI*
No medication	**0.86**	*0.80-0.93*	0.98	*0.89-1.08*
Antiadrenergic agents	**0.86**	*0.78-0.94*	1.08	*0.90-1.30*
Diuretics	**1.55**	*1.45-1.65*	**1.47**	*1.39-1.58*
Betablocking agents	**0.92**	*0.86-0.99*	1.04	*0.99-1.10*
RAAS inhibitors	**0.80**	*0.71-0.89*	**0.70**	*0.66-0.74*
Calcium channel blocker	**-**	-	**0.72**	*0.67-0.77*

Bold $p<0.05$

Age

In table 16.5 we present the differences in prescriptions of the antihypertensive drugs in relation to *age* (age group 45 to 64 years and age group 65 years and older).

In 1987 the proportion of hypertensive patients without medication was similar in both age groups, whereas in 2001 the proportion of patients without medication was higher in the age group 45 to 64 years compared with the group of 65 years and older.

Looking at the various drug classes , the oldest group was using relatively more antiadrenergic agents and diuretics, whereas the younger age group (45 to 64 years) used relatively more frequently RAAS inhibitors and calcium channel blockers. The use of antiadrenergic drugs dropped steeply in 2001 in both age groups.

Table 16.5 Number of hypertensive patients on medication by age in 1987 and 2001; percentages

	1987		2001	
	45-64y	65y+	45-64y	65y+
	%	%	%	%
No medicines	27.2	26.2	**9.3**	**6.9**
If treatment				
Monotherapy	64.2	65.3	**45.7**	**39.0**
Two	31.7	31.2	**37.4**	**39.0**
>=Three	4.2	3.6	16.9	21.9
Antiadrenergic agents	**15.5**	**22.7**	1.9	2.8
Diuretics	**56.1**	**68.0**	**50.4**	**62.7**
Beta-blocking agents	**53.3**	**37.8**	**55.2**	**48.6**
Calcium channel blockers	**-**	**-**	**19.6**	**24.6**
RAAS inhibitors	**15.2**	**9.8**	**47.5**	**48.6**

Bold p<0.05

SES

Both in 1987 and in 2001 the mean age was about 6 years higher in the lowest *SES group* compared to the highest SES group; in 1987 the mean age in the lowest group was 65.3 years and in the highest group 59.2 years ; in 2001 these figures were 66.3 years and 60.4 respectively.
This difference in age between the two SES groups, prompted us to perform a logistic regression analysis, because this enabled us to adjust for the effect of age. We performed a logistic regression analysis separately for 1987 and 2001 and compared the highest and lowest SES group (lowest group as reference) after adjusting for age and sex (table 16.6).
There was hardly any difference in the treatment between the two SES groups. The lowest SES group received relatively more frequently a diuretic and in 1987 the highest SES group was left more often untreated.

Table 16.6 Difference in antihypertensive treatment between highest and lowest Socio-economic (SES) group in 1987 and 2001; Odds ratios and 95% Confidence Intervals (CI) (lowest SES group is reference) in 1987 and 2001 adjusted for age and sex

	1987		2001	
	Odds ratio	*95% CI*	Odds ratio	*95% CI*
No medication	**1.07**	*1.02-1.11*	1.04	*0.99-1.09*
Antiadrenergic agents (C02)	0.96	*0.91-1.02*	1.06	*0.96-1.17*
Diuretics	**0.93**	*0.97-0.97*	**0.95**	*0.93-0.98*
Beta-blocking agents	0.98	*0.94-1.02*	0.99	*0.96-1.02*
RAAS inhibition	1.03	*0.97-1.10*	1.00	*0.97-1.03*
Calcium channel blockers C08	-	-	**0.94**	*0.89-0.99*

Bold p<0.01

16.3 Discussion

Overall

When we compare the pharmacological treatment of hypertension in 1987 and 2001, the overall picture is that patients were treated much more vigorously in 2001 than in 1987. Whereas in 1987 the mean number of drugs per patient was 1.0, this was 1.6 in 2001. The proportion of untreated patients declined from 28 % to 9 %. If patients were treated for hypertension, in 1987 two thirds of them were on monotherapy, in 2001 43% were on monotherapy.
One of the main reasons that may explain the decline in the proportion of untreated patients in 1987 and 2001 is that opinions about hypertension and the treatment of hypertension changed remarkably during that period, especially in relation to elderly people. In 1987 the diastolic blood pressure was used to decide whether a patient suffered from hypertension. What is now called isolated systolic hypertension was initially considered as a natural consequence of aging. In 1987 it was usual practice to refrain from treating elderly people with isolated systolic hypertension; antihypertensive treatment of patients with isolated systolic hypertension was even considered hazardous, because it was feared that reducing the systolic blood pressure might induce a stroke in patients who already had subclinical cerebrovascular disease [3]. These

fears were allayed by the findings of the Systolic Hypertension in the Elderly Program (SHEP) study [4] and Systolic Hypertension in Europe Trial [5], which showed unequivocal benefit from decreasing the blood pressure in patients with isolated systolic hypertension by using hydrochlorothiazide or the long-acting calciumchannel antagonist nifedipine.
This alteration in insight was reflected in a revision of the NHG guideline on hypertension. In the first edition of this guideline isolated systolic hypertension was not considered an indication for treatment, whereas in the revised edition in 1997 [1] the advice was to treat patients with systolic hypertension with an antihypertensive drug.
Between 1987 and 2001, changes in pharmacological treatment occurred; drugs from some pharmaceutical classes were much less frequently prescribed, new classes emerged. Antiadrenergic drugs virtually lost their place, diuretics and beta-blockers kept their position. Two new classes emerged, the RAAS inhibitors and the calcium channel blockers. The RAAS inhibitors (ACE inhibitors and ARBs) had a prescription rate of 43% in 2001 (9% in 1987). The calcium channel blockers had a prescription rate of 20% in 2001 and were not yet prescribed in 1987.
Differences between 1987 and 2001 for certain families of drugs is not surprising. Calcium channel blockers and RAAS inhibitors were in 1987 still in their infancy and the indication for their use was not yet firmly established
The guideline of the NHG, issued in the nineties, most likely played a role in raising GPs' consciousness about the importance of treating hypertension by promoting knowledge about the pharmacological treatment.

Sex

Although some differences in treatment were seen between males and females, one can't conclude that one group was treated better or worse than the other.
In 2001 male patients received more frequently RAAS inhibitors and calcium channel blockers, female patients more frequently diuretics. Because RAAS inhibitors and calcium channel blockers are also used for treating coronary heart disease (CHD), the differences between males and females might reflect the higher prevalence of CHD among hypertensive males

SES

After adjusting for the differences in age between the lowest and highest SES group, the treatment rate of both groups was rather similar; in 2001 the only

difference was that relatively more persons of the lowest SES group were prescribed diuretics.
We could not establish any disadvantage in the treatment of hypertension between the lowest and highest SES groups

16.4 Conclusion

The pharmacological treatment of hypertension intensified between 1987 and 2001. Fewer people with established hypertension remained untreated, and on average more drugs per patient were prescribed. There was no difference in the treatment of hypertension between the lowest and the highest SES group.

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17 The treatment of coronary heart disease in 1987 and 2001

17.1 Introduction

Coronary heart disease (CHD) includes angina pectoris (ICPC K74), myocardial infarction (K75) and other forms of coronary ischemia (K76).
CHD is a common chronic disorder in the primary care population that contributes substantially to the workload of general practice. [1,2]
Since 1987, important changes have taken place in the treatment of CHD.
New cardiovascular drug groups – like the calcium channel blockers, RAAS inhibitors and statines - were developed in the late seventies and in the early eighties and were finally established in the treatment of CHD after 1987.
The well-known aspirin, belonging to a class of nonsteroidal anti-inflammatory drugs, experienced a second life as antiplatelet agent and it conquered an essential place in the treatment of atherosclerosis and therefore in the treatment of CHD.
We compared the treatment of CHD in 1987 and 2001.
First, we defined the drugs that played a role in the treatment of CHD.
We included the following groups of medicines for our study:

- Cardiaca (ATC group C01, mainly glycosides, antiarrhythmic and nitrates);
- diuretics (C03 and various other C groups);
- beta-blockers (C07);
- calcium channel blockers (C08);
- RAAS inhibitors (C09) ;
- lipid lowering drugs (C10) and
- antithrombotics (B01 group, mainly Vitamin K antagonists and platelet aggregation inhibitors).

Lipid lowering and antithrombotic drugs are preventive medicines; if no contraindication exists, virtually all patients should be treated with these drugs.
Patients should use some of the drugs from the above mentioned groups, but for each patient the optimal combination must be determined on the basis of individual characteristics.

17.2 Results

Number of drugs

When we compare 1987 and 2001, we see an intensification in the treatment of CHD.
The mean number of CHD drugs prescribed to all patients with coronary heart disease was 1.3 in 1987 and 3.2 in 2001. When we consider solely the pharmacologically treated patients these figures were 1.7 and 3.4 respectively in 1987 and 2001.
The proportion of CHD patients who received none of the selected drugs declined from 22.2% in 1987 to 6.4% in 2001. At the same time, in 1987, 2.3% of the CHD patients under treatment used four or more different types of selected drugs against 46.3% in 2001.

Table 17.1 Treatment of coronary heart disease**:** mean number of drugs per patient and proportion of patients under treatment (percentages)

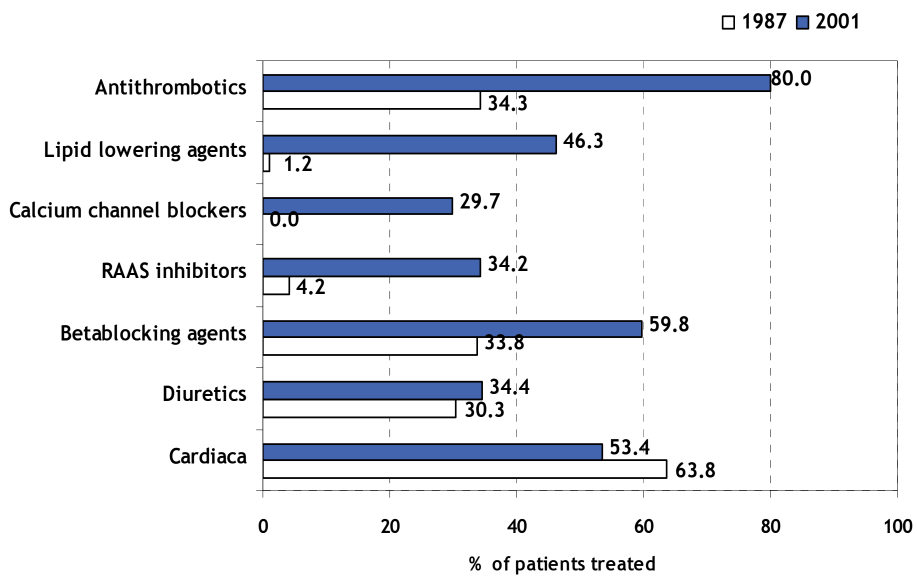
	1987	**2001**
Mean no. of CHD drugs	1.3	3.2
No medicines (%)	22.2	6.4
If on treatment		
Monotherapy (%)	49.4	11.1
Two drugs (%)	63.1	17.7
Three drugs (%)	12.1	24.9
More than three drugs (%)	2.3	46.3

Type of drugs

The differences between 1987 and 2001 for certain drug classes are not surprising. Calcium channel blockers, RAAS inhibitors and statins were in 1987 still in their infancy and the indication for their use was not yet firmly established.
In 1987, as antiplatelet agent mainly dipyridamole was prescribed, aspirin was not yet in use for this purpose. Antithrombotic treatment more than doubled in 2001.
From the drug groups that were already firmly established in 1987 the

proportion of beta-blocker users increased by 77% between 1987 and 2001 doubled and the proportion of users of diuretics remained more about similar.

Figure 17.1 Treatment of CHD: proportion of patients using selected drugs; percentages



Sex

Women with CHD were on average more than five years older than men. To compensate for this difference in age, we performed logistic regression analyses to establish male-female differences in the use of different medication classes in 1987 and 2001, while adjusting for age and SES. (table 17.2). The odds ratios in table 17.2 indicate the odds for females in relation to males in receiving a prescription of CHD drugs. An odds ratio of 1.2 virtually corresponds with a relative risk of 1.2. In table 17.2 only those odds ratio's were recorded, where there was a significant difference (P<0.05) between the sexes.

Females were prescribed more frequently cardiaca, diuretics and beta-blockers (only in 1987), whereas males had higher rates for lipid lowering agents (only in 1987) and antithrombotics.

Table 17.2 Male-female differences in the use of drugs for coronary heart disease by drug class in 1987 and 2001;
Odds ratios (male is reference) adjusted for age and SES: $p<0.05$

	1987	2001
No medication	-	-
Cardiaca	1.15	1.20
Diuretics	1.61	1.72
Betablocking agents	-	1.18
Calcium channel blocker	-	-
RAAS inhibition	-	-
Lipid lowering agents	-	0.73
antithrombotics	0.53	0.52

Age

In the age group 45 to 64 more patients remained untreated compared to the age group of 65 and older. In line with this finding the proportion of patients with four or more medicines was higher in the eldest group than in the younger group; in 2001 48% of the eldest group used four or more drugs, for the younger group this was 43.3%.

When we look at the various drug groups, we can see that the eldest age group was using more cardiac drugs and diuretics whereas the younger age group used more lipid lowering agents. In 1987 the 45 to 64 age group received relatively more antithrombotics (43.3% vs. 29%), however, in 2001 antithrombotics was used in 80% of the patients in both age groups.

Table 17.3 Number of CHD patients on medication by age in 1987 and 2001; percentages

	1987		2001	
	45-64y	65y a.o	45-64y	65y a.o
	%	%	%	%
No medicines	**25.7**	**18.4**	**10.3**	**3.8**
If on treatment				
Monotherapy	**52.5**	**47.4**	**13.2**	**10.0**
Two drugs	**33.1**	**38.0**	**19.0**	**16.8**
Three drugs	12.3	12.0	**24.5**	**25.2**
More than three drugs	2.1	2.6	**43.3**	**48.0**
Cardiaca	**52.6**	**70.5**	**43.3**	**59.0**
Diuretics	**19.9**	**36.6**	**20.4**	**42.4**
Betablocking agents	**42.7**	**28.6**	61.8	58.8
RAAS inhibition*	**3.5**	**4.7**	**31.7**	**35.9**
Calcium channel blockers	**-**	**-**	**26.4**	**31.9**
Lipid lowering agents	**1.9**	**0.6**	**63.0**	**37.5**
Antithrombotics	**43.3**	**29.0**	80.2	80.1

Bold: p<0.05

SES

Because the mean age is higher in the lowest SES group compared to the highest SES group (2.4 years difference in 1987 and 4.7 years in 2001), we performed logistic regression analysis for the different classes of drugs after adjusting for age and sex; the lowest SES group was used as reference (table 17.4.)

The odds ratio's were only shown when the difference between the lowest and highest SES group was statistically significant (P <0.05)(table 17.4).

In the highest SES group more patients were not treated compared to the lowest group. The lowest SES group was using in a higher proportion cardiaca, diuretics, calcium channel blockers and antithrombotics.

Table 17.4 Difference in the use of drugs for CHD by drug class between highest and lowest SES group in 1987 and 2001; Odds ratios (lowest SES group is reference) in 1987 and 2001 adjusted for age and sex (p<0.05)

	Odds ratio	
	1987	**2001**
No medication	1.19	1.38
Cardiaca	0.82	0.81
Diuretics	0.79	0.87
Betablocking agents	-	-
Ca channel blocker	-	0.85
RAAS inhibition	-	-
Lipid lowering agents	-	-
Antithrombotics	-	0.86

17.3 Discussion

When we compare the pharmacological treatment of CHD in 1987 and 2001, the overall picture is that patients were treated much more intensively in 2001 than in 1987. Whereas in 1987 the mean number of drugs per patient was 1.3, this was 3.2 in 2001. The proportion of untreated patients declined from 22.2% to 6.4%.

Certainly, the emergence of new effective medicines for prevention and treatment has contributed to this intensification of treatment, however, also the prescription of “old” medicines increased considerably; diuretics increased by a factor 1.5, beta-blockers doubled and antithrombotics increased by a factor 3. Solely the proportion of patients with cardiaca (C01) remained similar in 1987 and 2001

The guidelines of the NHG, issued in the nineties and reflecting the changed insights in evidence-based treatment, most likely played a role in raising GPs' consciousness about the importance of treating risk factors of CHD and in promoting knowledge about the pharmacological treatment.

An explanation for the male-female differences could be that males were referred more often to medical specialists, who prescribe statins and antithrombotics routinely, whereas females develop CHD at older age with more comorbidities; at older age GPs are more reluctant to prescribe a new drug on an already impressive list of drugs.

In both years the lowest SES group was treated more intensively than the highest SES group: in the lowest SES group a higher proportion received more than three different drugs and a higher proportion received cardiaca and diuretics.
The conclusion must be that treatment of the lowest socioeconomic group is not in arrears compared with the higher group. On average, the health status of lowest SES groups is worse than that of higher SES groups. The lowest SES group will suffer more comorbidities and this will result in more contacts with the GP with as a result a higher chance on treatment. This seems the most likely explanations for the difference in treatment between the two groups.

17.4 Conclusion

The pharmacological treatment of CHD underwent revolutionary changes. Whereas the treatment in 1987 focused mainly on symptomatic treatment (nitrates and diuretics), in 2001 preventive medicines as lipid lowering drugs, antithrombotics and RAAS inhibitors came to the fore. This resulted in polypharmacy in 2001; almost half of all CHD patients used four or more types of drugs. Doubtless the treatment of CHD has improved since 1987; all the added medicines have their own proven benefit.

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18 The treatment of heart failure in Dutch general practice

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Foreword

We start with presenting our published study "Treatment of heart failure in Dutch general practice". This study describes the situation in Dutch general practice in 2001. However, because this thesis is mainly concerned with a comparison between 1987 and 2001, we added after the conclusion of this publication a paragraph in which we provide information about the treatment of heart failure in 1987.

18.1 Abstract

Background

To study the relationship between the prescription rates of selected cardiovascular drugs (ACE-inhibitors and Angiotensin receptor blockers, beta-blockers, diuretics, and combinations), sociodemographic factors (age, gender and socioeconomic class) and concomitant diseases (hypertension, coronary heart disease, cerebrovascular accident, heart valve disease, atrial fibrillation, diabetes mellitus and asthma/COPD) among patients with heart failure cared for in general practice.

Methods

Data from the second Dutch National Survey in General Practice, conducted mainly in 2001. In this study the data of 96 practices with a registered patient population of 374.000 were used.
Data included diagnosis made during one year by general practitioners, derived from the electronic medical records, prescriptions for medication and sociodemographic characteristics collected via a postal questionnary (response 76%)

Results

A diagnosis of HF was found with 2771 patients (7.1 in 1000). Their mean age was 77.7 years, 68% was 75 years or older, 55% of the patients were women. Overall prescription rates for RAAS-I, beta-blockers and diuretics were 50%, 32%, 86%, respectively, whereas a combination of these three drugs was prescribed in 18%. Variations in prescription rates were mainly related to age and concomitant diseases.

Conclusion

Prescription is not influenced by gender, to a small degree influenced by socioeconomic status and to a large degree by age and concomitant diseases.

18.2 Background

General practitioners (GPs) play a central role in the diagnosis and management of heart failure (HF). Over half of the patients with HF are diagnosed in primary care, and one third is solely managed by the GPs [1,2]. In the last 15 years, new insights have changed the treatment of HF. In the 1970s and 1980s, physicians considered heart failure principally as a hemodynamic disorder; from the late eighties onwards they realised that it is a neurohormonal disorder[3] as well. The new concept has led to the recommendation in most guidelines [4-6] to treat patients with stable HF not only with diuretics, but also with inhibitors of the renine-angiotensin-aldosterone system (RAAS-Is) [7,8] and beta-blockers [9-11]. Currently, angiotensin-converting enzym-inhibitors (ACE-Is) are first choice among the RAAS- inhibiting drugs, but in case of side effects and adverse reactions angiotensin II receptor blockers (ARBs) are recommended as second choice [12,13]. In 1996, the Dutch College of General Practitioners issued guidelines for the diagnosis and treatment of HF. These guidelines did not include beta-blockers in the recommended medication; however, in the revised version of 2004 beta-blockers were included. In addition to these medicines digoxin [14] is still indicated in selected cases, and for patients suffering from HF with NYHA class 3 and 4 spironolactone 15 is recommended.

Recent surveys suggest that ACE-Is and beta-blockers are underprescribed in general practice [1,17].

The main aim of this study was to investigate the prescription rates of RAAS-Is, beta-blockers, diuretics, spironolactone and digoxin for patients diagnosed with HF in general practice by using a nationally representative database; these rates reflect the average prescription patterns in Dutch general practice.

We have examined the prescription rates of all patients known with HF in relation to sociodemographic (age, gender and socioeconomic class) and morbidity characteristics (specific concomitant disorders: hypertension, coronary heart disease, cerebrovascular accident, heart valve disease, atrial fibrillation, diabetes mellitus and asthma/COPD). Identification of subgroups with suboptimal treatment may guide interventions aimed at improving the quality of pharmacological treatment by GPs.

18.3 Methods

Design

Data were obtained from the second Dutch National Survey of General Practice, which was performed by the Netherlands Institute for Health Services Research (NIVEL) in 2001 [18]. In this survey, 195 GPs (165 GP full time equivalents) in 104 practices participated with a total practice population of 394.192 (midtime population), comprising a 2.5% sample of the Dutch population. For various reasons eight of the participating practices were excluded, leaving a midtime population of 374.000 (three practices did not deliver any morbidity data due to technical problems, the data of five practices did not meet the required quality criteria). The participating GPs were representative for Dutch GPs and practices with respect to age, gender and location in deprived areas, however, single-handed practices were underrepresented (32% instead of 44% nation wide). The patient population is representative for the Dutch population concerning age, gender, degree of urbanisation, social class and ethnic minority groups, and type of health insurance. In the Netherlands, GPs have a gatekeeper position in the health care system. All non-institutionalised patients are registered with a GP. Medical specialists are only accessible after referral by a GP. When a specialist starts treatment, in nearly all cases the GP will be responsible for the repeat prescriptions.

Measurements

Data about age, gender and type of health care insurance (public/private) were derived from the administration of the practices. Sociodemographic data of patients were obtained by sending a questionnaire by mail to all listed patients to collect data about occupational and educational status and country of birth.

The overall response was 76.5%. The non-responders showed no selection with respect to age and gender, but the non-indigenous population was under-

represented in the census: 12,5 percent in the response-group versus 17,5 in the Dutch population.
To examine socioeconomic gradients the data about occupational and educational level were aggregated in three socioeconomic classes: high, medium en low. The occupational level was used as primary marker for social class. In case of unknown occupation the highest educational level was used as indicator.

Information about morbidity was derived from the electronic medical records kept by the GP. Data included health problems presented within a consultation during twelve consecutive months and diagnoses were coded using the International classification of primary care (ICPC). Also, all GPs' prescriptions were extracted and coded according to the Anatomical Chemical Classification system (ATC). Patients with HF were defined on the basis of at least one contact diagnosis with ICPC code K77 during the observation year. The selected concomitant diseases were based on their respective ICPC codes in the same year. Hypertension, coronary heart disease, valve diseases and atrial fibrillation are not only important coexisting disorders but they also contribute to the development of HF and play a key role in its progression and response to therapy [19].

Prescription rates were calculated as proportions of patients with HF. We used chi-square tests to compare the effect of gender, age group, socioeconomic status and comorbidity on prescription rates.

18.4 Results

Patient characteristics

In total 2771 patients (7.4 in 1000) were diagnosed as suffering from of heart failure: 1248 (6.7 in 1000) males and 1523 (8.1 in 1000) females (table 18.1) . The mean age of all patients was 77,7 years (SD 10.5) ; for males it was 75.2 (SD 10.6) years, for women 79.7 years (SD 10.0); 1897 (68%) of all patients were 75 years or older. From the age of 45 onwards, every decade there was a fourfold increase in the prevalence rate of HF.

During the registration period 303 patients died; this amounted to 11% of all known patients with HF. The mean age of the deceased was 82.1 years.

Table 18.1 Number of patients with HF and prevalence rate of HF by age and sex

Age	**Number of patients with HF**			**Prevalence rate HF (/1000)**		
(yrs)	*all*	*male*	*female*	*all*	*male*	*female*
0–24	5	1	4	<0.1	<0.1	<0.1
25–44	19	11	8	0.2	0.2	0.2
45–54	71	39	32	1.3	1.4	1.2
55–64	224	159	65	5.2	7.5	3.1
65–74	555	309	246	21.7	26.3	17.7
75 and older	1897	729	1168	91.7	96.7	85.6
All ages	2771	1248	1523	7.4	6.7	8.1

Combination regimes

A combination of a diuretic with an RAAS-I and a beta-blocker (triple treatment) is considered as the basic regime for patients with HF. We investigated the various combinations of these three drugs (table 18.2). This triple treatment was used by 18% of all patients. We found statistically significant differences between the age-groups and socio-economic classes: the below-75 years group and the highest socioeconomic class were prescribed more frequently the triple treatment.
Looking at a combination of two of these three drugs, the combination diuretics and RAAS-Is occurred in 28.2%, diuretics and beta-blockers in 10.6%, and beta-blockers and RAAS-Is in 1.3 percent. The combination diuretics-RAAS-I was seen more often in the group of 75 years and older, the combination of RAAS-I and beta-blocker more often in the group below 75 years.
Diuretics as monotherapy were prescribed in 29.6% of all patients, RAAS-Is in 3.0% and beta-blockers in 1.7%. Here again significant differences were seen between the age groups.

Prescription rates for the separate drugs

One or more diuretics were used by 86% of all patients: in 75% of the HF patients loop diuretics were involved. RAAS-Is were prescribed to 1373 patients (50%). During the observation year 57 patients (2%) switched from an ACE-I to an ARB. Beta-blocking drugs were prescribed to 32% of the patients, spironolactone to 20%, and digoxin to 25%. Considering gender, no significant differences in prescription rates were seen for any of the medicines under investigation.

In the age group of 75 years and older prescription rates for diuretics and digoxin were higher, but lower for beta-blockers compared to the under 75 group. Socioeconomic differences were only found for prescription of beta-blockers with a higher rate in the highest socioeconomic class.

Table 18.2 Prescription rates for diuretics, RAAS-Is, beta-blockers alone or in combination

Medication	**All**	**Sex**		**Below or above 75 y**		**SES**	
		Male	Female	<75	>=75	low	high
		Triple treatment (%)					
Diuretic and RAAS-I and beta-blocker	18.0	18.4	17.7	**23.7**	**15.4**	**16.7**	**22.1**
		Two Drugs (%)					
Diuretic and RAAS-I	28.2	29.0	27.6	**21.7**	**31.2**	30.5	26.1
Diuretic and beta-blocker	10.6	9.8	11.2	11.1	10.3	10.5	10.7
RAAS-I and beta-blocker	1.3	1.1	1.4	**1.9**	**1.0**	1.3	2.4
		Monotherapy (%)					
Diuretic monotherapy	29.6	28.0	30.9	**24.7**	**31.2**	29.1	25.3
RAAS-I monotherapy	3.0	3.5	2.5	**4.6**	**2.2**	2.8	3.6
Beta-blocker monotherapy	1.7	2.1	1.7	2.3	1.4	1.7	3.1
		Prescription of every drug separately (%)					
Diuretics	86	85	88	**83**	**88**	87	83
RAAS-Is	50	51	48	51	49	50	53
Betablockers	32	32	32	**40**	**29**	**31**	**39**
Spironolactone	20	20	20	20	20	21	21
Digoxin	25	23	26	**19**	**27**	25	23

Concomitant disorders

Before studying the prescription rates for concomitants disorders, we determined in which proportion the selected diseases occurred in our population of patients with HF (table 18.3). Overall, 30% of the patients had no comorbidity at all, 36 percent one, 23 percent two, 9 percent three and 2 percent had four or more comorbidities. Hypertension was the most common comorbidity (31%), followed by coronary heart disease (28%), diabetes mellitus (20%), asthma/COPD (20%), atrial fibrillation (14%) and CVA/TIA (8%).

Comorbidity influenced the prescription rates of the medicines under consideration. Patients with coronary heart disease, hypertension and diabetes mellitus were taking in a higher proportion nearly all drugs under study including the triple treatment. As expected, patients with atrial fibrillation used more frequently digoxin and patients with asthma or COPD less often beta-blockers. The more comorbidities, the more medicines were used (data not shown). RAAS-Is were used by 70% of the patients with three or more comorbidities.

Table 18.3 Prescription rates in patients with HF in relation to comorbidity

	all	**CHD**	**HT**	**CVA/TIA**	**AF**	**DM**	**Astma/COPD**
	N = 2771	N = 769	N = 720	N = 212	N = 387	N = 551	N = 559
Medication (%)							
Triple	18	**30**	**27**	14	**23**	**24**	**13**
Diuretics	87	**90**	**90**	89	**90**	**90**	**92**
RAAS-Is	50	**60**	**62**	47	55	**62**	48
Beta-blockers	32	**51**	**45**	30	**40**	35	**24**
Spironolactone	20	23	21	13	21	**24**	22
Digoxin	25	**21**	24	24	**64**	**29**	26

18.5 Discussion

This study is unique as it describes the prescription patterns for HF in an unselected general practice population in the Netherlands. In comparison with HF patients in clinical trials and in community-based studies, such a population tend to have a higher mean age [20], a higher proportion of women [21], and a greater percentage of HF with preserved left ventricular function [22,23] . With a mean age of 77.7 years and a female proportion of 55%, our study population confirmed the findings for age and gender. About the percentage of patients with preserved left ventricular function we have no information.

The prevalence of 7.4 in 1000 is in line with the findings of Murphy [24] in Scotland. In most studies only the prescription rates of separate drugs were explored, in this study we investigated also the combined prescription of diuretics, RAAS-Is and beta-blockers. This triad was prescribed to approximately one out of five patients, with a significantly higher percentage in the under 75, the higher socioeconomic group and in patients with cardiovascular comorbidity, and with no differences for gender.

Considering each group of drugs separately: RAAS-Is were prescribed in about half of the cases with no significant differences for gender, age and socioeconomic status. A patient suffering from coronary heart disease, hypertension or diabetes mellitus had a chance of more than 60% to receive a RAAS-I. This proportion increased to 70% in case of three or more comorbidities in the same patient. Beta-blockers were prescribed to one third of all patients with a higher proportion in the younger age-group and highest socioeconomic class. Persons with coronary heart disease had a prescription rate above 50 percent, patients with hypertension and atrial fibrillation had prescription rates above 40 percent, people suffering from asthma or COPD had a lower rate (24%).

Our results demonstrated that age and comorbidity influenced prescriptions substantially, socioeconomic class only with regard to the triple treatment, and that gender had no influence. In table 18.4 we summarise the prescription rates in other primary care studies and compare them with our findings. The prescription behaviour of Dutch GPs is approximately as high as in other studies; however, beta-blockers and spironolactone seem to be prescribed more often in the Netherlands than in the UK. In other studies, combination treatments of medicines were not investigated.

Table 18.4 Prescription rates in several studies

	This study	***Pont***[25]	***Murphy***[24]	***Key Health Statistics***[26]	***Rutten***[27]
Country	NL	NL	Scotland	UK	NL
No. of patients	2771	2493	1007	17817	103
			Medication (%)		
ACE-I	45	42	39	48	40
ARB	6	9	5		6
Beta-blocker	32	26	21	11	9
Spironolactone	20	11	9		11
digoxin	25	25	22	28	

Limitations of this study

As any study of this type, this study too has its limitations. Firstly, we take the GPs' diagnosis of HF at face value, we have no independent confirmation of the diagnosis. In some studies, doubt has been raised about the validity of the diagnosis heart failure made by a GP [28,29]. However, our study aimed to study the prescription behaviour of GPs towards HF patients in primary care, so it seems justified to take the GPs' diagnosis as point of departure.

Secondly, no data about the dosages of the medicines involved are used. Thirdly, we have no information on the severity of the disease in our patient group. Fourthly, we can not differentiate between patients suffering from HF with left ventricular dysfunction and those with preserved left ventricular function.

How to judge our results? Is it acceptable that half of the patients receive RAAS-Is, one in three patient a beta-blocker and one in the five patients triple treatment?

In the IMPROVEMENT of Heart Failure Programme [1] the primary care physician's knowledge and perceptions about the management of HF were assessed. The conclusion was that knowledge of ACE-Is was high, but the physicians were less convinced about the benefits of beta-blockers. Guidelines for HF are largely based on surveys in which elderly patients and patients with multiple comorbidities are excluded. Moreover, in most studies only patients with HF and left ventricular dysfunction are included, whereas patients with preserved left ventricular function are left out. Scientific evidence about the beneficial effects of RAAS-Is and beta-blockers in patients with preserved left ventricular function is scarce [27]. In 2001, the guidelines of the Dutch Association of General practitioners did not yet recommend beta-blockers for HF.

An impression of the achievable prescription rates can be derived from Brotons [30] and Baxter [31]. Brotons et al. determined in a population of persons two years after their first myocardial infarction that the achievable standard for ACE-Is was 50%, whereas 32% were actually receiving it; for beta-blockers these figures were 70% and 50%, respectively.

Baxter et al. determined in the setting of a geriatric outpatient department the tolerability and symptoms changes associated with the introduction of bisoprolol treatment in older patients with HF. The bisoprolol was tolerated by

69% of the 51 patients with a mean age of 78 years. When we apply these figures cautiously to our study population of patients with heart failure and hypothesize that 30% of our population had justified reasons not to use a RAAS-I, the achievable prescription rate is 70%; with the actual prescription rate of 50% there is a gap of 20%. Only persons with three or more comorbidities in our population received RAAS-Is in a proportion of 70%.

For beta-blockers we can follow a similar reasoning. Assuming that 80 percent of the patients is eligible for treatment with a beta-blocker and that 30% of the patients have justified reasons for not using it, the achievable prescription rate should be 50%. Compared with the actual rate of 32%, there is a gap of nearly 20%.

18.6 Conclusion

Considering the observed prescription rates, the conclusion must be that, on the one hand, there is room for improvement in the treatment of patients with HF in general practice, but, on the other hand, the gap between achievable standards and actual treatment may be smaller than generally suggested. The influence of gender and socioeconomic class on prescription rates is not very marked, the influence of age and comorbidity is considerable.

Despite best practice, it may not be achievable for some patients to reach the recommended medication for various reasons, such as comorbidity, contra-indications or side effects. All these reasons will occur more often in an elderly population. In the United States, 20 percent of the Medicare beneficiaries have five or more chronic conditions and 50 percent are receiving five or more medications[32]. Viewing disease-specific medication guidelines from this perspective, the question raises whether what is good for the disease is always best for the patient.

In the Netherlands, the GP has an overview of the whole medical history of a patient. Therefore, he is in the best position to translate disease guidelines into prescribing decisions for individual patients with multiple chronic conditions by weighting benefit and harm associated with multi-drug regimes. Therefore he should be supported by evidence and guidelines which are less disease-driven and more patient-driven.

18.7 Treatment of heart failure: 1987 and 2001 compared

All drugs were prescribed much less in 1987 than in 2001 with the exception of digoxin (table 18.5).
In 1987, the most important drugs for the treatment of heart failure were diuretics and digoxin. Digoxin was considered important due to its inotropic qualities. In 2001, digoxin was no longer a drug of first choice in the treatment of heart failure.

Table 18.5 Treatment of heart failure in 1987 and 2001

	1987 N=1828	2001 N=2771
Triple treatment (%)		
Diuretic and RAAS-I and beta-blocker	0.7	18.0
Two drugs (%)		
Diuretic and RAAS-I	4.9	28.2
Diuretic and beta-blocker	5.7	10.6
RAAS-I and beta-blocker	0.1	1.3
Monotherapy (%)		
Diuretic monotherapy	58.6	29.6
RAAS-I monotherapy	1.3	3.0
Beta-blocker monotherapy	2.0	1.7
Prescription of every drug separately (%)		
Diuretics	70.0	86.4
RAAS-Is	6.9	49.9
Betablockers	8.4	32.1
Spironolactone	5.9	20.1
Digoxin	38.0	24.8

Abbreviations
ACE-I: angiotensin-converting enzym-inhibitors
ARB: angiotensin II receptor blocker
ATC: Anatomical Chemical Classification system.
GP: general practitioner
HF: heart failure
ICPC: International classification of primary care
NYHA: New York Heart Association Classification
RAAS-I: renine-angiotensin-aldosterone system inhibitors

The beneficial influence of RAAS-Is on heart failure was hardly known in 1987, and beta-blockers were even thougt to be contraindicated in heart failure. It is not surprising that the rates for RAAS-Is and beta-blockers were very low in 1987.

Ethical approval

The study was carried out according to Dutch legislation on privacy. The privacy regulation of the study was approved by the Dutch Data Protection Authority. According to Dutch legislation, obtaining informed consent is not obligatory for observational studies

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19 The prescription of antidepressants in general practice in 1987 and 2007

19.1 Introduction

In this chapter we examine the prescription of antidepressant medication in Dutch general practice in 1987 and 2001. We studied various aspects of the treatment with antidepressants. We calculated the number of prescriptions per 1000 patients and the proportion of persons in the population with at least one prescription during the registration period. Furthermore, we analysed which antidepressant drug classes were involved in the prescriptions. Finally, we determined the prescription rate in patients diagnosed with depressive disorders or anxiety disorder and studied the off-label prescription rate.

Increase in prescription rates of antidepressants

From several sources we know that the prescribing of antidepressants increased enormously during the 1990s all over Europe.[1] The emergence of a new class of antidepressant drugs in the eighties - the serotonin selective reuptake inhibitors (SSRIs) – was largely responsible for this increase.[i]
SSRIs caused a change in the paradigm of depression and other psychiatric diseases. There was a shift from a more psychodynamic model to a neuro-biological model.[2] Where in the seventies - in the decade of the so-called antipsychiatry - mental disorders were seen as the result of unhealthy societal conditions, and in the eighties as the result of a dysbalance between exposure to stress and a person's coping ability, in the nineties mental disorders were primarily considered as brain disease.

Because our surveys were conducted in 1987 (before the SSRI era) and in 2001, it is important to explore how this paradigm change affected the anti-depressant treatment in general practice.

Classes of antidepressant drugs and indications

Distinct pharmacologic mechanisms allow antidepressants to be separated into different classes. The two most important antidepressant classes are the tricyclic antidepressants (TCAs) and the serotonin selective reuptake inhibitors (SSRIs).
Despite the name, antidepressants are used for a range of different other conditions including anxiety disorders, phobias, obsessive compulsive dis-

[i] The first drug of this class fluoexetine (Prozac®) came on the market in 1987 and became very popular first in the United States, in the nineties also in Europe.

orders, post-traumatic stress disorder and bipolar disorders. TCAs are also used for neuropathic pain (mainly amitryptiline in low doses) and in children for enuresis nocturna (mainly imipramine).

Guidelines about antidepressant prescribing

The NHG guideline about depression issued in 1994 made a difference between mild depressions and serious depressions [3]. For mild depressions medication was thought not to be effective and counselling was recommended as a therapy. In the case of a serious depression TCAs were recommended; however, in case of adverse reactions to TCAs or in case of certain comorbidities, prescribing of SSRIs was advised. In the updated NHG guideline of 2003[4], the distinction between a mild and a serious depression was no longer mentioned and the choice for treatment with antidepressant drugs was made dependent on the duration of the symptoms, the suffering of the patient, and on the preference of the patient. Which class of drugs to use - TCAs or SSRIs - was made dependent upon contraindications, potential side effects and patients' preferences.
In 2001, the 1994 guideline was still the prevailing one; however, it was widely known among GPs that a revision was forthcoming.
The first NHG guideline for anxiety states issued in 1997 gave antidepressant medication a place in the treatment of panic disorders and recommended as drug of first choice imipramin (a drug of the TCA class); in case of adverse reactions or contraindications fluvoxamin - a drug of the SSRI class - was recommended.[5] The revised version of this guideline in 2004 broadened the indication to all anxiety disorders and showed the same evolution as the guideline about depression[6]; no definite preference was expressed for either TCAs or and SSRIs.

Research questions

The following research questions: will be dealt with:

- What is the number of prescriptions for antidepressants per 1000 patients in relation to sex, age and SES in 1987 and 2001?
- What is the proportion of the various classes of prescribed antidepressant drugs in the total number of antidepressant prescriptions in 1987 and 2001?
- What is the proportion of patients - diagnosed with a depressive disorder or an anxiety state – using any antidepressant drug and using drugs of selected classes of antidepressants?

19.2 Methods

Table 19.1 Classification of antidepressant drugs as used in this chapter

ATC	Generic	ATC	Generic
TCA's		***Buproprion***	
N06AA01	desipramine	N06AX12 (Later N07BA02)	Buproprion
N06AA02	imipramine	***Lithium***	
N06AA04	clomipramine	N05AN01	lithiumcarbonaat
N06AA06	trimipramine	***REST GROUP***	
N06AA09	amitriptyline	N06AX05	trazodon
N06AA10	nortriptyline	N06AX06	nefazodon
N06AA12	doxepine	N06AF04	Tranyl Cypromine
N06AA16	dosulepine	N06AG02	moclobemide
N06AA21	Maprotiline*	N06AX11	mirtazapine
SSRI's		N06AX03	mianserine
N06AB03	fluoxetine		
N06AB04	citalopram		
N06AB05	paroxetine		
N06AB06	sertraline		
N06AB08	fluvoxamine		
N06AX16	Venlafaxine#		

* tetracyclic agent, for practical purposes classified with TCA
\# for practical purposes categorised in the SSRI group

We divided the antidepressive drugs in a number of groups. The two most important groups are the tricyclic antidepressants (TCAs) and the serotonin selective reuptake inhibitors (SSRIs). Lithium is exclusively used in affectively psychosed (bipolar disorders) and buproprion is mainly used as an aid to stop smoking.

Because the registration period was shorter in 1987 (three months) than in 2001 (twelve months), we first examined whether it is possible to compare the percentage of patients receiving an antidepressant drug in 1987 and 2001 when suffering from a mood disturbance or an anxiety state. For this, we calculated how many days elapsed between the date of first diagnosis and the date of the first prescription of an antidepressant drug.

An antidepressant drug was prescribed within 30 days in 91% of patients newly diagnosed with depression in 1987 and in 86% in 2001 (table 19.2); for a newly diagnosed anxiety state these figures were 76% in 1987 and 71% in 2001.

If we examine all episodes of depression and anxiety , we see the same pattern as with new episodes (see table 19.2).

So, the vast majority of patients with a depression or with anxiety were treated within a month after presenting their complaints to their GP. On the base of this finding, we concluded that we can compare the proportion of patients being prescribed an antidepressant in 1987 and 2001 despite the difference in observation periods (3 and 12 months respectively).

Table 19.2 Period (in days) between diagnosing a depression/ anxiety and the prescribing of an antidepressant drug; percentages

	1987				2001			
	Depression episodes		Anxiety episodes		Depression episodes		Anxiety episodes	
	new	all	new	all	new	all	new	all
Days	%	%	%		%	%	%	%
0 -14	84.6	86.0	75.5	79.4	79.7	85.7	70.9	74.8
15-29	6.8	6.6	10.2	7.2	4.6	3.2	6.3	5.3
30-44	4.3	3.1	8.2	7.8	3.1	2.0	2.5	2.6
45-89	4.4	4.3	6.1	5.7	5.2	3.7	7.1	5.7
>=90					7.5	5.4	13.2	11.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

19.3 Results

Number of prescriptions per 1000 persons

In 1987 on average 52 prescriptions for antidepressant drugs per 1000 persons were issued against 210 per 1000 persons in 2001 (table 19.3). The percentage of persons with one or more prescriptions for an antidepressant drug was 7 per 1000 in 1987 and 42 per 1000 in 2001 (not in table.)
Both in 1987 and in 2001, in women the mean number of prescriptions was about twice as high as in men.
The lowest SES group had a 2.5 times higher prescription rate than the highest SES group, both in 1987 and 2001: the lowest/highest ratio was 2.5 in 1987 and 1.7 in 2001.
The number of prescriptions was rising with increasing age.

Table 19.3 Number of antidepressant prescriptions (per 1000 patients) in 1987 and 2001 in relation to sex, SES, and age

	1987 Prescriptions Per 1000	2001 Prescriptions Per 1000	*2001/1987* *Ratio*
All	52	210	***4.1***
Sex			
Male	35	127	***3.7***
Female	67	291.7	***4.4***
Female/male ratio	***1.9***	***2.3***	
SES			
Lowest	73	304	***4.2***
Highest	29	119	***4.1***
Lowest/highest SES ratio	***2.5***	***2.5***	
Age			
0-24y	7	27	***3.9***
25-64y	60	257	***4.3***
65y a.o	106	356	***3.3***

Bold p<0.05

In 1987, 83% of all prescriptions concerned TCAs (table 19.4). Although the prescription rate of TCAs increased in 2001 compared with 1987 (from 43 to 53 per 1000 persons), in 2001 TCAs were replaced by the SSRIs as most frequently prescribed antidepressants. In 1987, amitryptiline was the most prescribed antidepressant with a prescription rate of 20 per 1000 patients; in 2001 paroxetine was the most prescribed antidepressant (79 prescriptions per 1000 persons), with amitryptiline on the 2nd place (30 prescriptions per 1000 persons).

Table 19.4 Number of prescriptions per 1000 persons for each class of antidepressants

	1987		2001	
	per 1000 persons	*% of all prescriptions*	per 1000 persons	*% of all prescriptions*
TCA	43	*83*	53	*25*
SSRI	1	*2*	132	*63*
other	6	*11*	16	*8*
Lithium	2	*4*	6	*3*
buproprion	0	*0*	3	*1*
All anti-depressants	52	*100*	210	*100*

Use of antidepressants in relation to ICPC codes referring to mood disturbances and anxiety states

We examined which proportion of the patients suffering from mood disturbances and anxiety states received one or more prescriptions for antidepressants in 1987 and 2001 (table 19.5).

In 1987, 43% of all patients with a mood disturbance were treated with an antidepressant against 75 % in 2001. Patients with a depressive disorder (ICPC code P76) were treated more frequently with an antidepressant than patients "feeling depressed" (ICPC code P03); this difference was larger in 2001 than in 1987. In 2001, 83% of all patients with a depressive disorder were treated with an antidepressant drug, whereas in 1987 less than half of the patients were treated.

Patients suffering from anxiety states were more frequently treated with antidepressants in 2001 than in 1987: in 1987, only 5% of all patients were treated, while in 2001 29% of the patients were prescribed an antidepressant.
The increase in the proportion of patients being treated with an antidepressant was particularly marked for patients suffering from anxiety disorders (6% treated in 1987, 60% treated in 2001) and for patients suffering from phobia/compulsive disorders (8% treated in 1987, 49% treated in 2001).

Table 19.5 Proportion of patients to whom antidepressants were prescribed in relation to diagnoses referring to mood disturbances and anxiety states; percentages

	1987	**2001**
	%	**%**
Feeling depressed (P03)	30	46
Affective psychosis (P73)	45	47
Depression (P76)	44	83
ALL MOOD DISTURBANCES	43	75
Feeling anxious (P01)	5	20
Acute stress reaction (P02)	3	16
Anxiety disorder (P74)	6	60
Phobia/compulsive (P79)	8	49
ALL ANXIETY STATES	5	29

There were no relevant differences between males and females in the treatment of mood disturbances and anxiety states (table 19.6).
In 1987, persons of the lowest SES group were more frequently treated with antidepressants than people of the highest SES group, both for mood disturbances (lowest/highest SES ratio 1.35) and anxiety states (ratio 1.93); in 2001, these differences were much smaller (ratio for mood disturbances and anxiety states 1.08 and 1.25 respectively).

Table 19.6 Prescription of antidepressants (in %) for mood disturbances and anxiety states in relation to sex

	1987		2001	
	Mood disturbance	Anxiety states	Mood disturbance	Anxiety states
	%	%	%	%
All	43	5	75	29
Sex				
Male	44	4	72	26
Female	43	5	76	30
Male/female ratio	*0.98*	*1.27*	***1.05***	***1.16***
SES				
Lowest	49	6	77	30
Highest	36	2	72	24
Lowest/highest ratio	***1.35***	***1.93***	***1.08***	***1.25***

Bold p<0.05

Regarding patients suffering from a mood disturbance, the proportion of patients treated with antidepressants in the *youngest age* group (0 to 14) was approximately similar in 1987 and 2001 (table 19.7), whereas in all older age groups the the proportion of treated patients increased from 60 to 100% between 1987 and 2001.

The proportion of treated patients suffering from an anxiety state was lowest in the age from 0 to 24 both in 1987 and 2001, although the rates were much higher in 2001 than in 1987. In all older age groups we saw also a distinct increase in the proportion of treated patients between 1987 and 2001.

Patients diagnosed with an anxiety state were treated with an antidepressant.

Table 19.7 Prescribing of antidepressants to patients diagnosed with mood disturbances and anxiety states in relation to age; percentages

	1987		2001	
age	Mood disturbance	Anxiety state	Mood disturbance	Anxiety state
	%	%	%	%
0-14 yr	27	2	25	6
15-24 yr	27	1	54	19
25-44 yr	37	4	75	32
45-64 yr	49	6	78	31
65 yr and older	45	6	78	26

19.4 Discussion

Summary of results

The use of antidepressant drugs increased steeply between 1987 and 2001. The number of prescriptions rose by a factor four. The differences between 1987 and 2001 fit into a picture found all over the developed world.[1] A survey in 2001 in France demonstrated that 3.5% were being prescribed antidepressants compared to 1.7% in 1992.

The increase in the prescription of antidepressants was mainly the result of the introduction of the SSRIs; in 2001, the number of prescriptions was 158 per 1000 persons higher in 2001 than in 1987, whereas the number of prescriptions of SSRI's was 131 per 1000 persons higher in 2001 than in 1987.

By extrapolating our data, we found that in 2001 672,000 people in the Netherlands were prescribed antidepressant medication by their GP and it concerned SSRIs in 64% (448,000 persons). According to the 'GIP soundings' (a nationwide system monitoring system of the health insurers, which produce reliable figure) 851,000 persons were using antidepressants.[7] This means that GPs prescribe 80% of the total volume of antidepressant drugs.

Females were using at least two times more often an antidepressant drug than males. In the first place this is caused by the higher incidence and prevalence rates of mood and anxiety problems in females, however, as prescribing is obviously dependent on the individual's willingness to seek help, gender differences in prescribing may also reflect differences in consultation patterns

between males and females.
The older a person, the higher the chance of using an antidepressant. This trend was visible in both surveys. Persons of the lowest SES group used more often antidepressants than persons of the highest SES group. The reason for the higher prescription rates for older persons and persons of the lowest SES group, are the same as mentioned earlier for women.
Persons who were diagnosed with a depressive disorder, were using an antidepressant drug in less than half of all cases in 1987 and in more than 80% of all cases in 2001. This is also an indication of the increased importance of these drugs.
Persons diagnosed with any form of anxiety were much more frequently treated with antidepressants in 2001 than in 1987. In 1987 it was not yet generally known that antidepressant drugs exerted a beneficial effect on patients with anxiety. Contrary to recommendations of the guideline for depression and anxiety, GPs chose in 2001 predominantly for SSRIs when they decided to treat.

Why did prescribing antidepressants rise between 1987 and 2001?

What is the reason of the enormous increase in the use of antidepressant agents between 1987 and 2001.
On theoretical grounds we may postulate four reasons

- more people were diagnosed with a depression by GPs in 2001 than in 1987
- patients with a depression were more often prescribed antidepressant medication in 2001 than in 1987
- patients with a depression were treated for a longer period with a antidepressant drug in 2001 than in 1987
- antidepressants were used for a wider range of conditions in 2001 than in 1987

We will successively discuss these four points.

Were more people diagnosed with depressions by GPs in 2001 than in 1987?

We should keep in mind that more people being diagnosed can have different reasons. It may indicate that there are more persons with a depression in the population; or that persons with a depression are more readily presenting this to their GP; or that GPs' ability to detect a depression has been improved; and of course any combination of these three reasons. From morbidity figures only, it is not possible to conclude which reason prevailed.

Between 1987 and 2001, the incidence of mood disturbances remained more or less similar (11.5 per 1000 in 1987 and 10.6 per 1000 in 2001 ; see chapter 12). From the CMR peilstations we have incidence figures for the period 1983-1985 and for the year 2001; in 1983-1985 the yearly incidence was 6.9 per 1000 and in 2001 3.4 per 1000.[8] In the Weekly Returns Service of Birmingham (UK) the incidence of depression decreased from 17.8 per 1000 in 1996 to 12.9 per 1000 in 2001. [9]

In contrast with these data, in the Nijmegen CMR the incidence of depression was rising from 2.7 per 1000 in the periode 1986-1990 to 6.3 per 1000 in the period 1999-2003. However, the increase in the Nijmegen registration can be considered as catching up; in the earlier period more patients were diagnosed with the non-specific label "nervous-functional complaints" .

Concluding, the data presented in this thesis demonstrate that the dramatic rise in prescribing antidepressants is not matched by a corresponding increase in the number of new cases of depressions diagnosed by GPs. With the exception of the Nijmegen CRM other data sources support these findings.

Were patients with a depression receiving more often antidepressant medication in 2001 than in 1987?

Two factors might contribute to this; GPs being more inclined to prescribe antidepressants and/or people with depression being more willing to ask for or accept antidepressant medication.

These two factors are interrelated. The prescribing pattern is always an interaction between a doctor and a patient.

Our data confirm that patients with a diagnosis of depression (P76) were prescribed more often an antidepressant drug in 2001 than in 1987 (83% vs. 44%). Patients with the label "feeling depressed" (P03) received an anti-depressant prescription in 30% of the cases in 1987 and in 45% in 2001.

This increase is in accordance with the NHG guideline on depression issued in 1994 [3]. However, contrary to the recommendation of this guideline, not TCAs but SSRIs were the most prescribed antidepressants. As stated in the introduction of this chapter, in 2001 GPs knew that a revision of the guideline was forthcoming that would expand the indications for SSRIs. Grundmeijer, one of the authors of the guideline, confessed in 2000 that he personnally also had switched to SSRIs as treatment of first choice.[10]

Verhaak examined how the patients from the CMR peilstations, diagnosed with a depression in 2000 (N=516), were treated. About 80% were treated with a

SSRI or a TCA, ten percent of the patients were treated with other medication.[11]

Were patients with a depression treated for a longer period with an antidepressant drug in 2001 than in 1987?

In the NHG guideline on depression it was advised to continue treatment till six months after the depressive symptoms had abated. Before the publication of this guideline no uniform regime was followed by doctors, resulting in disparate periods of prescribing. Is a longer duration of use (partly) responsible for the increase in the prescribing of antidepressant drugs?
Our study is not suited to answer this question. However, De Waal confirmed in her study that GPs were prescribing antidepressants for longer periods of time.[12] Meijer, using data of the PHARMO record linkage system collected between 1991 and 2001 [13], came to the same conclusion.[14-15] This indicates that most likely prolonged use of antidepressants is a contributing factor to the rise of the volume of antidepressant drugs between 1987 and 2001.

Were antidepressants used for a wider range of conditions in 2001 than in 1987?

We learned that for all diagnoses related to anxiety states, antidepressants were much more frequently prescribed in 2001 than in 1987. This is in concordance with the NHG guideline on anxiety states. Initiated by the NHG guideline, anxiety states were considered as an indication for antidepressants.

Therefore, the use of antidepressants for a wider range of conditions is also contributing to the increase in prescribing volume of these drugs.

19.5 Conclusion

The surge in prescribing antidepressants was mainly brought about by SSRIs. Due to or associated with the development and the marketisation of the SSRIs, depression and other psychiatric diseases were more and more considered as a brain disease caused by a deficiency of serotonin, which made treatment with SSRIs a logical choice. However, in hindsigth this concept proved to be much too simplistic. In current conceptualizations of the neurobiology of depression, monoaminergic dysregulation is seen more as an associated factor than as a primary cause.[16] Also, a critical revaluation of the SSRIs showed that their favourable effects were much less than previously found. [17]

We attempted to find the mechanisms which were responsible for the increase in the prescribing of antidepressants between 1987 and 2001.

We found no indication in our data that more patients were suffering from depression in 2001 than in 1987. However, we established that patients with a depression were being treated with antidepressant medication in a higher proportion in 2001, that antidepressants were being used for a wider range of conditions, and that patients on antidepressant medication were being treated for a longer period of time.

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20 Dutch General Practitioners’ referrals to medical specialists in 1987 and 2001

20.1 Introduction

In this chapter we focus on the new referrals of GPs to medical specialists and we will provide quantitative information about these referrals to the various specialties. A referral is a temporary transfer of the responsibility for a health problem of a patient to a medical specialist.
In the Netherlands, patients generally require a referral from their GP for consulting a medical specialist, apart from a small number of specialist services such as accident and emergency departments and STD clinics, and referrals made by other care providers, such as other specialists.
Although the access to specialist care via the GP formally applied in 1987 and 2001 only to publicly insured patients, many insurance companies applied this rule also for privately insured patients. [i]
It is this 'filtering' process that has led to general practitioners being described as gatekeepers for specialised health services. In this system GPs are making the decisions about when a referral is necessary - of course always in close cooperation with the patient - and are choosing the appropriate specialist. GPs are supposed to provide adequate triage and showing patients the way through an increasingly complex healthcare system to ensure that they receive the kind of care that is appropriate. Such "navigation" is one of the key competences of general practice [1] .
In the Dutch Health care system new referrals are the best indicator for studying the role of GPs; extended referrals and posterior referrals do not measure the decisions of GPs, but they are determined by rules of the Dutch health insurance system.[ii]

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[i] The majority of patients (two thirds of the population), are insured in a public scheme and the rest, belonging largely to the higher income group, are privately insured. General practitioners are paid through capitation for patients who are publicly insured and by fee for service for those privately insured whereas specialists are paid on a fee for service basis for all patients.

[ii] In the public insurance scheme, the patient is given a referral card valid for one year which is passed on to the specialist effectively authorising his fee. Continuing treatment after one year requires further authorisation (extended or repeat referral) simply to satisfy an administrative procedure. When specialist care is provided in emergency without referral, the authorisation is obtained retrospectively (posterior referral). Both extended and posterior referrals are passive referrals and commonly authorised indirectly without consulting a GP.

Relevance of studying referrals

Studying referrals from GPs to secondary specialistic care is important for several reasons.
Referral decisions by GPs have potentially far-reaching consequences for the patient and have an enormous impact on the costs of care. Appropriate referral may lead to timely diagnosis and treatment of conditions that are beyond the immediate expertise of the GP. Inappropriate referral, however, may lead to unnecessary testing and a cascade of increasingly expensive, invasive, and risky procedures in an often futile search for diagnostic certainty [2].
Although general practice consumes a relatively small proportion of the total health care budget, the referral decisions made in general practice are a crucial determinant of the use of specialised care resources [3]. In the light of the importance of referrals, information on GPs' referral rates is of interest for GPs, medical specialists, health insurance companies and policy makers.

For individual GPs it important to know for which problems patients are frequently being referred and which problems are managed predominantly by GPs and therefore seldom referred. This enables GPs to compare their own referral behaviour with a national average.
For specialists, such information provides a frame of reference for their work in relation to primary care: which conditions are referred, and is a referral for a specific condition an exception or the rule? Moreover, valuable insight may be gained in the demand for specialist care. The morbidity spectra encountered by doctors at different levels and in different specialties vary greatly, which has implications for the value of diagnostic procedures and management. Insight into the a priori chance of a condition being referred can assist the specialist in formulating a differential diagnosis.

Health insurance companies are interested as health care financers. A referral to secondary care means that the care for a patient is transferred from a relatively low cost sector to a potentially high cost sector.
Healthcare systems which allow patients direct access to specialists like USA, Germany, France, and Sweden tend to incur higher costs than those that channel the demand via general practitioner referrals, such as UK, Denmark, Finland, and the Netherlands [4].
In 1998, European countries with gatekeeping systems spent less on healthcare as a percentage of their gross national product than those that allowed direct access to specialists (7.8% vs. 8.6%) [5].

Health insurance companies and policy makers alike are interested in the efficiency and the cost-effectiveness of the health services. Because of the rising costs of the health services, the policy is to advocate substitution of care to the lowest possible level. This means a shift in the balance from secondary to primary care. To monitor the effects of the measures taken to promote this, insight into the flow of patients from primary care to secondary care and vice versa is necessary.

The study of the referral behaviour of general practitioners

Referral rates are the outcome of the referral behaviour of the GP. It is no wonder that given the costs referrals generate much attention has been paid to variations in referral rates between GPs.

Referral rates predominantly reflect the morbidity presented to GPs; the case-mix is the most important determinant [6]. Predisposing factors as age, sex and socioeconomic status are contributing factors to the case-mix. However in addition, in many cases the choice for GPs to refer or not to refer is not straightforward. Each GP has his/her own threshold for referring.

Such a threshold may reflect the unique weighting each GP applies to such intangible issues as the fear of making a mistake, the desire to please a patient, or the challenge of leaving no stone unturned. In making a referral decision, a general practitioner is also influenced by factors outside the immediate clinical situation: these might include the illness of relatives, previous failure in management of a patient, the claiming behaviour of a patient.

Despite a widespread assumption that frequently referring GPs tend to refer unnecessarily, Knottnerus found in the Netherlands no difference in the appropriateness of referral from doctors with high and low referral rates [7]. In three British studies the same conclusion was drawn [8-10]. Another remarkable finding was that GPs with particular areas of interest had higher referral rates in those specialties in which they were specially skilled [9].

Fleming has demonstrated in his European study of referrals from primary to secondary care that the referral rate not only depends on the need for secondary care, but also is also strongly related to the health care system and availability and accessibility of specialist care [11]. In areas where the specialist density is high, more people were referred to a specialist than patients living in more rural areas [12]. Local differences in access to facilities such as radiological services, physiotherapists may also affect referral rates.

The conclusion should be that referral rates should not be used as proxy for quality of care. A high referral rate does not imply poor quality referrals or inappropriate referrals , whereas low referral rates might indicate poor quality care [13]. It is extremely difficult to judge the quality of referrals and we will not venture to do so in this chapter.

Referral numerators and denominators

The preferred numerator for referrals is the number of persons referred. In many studies referral data are concerned with counts of referrals as events and not with counts of persons, because in many information systems there is no selection possible on individual patients . Fortunately, our data of 1987 and 2001 allowed patient linkage of referrals.
Given an agreed numerator for counting referrals, a denominator is needed for expressing rates. Because general practitioners care for defined populations in the Netherlands, it is possible to express referred persons as a proportion of the listed population.
Other possible denominators include consultations and persons consulting. Persons consulting is theoretically a preferable denominator compared to patients registered, because doctors have no opportunity to refer a non-consulting patient. However, in a study comparing practice-based referred person rates using registered persons and persons consulting as denominators, there were very few differences in the ranking order of the practices [14].
The most practical denominator for expressing individual general practitioner referral rates is the consultation, but when we interpret data with a time difference of 14 years (1987 vs. 2001) the variability in consultation frequency should be considered. When the number of telephone consultations increase - as actually happened between 1987 and 2001 - it is questionable whether it is advisable to use consultation as denominator.

What is this chapter about?

The aim of this chapter is to give a nationally representative overview of rates of new referrals from GPs to medical specialists in 1987 and 2001 for health problems, and to compare the figures of 1987 and 2001. Information on how referral patterns evolved over time within a country are scarce. Since the first National Survey in 1987, several changes took place within general practice with as most important development that several evidence-based guidelines for a number of diseases have been implemented to help decision making for referral to primary and secondary specialist care [15].

As stated previously, we will study the variations in referral rates for patients in relation to sex, age and socioeconomic status (SES).
The research questions for this chapter are:

- *How often and to which medical specialists were patients referred in relation to sex, age and SES in 1987 and 2001?*
- *What were the top-10 diagnoses for which patients were referred in 1987 and 2001?*
- *What were the top-5 referral diagnoses for each medical specialty in 1987 and 2001?*

20.2 Methods

Data were analysed from the first and second Dutch national survey of general practice (NS1 and NS2), which were performed by the Netherlands Institute for Health Services Research (NIVEL) in 1987 [16] and 2001 [17].
In chapter 6 we described in detail the characteristics of the two surveys. In this section we will give additional information related to referrals to medical specialists by GPs.
In these analyses, we considered only new referrals; extended or repeat referrals were not included in the analyses. Also not included were posterior referrals: these are referrals where authorisation is obtained retrospectively.
A referral was considered new when a patient was referred to a specialist for the first time for a certain health problem. However, if a person was referred a second time for the same health problem to the same specialty, because of failure to make progress after an initial referral, this was not counted as a new referral. If, later on in the study period, a person was referred to the same specialist for another health problem, this was considered as a new referral. The referral diagnosis is the work hypothesis or diagnosis made when the patient was referred to secondary care. Some peculiarities in the results, (e.g. a person with an appendicitis who was not referred) are caused by the method of registration in this survey, in which a GP could write down a provisional diagnosis or working hypothesis in case of suspicion.
We distinguished between a population-based referral rate and an episode-based referral rate.

Population-based and episode-based referral rate

Population-based referral rate

The referral rate was calculated as the number of referrals per 1000 patients per year, the numerator representing the actual number of referrals in that year, and the denominator representing the registered patients during the entire registration period.

Episode-based referral rate

The referral rate by episodes of illness, is a measure of likelihood of a patient with a certain condition being referred. It was calculated as the number of referrals for a condition per 100 new episodes presented to general practice [18].

We applied a quality check on the completeness of the recorded referrals.
In 2001, in addition of the eight practices that were excluded based on their morbidity recording, we excluded 30 practices because their registration of referrals was considered inadequate and unreliable. (Practices with less than 100 new referrals per 1000 publicly insured patients or practices with less than 30 new referrals per 1000 privately insured referred patients.) This left us with data from 66 practices with a base population of 241,718. The base population of 1987 was 334,007.

Table 20.1 The absolute and the proportional distribution across the socioeconomic groups of the basis referral populations in 1987 and 2001

	1987			2001		
	N	%	%	N	%	%
lowest SES	91,302	27.3	34.9	54,978	22.7	29.3
middle SES	127,287	38.1	48.6	79,924	33.1	42.6
highest SES	43,102	12.9	16.5	52,596	21.8	28.1
unknown SES	72,316	21.7	-	54,220	22.4	-
	334,007	100.0	100.0	241,718	100.0	100.0

For differences in duration of registration – three months in 1987 and 12 months in 2001 - a weight factor was applied, which made it possible to

calculate annual figures.
All referral rates were standardised for age; we used the age composition of the Dutch population on 1-1-2001 as standard.
Statistical significant differences between 1987 and 2001 were, when appropriate, tested by using the Chi-square test.

Clusters

To account for differences in coding between 1987 and 2001, we composed a number of disease clusters (table 20.2).

Table 20.2 Composition of Disease Clusters

	Functional Gastrointestinal		**Mood disturbance**
D01	Abdominal Pain/Cramps	P03	Feel.Depressed
D02	Stomach Ache/Pain	P73	Manic-depressive disorder
D06	Oth.Localized Abd.Pain	P76	Depressive Disorder
D09	Nausea		**Upper Respiratory Tract Infection**
D87	Disord.Stomach Function	R05	Cough
D93	Irritable Bowel Syndrome	R07	Sneezing/Nasal congestion
	Diarrhoea-all forms	R08	Nose symptoms
D11	Diarrhoea	R09	Sinus symptoms
D70	Infectious Diarrhoea, Dysenter	R72	Streptococcal throat infection
D73	Gastroenteritis presumed infection	R74	Upper respiratory tract infection
	Problems with visus	R75	Sinusitis
F05	Oth.Probs.With Vision	R76	Ac Tonsillitis
F91	Refractive Error	R77	Laryngitis/Tracheitis
	Problems with hearing	R90	Hypertrophy tonsils/adenoids
H02	Hearing Complaint	H71	Ac. Otitis media
H84	Presbyacusis		**Lower Respiratory Tract Infection**
H86	Deafness/Partial Or Complete	R70	Tuberculosis
	Serous Otitis med	R71	Whooping cough
H72	Serous Otitis Media	R78	Ac.Bronchitis/Bronchiolitis
H73	Eustachan Salpingits	R80	Influenza
	Coronary heart disease	R81	Pneumonia
K74	Angina Pectoris		**Chronic bronchitis/COPD**
K75	Myocardial Infarction	R91	Chronic bronchitis
K76	Chronic Coronary Artery Disea	R95	COPD/Emphysema

Table 20.2 - *continued*

	Problems with bloodpressure		**Dermatitis all forms**
K85	Elevated B/P W/O Hypertension	S86	Seborrheic Dermatitis
K86	Hypertension, Essential	S87	Eczema/Atopic Dermatitis
K87	Hypertension Involv.Target Or	S88	Contact Dermtatis/Oth.Ecze
	Neck problems		**Problems mammae not malign**
L01	Neck Sympt/Complaints	X18	Breast Pain
L83	Neck Syndrom	X19	Breast Lump/Mass
	Low back problems	X20	Sympt/Complaint Nipple
L02	Back Symptoms/Complaints	X21	Oth.Sympt./Compl.Breast
L03	Low Back Pain Symtom/Complaint	X26	Fear Breast Cance
L84	Low Back Syndrom without radiation	X79	Benign Neopl.Breast
L86	Low Back Pain with Radiation	X88	Chronic Cystic Dis.Breast
	Shoulder problems		**Prostate problems**
L08	Shoulder Symptoms/Complaints	Y06	Prostate symptoms
L92	Shoulder Syndrome	Y85	Benign prostate hypertrophy
	Anxiety states		
P01	Feel.Anxious/Nervous/Tense		
P02	Acute stress reaction		
P74	Anxiety Disord/Anxiety State		
P79	Phobia/Compulsive disorder		

20.3 Results

20.3.1 Overall rates

In 1987, on an annual basis, the standardised referral rate of new referrals to medical specialists was 188 per 1000 new episodes (table 20.3); 172 per 1000 patients were referred at least once to a medical specialist. In 2001, the referral rate was 156 per 1000 new episodes); 134 per 1000 patients were referred at least once to secondary care. This means that the referral rate was in 2001 17% lower than in 1987.

The rate in males decreased 22% between 1987 and 2001, in females 12%. The gap in referral rate between males and females grew: the rate in females was in 1987 14% higher than in males, in 2001 28% higher. The referral rates in all three SES groups were lower in 2001 than in 1987. The gap between the lowest and the highest SES group became wider between 1987 and 2001.

Table 20.3 Overall referral rate to medical specialists by sex and SES (per 1000 per year), female/male ratios and lowest/highest SES group ratios in 1987 and 2001

	1987 /1000	2001 /1000	2001/1987 ***ratio***
all	188.2	156.1	***0.83***
Sex			
male	176.2	136.5	***0.78***
female	200.1	175.4	***0.88***
female/male	***1.14***	***1.28***	
SES			
lowest	204.8	200.7	*0.98*
middle	187.8	159.7	***0.88***
highest	158.4	130.1	***0.82***
lowest/highest	***1.29***	***1.54***	

Bold < p 0.05

The referral rates across the different age groups showed the same wheelbarrow-shaped pattern in 1987 and 2001, although the rates were in 2001 lower than in 1987 for the age 65 years and younger (figure 20.1). The highest rates were found in the eldest groups, the lowest rates in the age from 5 to 24, and relatively high referrals rates in the youngest age group.

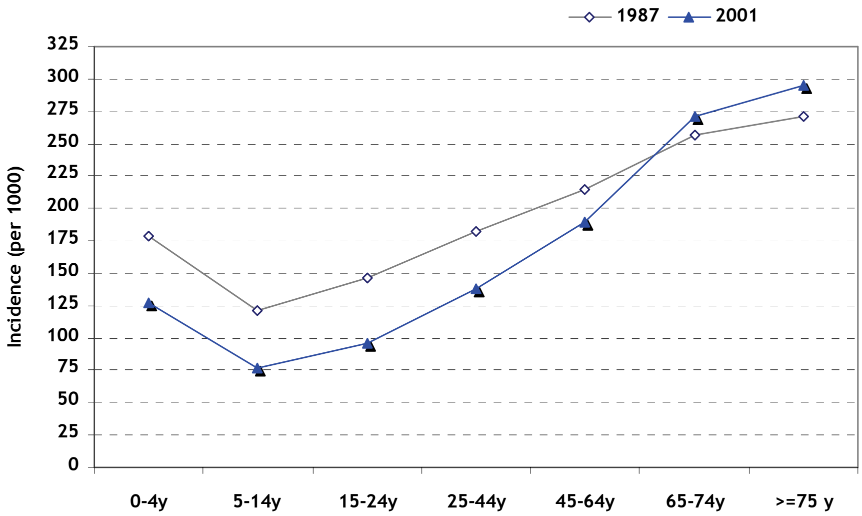
The largest difference in referral rate between 1987 and 2001 occurred in the age group 5 to 14 (37%).

The gap between lowest the referral rate (age group 5 to 14) and the oldest group (75 years and older) was larger in 2001 than in 1987: in 2001 the oldest group was 3.8 times more frequently referred whereas in 1987 this was 2.2 times more frequently.

The differences between 1987 and 2001 were statistically significant across all age groups.

In the youngest age group the referral rate was higher in males than in females, in 1987 and 2001. In the age group 5 to 14 the rate was higher in females than in males in 1987, and higher in males in 2001. Between the age of 15 to 64, the rates were higher in females both in 1987 and 2001. In the two oldest age groups the differences between the sexes were small or non-existent.

Figure 20.1 Referral rates to medical specialists (per 1000 per year) in 1987 and 2001 by age



	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75 y
2001/1987	**0.71**	**0.63**	**0.66**	**0.75**	**0.88**	**1.06**	**1.09**
Female/ male ratio							
1987	**0.88**	**1.08**	**1.25**	**1.31**	**1.11**	**0.98**	0.97
2001	**0.67**	**0.92**	**1.59**	**1.55**	**1.29**	1.05	**0.91**

Bold p<0.05

20.3.2 Referral rate per specialty

In table 20.4 we listed the referral rates per specialty in 1987 and 2001.
In all following tables we omitted those specialties which had lower overall referral rates than 1 per 1000 in 1987 or 2001 (gastroenterology, rehabilation medicine, oral surgery, neurosurgery, radiotherapy, anaesthesiology, geriatrics).

As stated, the overall referral rate went down by 17% between 1987 and 2001. The specialties most affected were internal medicine (40%) and surgery (37%). The differences in referral rates between 1987 and 2001 were not statistically

significant ($p<0.01$) for the following specialties: dermatology, cardiology, neurology, urology, respiratory medicine, psychiatry, oral surgery and radiotherapy.
However, for some specialties the referrals rates were higher in 2001 than in 1987. It concerned rehabilitation (90%), gastroenterology (67%), rheumatology (63%).
The proportional contribution of the various specialties to the sum of all referrals remained rather stable with the exception of surgery and internal medicine: the share of surgery went down from 17% in 1987 to 13% in 2001, and the share of internal medicine from 11% in 1987 to 8% in 2001.

Table 20.4 New referrals to medical specialists, rates per 1000 patients per year, proportion of each specialty on total number of referrals, ratio 2001/1987ratio, P value

	1987		2001		*2001/1987*	
	/1000	%	/1000	%	*ratio*	P
Surgery	32.5	*17*	20.6	*13*	***0.63***	***
Ear NoseThroat	20.8	*11*	18.3	*12*	***0.88***	***
Opthtalmologist	19.8	*10*	16.0	*10*	***0.81***	***
Internal medicine	20.0	*11*	12.1	*8*	***0.61***	***
Orthopaedics	16.6	*9*	14.7	*9*	***0.89***	***
Gynaecology/Obst	15.7	*8*	11.1	*7*	***0.71***	***
Dermatology	15.1	*8*	15.9	*10*	***1.05***	*
Neurology	13.7	*7*	12.2	*8*	***0.89***	***
Cardiology	7.6	*4*	7.0	*4*	***0.92***	*
Urology	7.1	*4*	7.5	*5*	***1.07***	*
Paediatrics	5.5	*3*	3.8	*2*	***0.69***	***
Respiratory medicine	3.7	*2*	3.1	*2*	***0.85***	***
Psychiatry	3.0	*2*	3.0	*2*	*1.00*	Ns
Reconstructive surgery	2.5	*1*	3.1	*2*	***1.26***	***
Rheumatology	1.7	*1*	2.7	*2*	***1.63***	***
Oral surgery	0.9	*0*	0.9	*1*	*1.04*	Ns
Rehabiliation medicine	0.8	*0*	1.6	*1*	***1.90***	***
Gastroenterology	0.7	*0*	1.2	*1*	***1.67***	***
Neurosurgery	0.4	*0*	0.1	*0*	***0.32***	***
Radiotherapy	0.1	*0*	0.1	*0*	*0.75*	Ns
Anaesthesiology	0	*0*	0.5	*0*		
Geriatrics	0	*0*	0.4	*0*		
all	188.2	*100*	156.1	*100*	***0.83***	***

* 0.05<p>0.01; **0.01<=p>0.001; *** p<= 0.001 Ns= statistically not significant

Referral rate per specialty by sex

Males versus females

For most specialties the referral rate was higher for females than for males both 1987 and 2001. In 1987 the female/ male ratio was highest for reconstructive surgery (2.32), rheumatology (1.96) and psychiatry (1.55); the ratio was lowest for urology (0.26), respiratory medicine (0.39) and cardiology (0.70).

In 2001 the trend of most ratio's was similar to that in 1987; the highest ratios were for rheumatology (2.83), reconstructive surgery (2.42 and dermatology (1.47) and by far the lowest ratio was for urology (0.20).

Two ratios differed considerably: respiratory medicine had a female/male ratio of 0.39 in 1987 and 0.79 in 2001; psychiatry had a female/male ratio of 1.55 in 1987 and 1.16 in 2001.

Male-male and female-female 1987-2001

In males the referral rates to most specialties decreased between 1987 and 2001: the most pronounced decline were the rates of referrals to surgery, internal medicine, paediatrics and respiratory medicine. Increased referral rates were recorded for urology, psychiatry, reconstructive surgery and rheumatology.

In females, like males, there was a decline in the referral rate to surgery, internal medicine and paediatrics, however unlike males there was an increase in the referrals to respiratory medicine; other specialties with higher referral rates were dermatology, rheumatology and reconstructive surgery.

Table 20.5 New referrals to medical specialists in relation to sex: Female/male ratio's 1987 and 2001; male/male and female/female ratio 2001/1987

	1987	2001	2001/1987	2001/1987
	Female /male *ratio*	***Female /male*** *ratio*	**Male/male** ratio	**Female/female** ratio
Surgery	***0.91***	***1.06***	***0.58***	***0.68***
ENT	***0.93***	***0.93***	***0.89***	***0.90***
Opthtalmology	***1.25***	***1.27***	***0.80***	***0.81***
Internal medicine	*1.04*	***1.40***	***0.51***	***0.68***
Orthopaedics	***0.90***	***1.12***	***0.78***	***0.97***
Gynaecology				***0.72***
Dermatology	***1.39***	***1.47***	*1.01*	***1.08***
Neurology	*1.04*	***1.14***	***0.84***	***0.92***
Cardiology	***0.70***	***0.80***	***0.85***	*0.98*
Urology	***0.26***	***0.20***	***1.09***	***0.82***
Paediatrics	***0.90***	***0.82***	***0.76***	***0.69***
Respiratory medicine	***0.39***	***0.79***	***0.63***	***1.28***
Psychiatry	***1.55***	***1.16***	***1.19***	***0.89***
Reconstructive surgery	***2.32***	***2.42***	***1.23***	***1.28***
Rheumatology	***1.96***	***2.83***	***1.27***	***1.83***

Bold $p<0.05$

Referral rate per specialty by SES

Lowest-lowest 2001/1987 and highest-highest ratio 2001/1987

The referral rates for most specialties were lower in 2001 than in 1987, both in the lowest and the highest SES group (table 20.6). Overall, the referral rate for the lowest SES group was 11% percent lower in 2001 than in 1987 (ratio 0.89), for the highest group the rate was 14% lower.

The lowest SES group had low rates for opthalmology (0.58) and internal medicine (0.57) and high rates for rehabilitation medicine (1.95) gastro-enterology (2.45)

In 2001, the decrease in referral rates for the highest SES group was, like the lowest group, most marked in internal medicine (0.62); the strongest increase was in urology (1.79) and psychiatry (1.79).

Lowest versus highest SES group in 1987 and 2001

In 1987, the largest differences between the ratios of the referral rates for the lowest and highest SES were in psychiatry (2.26), paediatrics (1.75) and rheumatology (1.58).

Table 20.6 New referrals to medical specialists by SES: lowest/highest ratio's in 1987 and 2001; lowest/lowest and highest/highest ratio 2001/1987

	1987 *low/high ratio*	***2001*** *low/high ratio*	***2001/1987*** *lowest SES ratio*	***2001/1987*** *highest SES ratio*
Surgery	***1.35***	***1.35***	***0.70***	***0.69***
ENT	***1.22***	***1.12***	***0.93***	*1.01*
Ophthalmology	***1.25***	***1.39***	***0.90***	***0.81***
Internal medicine	***1.37***	***1.25***	***0.57***	***0.63***
Orthopaedics	***1.27***	***1.50***	*1.01*	***0.86***
Gynaecology [a]	***1.43***	***1.54***	***0.82***	***0.76***
Dermatology	1.00	1.08	***1.13***	*1.05*
Neurology	***1.31***	***1.50***	*1.03*	*0.90*
Cardiology	1.06	1.10	*0.96*	*0.93*
Urology	***1.44***	***0.83***	*1.02*	***1.77***
Paediatrics [b]	***1.71***	***1.36***	***0.79***	*0.99*
Respiratory medicine	***1.51***	1.05	***0.70***	*1.02*
Psychiatry	***2.24***	1.03	***0.82***	***1.78***
Reconstructive surgery	0.94	1.22	***1.41***	*1.08*
Rheumatology	***1.60***	***1.78***	***1.72***	***1.54***

Italics Bold: $p < 0.05$

In 2001, the differences were less than in 1987; the largest differences were found in orthopaedics (1.49), neurology (1.48) and gynaecology/obstetrics

(1.47). Considering both years, in 2001 urology was the only specialty where the referral rate was significantly higher for higher SES than for the lowest SES group.

20.3.3 Referral rates top-5 specialties per age group

Table 20.7 shows the referral rates to the top-5 specialties per age group for 1987 and 2001.

Surgery was the only specialism featuring in the top-5 of all age groups both in 1987 and in 2001.

Ophthalmology occurred also in the top-5 of most age groups in 1987 and 2001, with the exception of the age group 15 to 24 and, and with the exception of the age group 25 to 44 in 2001.

In figure 20.1 we saw that below the age of 65 the overall referral rates were lower in 2001 than 1987, whereas from the age of 65 years onwards the rates in 2001 were slightly higher than in 1987.

Below the age of 65 the referral rates of the top-5 specialties were lower in 2001 than in 1987; in the age groups of 65 years and older, the referral rates increased most for ENT and ophthalmology between 1987 and 2001.

Age group 0 to 4 and age group 5 to 14

These two age groups can be combined because the top-5 specialties, to which patients were referred, were rather similar. Only in the age group 0 to 4 orthopaedics, which ranked fifth in 1987, was superseded by dermatology in 2001.

The top-5 specialties were in 1987 and 2001 responsible for 90% of all referrals in the age group 0 to 4; in the age group 5 to 14 this was 83% in 1987 and 81% in 2001.

Age group 15 to 24

The top-5 specialties referred to were the same in 1987 and 2001, however their rankings were different. Surgery was at the top in 1987, but lost the first place to dermatology in 2001; this was brought about by a 52% decline in referral rate for surgery against a seven percent decline for dermatology.

The top-5 specialties were in 1987 responsible for 71% and in 2001 for 66 % of all referrals.

Age group 25 to 44

Gynaecology/obstetrics ranked first both in 1987 and in 2001 in spite of a 29%

lower referral rate in 2001. Surgery , 2nd in 1987 and 2001, went down 43% from 32 per 1000 in 1987 to 18 per 1000 in 2001. The referral rate of dermatology remained similar (16 in 1987 and 15 per 1000 in 2001). The top-5 presented about 68% of all referrals in 1987 and 55% in 2001.

Age group 45 to 64 years

In both years, surgery was the specialty most referred to, although the referral rate decreased 28%. Gynaecology occupied the second position in 2001 (referral rate 21 per 1000), the second position was in 1987 occupied by internal medicine (29 per 1000 vs 17 per 1000 in 2001; not in table).
For the first time, neurology appeared in the top-5 at the 4th place in both years with a rate of 20 and 18 per 1000 respectively.

Age group 65 to 74 and age group 75 years and older

The top four specialties were similar for both age group, however, their mutual rankings were different. Striking is the decline in the referral rate of internal medicine with approximately 50%.
The referral rate of ophthalmology rised steeply between 1987 and 2001 in the age group 75 and older from 27 per 1000 to 50 per 1000.
The top-5 specialties were in the age group 65 to 74 in 1987 responsible for 63% of all referrals and in 2001 for 55%; in the age group 75 years and older, these figures were 67% and 51% respectively.

Table 20.7 Ranking of specialties referred to by age group in 2001 and 1987 with referral rates (per 1000 patients per year) per specialty

	0-4y				5-14y				15-24y				25-44y				45-64y			
	1987		2001		1987		2001		1987		2001		1987		2001		1987		2001	
1	ENT	*55*	ENT	*44*	ENT	*30*	ENT	*18*	SUR	*31*	DER	*16*	GYN	*61*	GYN	*43*	SUR	*37*	SUR	*27*
2	PED	*55*	PED	*37*	SUR	*24*	PED	*14*	GYN	*31*	SUR	*15*	SUR	*32*	SUR	*18*	INT	*29*	GYN	*21*
3	SUR	*21*	OPH	*14*	OPH	*17*	OPH	*12*	ORT	*18*	GYN	*14*	ORT	*18*	DER	*15*	OPH	*24*	ORT	*20*
4	OPH	*18*	SUR	*12*	PED	*16*	SUR	*10*	DER	*17*	ENT	*13*	DER	*16*	ORT	*14*	GYN	*22*	OPH	*19*
5	ORT	*11*	DER	*8*	DER	*13*	DER	*8*	ENT	*16*	ORT	*11*	OPH	*15*	ENT	*12*	NEU	*20*	NEU	*18*

	65-74 y				>= 75 y			
	1987		2001		1987		2001	
1	INT	*49*	OPH	*39*	INT	*66*	OPH	*50*
2	SUR	*36*	SUR	*34*	SUR	*43*	ENT	*35*
3	OPH	*32*	ENT	*28*	OPH	*27*	SUR	*33*
4	NEU	*24*	INT	*26*	NEU	*24*	INT	*33*
5	CAR	*23*	ORT	*25*	CAR	*23*	DER	*25*

CARD= Cardiology; DER= Dermatology ; ENT= Ear Nose Throat;
GYN= Gynaecology/Obstetrics; INT Internal medicine; NEU=Neurology;
OPH= Ophthalmology; ORT= Orthopaedics; PED= Pediatrics; SUR= Surgery

In appendix 20.1 a complete table with the referral rates to the various specialties across the age groups can be found.

20.3.4 Top-5 of referral diagnoses per specialty

In this section we give for each medical specialty the top-5 referral diagnoses in 1987 and 2001. For each diagnosis of the top-5 we provide the referral rates for 1987 and 2001 and their ranking among all referral diagnoses for that specialty. We calculated also the proportion of this top-5 referral rate compared with all referrals to that specialty.
In table 20.8 we present the results for surgery, ENT and ophthalmology, because these were the three specialties with most referrals in 2001.
The results of other specialties can be found in appendix 20.2.

Surgery

Four out of the five health problems of the top-5 in 1987 were also in the top-5 in 2001.

In 1987, fractures and distorsions were the disorders most frequently referred; in 2001 fractures were on the third place with a much lower referral rate, whereas distorsions fell from the top-5 to the 15th position. In both years the top-5 contained around 30 percent of all referrals to surgery.

ENT specialist

In 1987 and 2001 upper respiratory tract infections were by far the most referred diagnoses (remember that acute otitis media is included in the cluster upper respiratory tract infections) followed by deafness and serous otitis media. The top-5 diagnoses included more than 64% of all referrals to ENT.

Ophthalmology

Problems with the visus were by far the most frequent reasons for referral in 1987 and 2001. Diabetes mellitus which was found on the 12th place in 1987 (referral rate 0.31 per 1000), advanced to the 2nd position in 2001 (referral rate 1.79 per 1000). Just like ENT, the top-5 diagnoses incorporated approximately 60 percent of al referrals to ophthalmology.

Table 20.8 Top-5 referral diagnoses per specialty- referral rates 1987 and 2001 (per 1000 per year), ranking 1987 and 2001

	Referral rate		Ranking		P
Health problem	**1987**	**2001**	**1987**		
	/1000	/1000			
Surgery	**32.5**	**20.5**			
Fractures	3.73	0.99	1	3	***
Distorsions	2.01	0.43	2	15	***
Inguinal Hernia	1.48	1.57	3	2	NS
Sebaceous Cyst	1.47	0.88	4	5	***
all female breast (excl malign)[a]	1.39	2.02	5	1	***
Varicose Veins	1.05	0.97	7	4	NS
Top-5 (%)	31	31			
Ear/Nose/Throat	**21.0**	**18.3**			
Upper Respir. Tract Infection	6.95	4.72	1	1	***
Deafness	2.33	4.06	2	2	***
Otititis med -serous	2.05	1.48	3	3	***
Respiratory disease other	1.01	0.16	4	19	***
Allergic rhinitis	0.65	0.33	5	11	***
Throat symptom/complaint	0.45	0.84	8	4	***
Voice symptom/complaint	0.32	0.71	11	5	***
Top-5 (%)	62	65			
Ophthalmology	**20.2**	**16.0**			
Problems visus	9.03	4.51	1	1	***
Other Eye Disease	1.05	0.68	2	4	***
Allergic Conjunctivitis	0.90	0.10	3	23	***
Cataract	0.80	1.24	4	3	***
Infections eyes; other (F73)	0.72	0.28	5	15	***
Diabetes mellitus	0.31	1.79	12	2	***
Blepharitis/Stye/Chalazion	0.61	0.47	7	5	*
Top-5 (%)	65	55			

a as denominator all females

* Chi-square *** p <0.001; ** p>=0.001 and p<0.01 ; * p>=0.01 and p<0.05

20.3.5 Top-10 diagnoses most referred

In this section we take the referral diagnosis as point of departure. In table 20.9 we give an overview of the top-10 referring diagnoses to a medical specialist (expressed as the population-based referral rate) in 1987 and 2001; in addition, we provide per diagnosis the episode-based referral rate (number of new referrals per 100 new episodes).
The sequence of the first ten diagnoses represent the ranking of 1987 with the ranking of 2001 in the second column. Below the line, we added the diagnoses, that were in 2001 in the top-10, but not in 1987.

Population-based referral rate

Most of the diagnoses in the top-10 concerned cluster diagnoses. Six out of the top-10 health problems in 1987 were also in the top-10 of 2001. The top-3 diagnoses of 1987 – visus problems, upper respiratory tract infection, low back pain - were also in the top-3 of 2001, however, the rates were lower in 2001. In the top-100 of 1987 and 2001 67% can be found in both years (not in table).
The referral rate of fractures and distorsions decreased between 1987 and 2001 by respectively 70% and 66%. Acute injury of the knee (L96) occupied the 10th position in 1987 with a referral rate of 2.42 per 1000 patients, but plunged on the ranking list in 2001, because the rate fell to 0.98 per 1000 in 2001.
At the same time however, the referral rate of knee symptoms went up from a referral rate of 0.49 per 1000 in 1987 against 2.21 per 1000 in 2001 (8th position).
The referral rate of most diagnoses was higher in 1987 with the exception of functional gastrointestinal complaints, deafness, varicose veins, diabetes mellitus and knee symptoms.

Episode-based referral rates

The episode-based referral rates were in 5 out of the 14 conditions significantly higher ($P<0.01$) in 1987 than in 2001, in 5 out of the 14 conditions there was no significant difference, and in 4 out of the 14 conditions the rates were significantly higher in 2001 (upper respiratory tract infections, functional gastrointestinal complaints, varicose veins, diabetes mellitus).
In both years, visus problems and deafness had the highest episode-based referral rates with rates higher than 50%; in 2001 the rates were higher than 50% for diabetes mellitus, acute internal injury of the knee, varicose veins, whereas in 1987 the rates for this condition were below the 50%. For coronary

heart disease the opposite was true: in 1987 the rate was 56% against 43% in 2001.
For diabetes mellitus we determined the episode-based referral rate to internal medicine or paediatrics; in 1987 11% of all new diabetic patients were referred to internal medicine or paediatrics; in 2001 this was three percent of all patients (not in table).

Table 20.9 Top-10 referred diagnoses in 1987 and 2001: population-based and episode-based referral rates

	Ranking		**Population-based Referral rate**				**Episode-based Referral rate**		
	1987	**2001**	**1987**	**2001**	***2001/ 1987***		**1987**	**2001**	
			/1000	/1000	*ratio*		Per 100	Per 100	
Visus problems	1	2	9.17	4.59	*0.51*	***	100	69.0	***
Upper Respir tract infections	2	1	7.90	5.50	*0.64*	***	2.5	3.4	***
Low back problems	3	3	5.45	4.41	*0.86*	***	9.8	7.7	***
Coronary heart disease	4	12	4.83	1.99	*0.41*	***	55.9	42.9	***
Musculoskeletal disease other	5	10	4.7	2.1	*0.45*	***	12.9	12.7	NS
Fractures	6	18	4.56	1.39	*0.30*	***	44.7	19.5	***
Distorsion	7	21	3.57	1.29	*0.36*	***	5.3	4.3	**
Dermatitis	8	6	3.37	3.04	*0.90*	***	7.7	7.1	NS
Functional Gastrointest complaints	9	5	2.93	3.82	*1.30*	***	6.9	9.0	***
Acute internal injury knee	10	33	2.42	0.98	*0.40*	***	47.0	54.2	*
Deafness	11	4	2.38	4.08	*1.71*	***	59.7	56.4	NS
Diabetes mellitus	30	7	1.30	2.45	*1.88*	***	36.0	54.9	***
Knee symptom/complaint	98	8	0.49	2.21	*4.51*	***	19.5	14.6	*
Varicose veins of leg	14	9	2.00	2.13	*1.07*	***	36.0	53.0	***

* Chi-square *** p <0.001; ** p>=0.001 and p<0.01 ; * p>=0.01 and p<0.05

20.4 Discussion

This chapter gives a overview of new referrals made by GPs to medical specialists in the Netherlands. The design and the size of the two national surveys enabled us to present detailed information about referrals to medical specialists. Information about referrals on such a scale is uncommon.
We start this section with a comparison of our referral rates with referral data from other general practice-based sources.
Thereafter, we discuss the most relevant differences in referral rates between 1987 and 2001 by sex, age and socioeconomic group and finally we place the differences in the light of changes that occurred in the behaviour of the population, in the behaviour of the GPs and in changes in the health care system.

20.4.1 Comparison with data from other sources

We will start with the comparison of the referral rates of the second National Study with the annual referral rates of the Continuous Morbidity Registration system (CMR) of Nijmegen in the period 1999-2003 (table 20.10). We did not have data from the CMR for the period around 1987.
The overall rates of the CMR and the NS2 were very close. Also, the referral rates to the various specialisms were remarkably similar and the same applied to the female/ male ratios of the referral rates.

Table 20.10 Referral rate (per 1000 per year) and female/male ratio of the referral rates from the CMR 1999-2003 and the NS2

	1999-2003 CMR N=66,557		**NS2 (2001)** N= 241,719	
	/1000	*Female/ Male ratio*	/1000	*Female/ Male ratio*
Surgery	21.3	*1.15*	20.6	*1.06*
Ear NoseThroat	15.4	*0.97*	18.3	*0.93*
Ophthalmologist	15.4	*1.29*	16.0	*1.27*
Internal medicine	11.8	*1.32*	12.1	*1.40*
Orthopaedics	13.5	*1.14*	14.7	*1.12*
Gynaecology/Obst	11.5		11.1	
Dermatology	11.1	*1.70*	15.9	*1.47*
Neurology	11.1	*1.12*	12.2	*1.14*
Cardiology	8.2	*0.80*	7.0	*0.80*
Urology	7.3	*0.11*	7.5	*0.20*
Paediatrics	5.8	*0.91*	3.8	*0.82*
Respiratory medicine	3.5	*0.82*	3.1	*0.79*
Psychiatry	2.8	*1.30*	3.0	*1.16*
Reconstructive surgery	3.4	*2.17*	3.1	*2.42*
Rheumatology	1.5	*1.78*	2.7	*2.83*
Other	4.8		5.0	
All referrals to med.specialties	148.4	*1.22*	156.1	*1.23*

For some specialties we could make a comparison between referral rates of the Transition project in 1987- 1988 [19] , the average yearly referral rate in England and Wales between 1994 and 1998, and the referral rates of the first and second Dutch National Survey (table 20.11).
In England and Wales the data were collected in 211 practices; the practices had a total population of 1.4 million patients in 1998, representing 2.6 per cent of the population of England and Wales [20].
The referral rates of the NS1 and the Transition project were rather close both for the overall rate and for most specialties.

Table 20.11 Comparison between NS1, Transition project, Key health statistics UK and NS2; referral rates per 1000 per year

	NS1 1987	Transition project 1987-1988	Key health statistics UK 1994-1998	NS2 2001
Surgery	33	33	28	20
ENT	21	20	16	19
Ophthalmology	20	23	11	16
Internal medicine	20	22	18	12
Orthopaedics	17	12	19	15
Gynaecology	16	17	15	11
Dermatology	15	19	12	16
Neurology	14	10	3	12
Paediatrics	6	4	6	4
Psychiatry	3	3	7	3
Rheumatology	2	1	4	3
overall	167	164	139	131

The conclusion of this comparison of referral rates with other general practice-based sources is that in general the rates were remarkable similar. In the UK, the referral rate to neurology was considerably lower than in the Netherlands. We have no explanation for this difference.

20.4.2 Differences in referral rates between 1987 and 2001

Overall

Referral patterns have changed considerably over the past 15 years in the Netherlands. In 2001 Dutch GPs referred 17% fewer patients to specialist care than in 1987. Van den Berg et al. related the number of referrals to the number of face-to-face contacts of GPs and patients in 2001. They found that per 1000 face-to-face contacts 44 patients were referred to a medical specialist [21].

The overall referral rate is the outcome of differential changes: on the one hand, the referral rate to every specialty contributes to the overall rate, on the other hand sociodemographic characteristics as sex, age and socio-economic status contribute to the overall figure. Studying the shifts in the referral rates of these subgroups gives more clues for interpreting the differences between 1987 and 2001 than the overall rate. The differences in overall rate are useful as reference: which subgroups diverged most from the reference. In the following paragraphs, we will mainly focus on differences between subgroups.

Sex

Overall, the referral rate of women was higher than the rate of men both in 1987 and 2001 (female/male ratio 1.14 in 1987 and 1.28 in 2001). In 2001 males were 22% less frequently referred than in 1987, females 12%. To make a fair comparison between the referral rates of men and women, we deducted the referral rates of gynaecology/obstetrics and urology from the overall rate and this gave us the following results:

	1987	2001
• Male referral rate (per 1000)	164.4	126.9
• Female referral rate (per 1000)	166.9	145.4
• Female/male ratio	1.02	1.15

After this calculation there was no difference between men and women in 1987 and a reduced difference in 2001.

When we consider the referral rates of males and females to the various specialties, we see a mixed pattern for both sexes. The two specialties where the differences were largest between males and females were, not surprisingly, urology and gynaecology.

One of the most significant differences occurred in the referrals to the lung specialist. While the referral rate for males dropped by 37% between 1987 and 2001, it increased by 28% for females; in 1987 the female/male ratio was 0.39, in 2001 0.79. Most likely, females caught up because their smoking behaviour resembled that of males from the seventies onwards, resulting in lung problems like chronic bronchitis, emphysema and lung carcinoma as can be seen in smokers.

In psychiatry the referral rates of males and females came closer; in 1987 the female/male ratio was 1.55 against 1.16 in 2001. An explanation could be that more male adolescents were referred with behavioural problems to assess whether they should be treated with methylphenidate.

Both sexes were more often referred to rheumatologist; in 2001 the referral rate for females was nearly three times higher than for males. Several explanations might be postulated: the possibilities for treating reumatoid artritis by the rheumatologist increased between 1987 and 2001. Another factor that may have increased the referral rate is the emergence of the new "diagnosis" fibromyalgia.

Age

From the age of 65 years onwards, the referral rates in 2001 were higher than in 1987.

There is an interaction between sex and age. In the youngest age group boys were referred more frequently than girls: the difference was larger in 2001 than in 1987. This finding, although not fully understood, is also reported by others [22-24].

In 1987, in the 5 to 14 years age group the referral rate of girls was higher than the rate of boys , however, in 2001 the referral rate of boys was higher. In the age from 15 to 44 years the referral rate of women was much higher than the rate of males. Many of the referrals of women in this age category are related to pregnancy and anticonception. In the age group 25 to 44 years gynaecology/ obstetrics was the specialty most frequently referred to in 2001; in 1987 it occupied the second place. In the age group of 65 years and older the rates between males and females were about the same.

SES

The health status of persons with a lower socioeconomic status is in general worse than the health status of persons with higher SES. The gap between the lowest and highest SES group became wider between 1987 and 2001.

In 1987, the differences between the lowest and highest SES group were most marked for psychiatry (124%), paediatrics (71%), rheumatology (60%) and respiratory medicine (51%); in 2001 the differences were largest for rheumatology (78%), gynaecology (54%), neurology (50%) and orthopaedics (50%).

The most remarkable shift between 1987 and 2001 occurred for psychiatry and urology. In 1987, in psychiatry the referral rate in the lowest SES group was 124% higher than in the highest SES group, whereas in 2001 the difference between these two groups was statistically not significant.

It is important to remark that a referral to a psychiatrist is only one of the possibilities for referral for psychological problems. Patients with the same kind of problems can be referred to the ambulatory health care or a primary care psychologist. It is possible that the reputation of the ambulatory health care has gone down between 1987 and 2001 and that particularly people from the highest SES group preferred to be referred to a secondary care psychiatrist.

In urology, in 1987 the lowest SES group had a 44% higher rate than the highest SES group, whereas in 2001 the rate in the lowest group was 17% lower than in the highest groups. The referral rate for sterilisation nearly doubled (appendix 20.2, urology). In 2003, in the Netherlands about 11% of the males in the age from 18 to 63 years were sterilised (Statistics Netherlands, health questionnaire). In the USA and Australia low-income, minority and less educated men were underrepresented among vasectomy recipients [25-26]. We are not aware of Dutch publications regarding the socioeconomic status of males who underwent vasectomy. However, it is plausible that, like in the USA, males of the higher SES groups were more readily to undergo a vasectomy. Between 1987 and 2001, vasectomy among males has become more accepted. However, it is plausible that males of the higher SES group accepted sterilisation more than males of the lowest SES group. Furthermore, in 2001 more males belonged to the highest SES group than in 1987. This could be one of the explanations of changes in lowest/highest SES group referral rates in 1987 and 2001.

20.4.3 Factors that can explain differences between 1987 and 2001

In the previous paragraphs, we demonstrated that the differences in referral rates between 1987 and 2001 were not uniformly distributed across sex, age, SES, and the various specialisms and diagnoses.
In this paragraph we will try to identify a number of factors that caused differences between 1987 and 2001, and illustrate this with examples.

Changes related to the population
The reduction in surgical referrals between 1987 and 2001 is at least partly caused by an increasing number of patients, who bypassed their GP after they sustained an injury and presented their injury directly to an emergency department [27].
In particular, in the big cities the surgical emergency department is functioning as first aid for all kinds of smaller and bigger accidents [28]. In chapter 11 we saw a 38% decrease in the incidence of fractures between 1987 and 2001. It seems justified to conclude that the lower incidence in 2001 can be attributed to the fact that patients bypassed their GP more often in 2001 than in 1987.
Not only patients with injuries refer themselves to emergency department, also patients with conditions that are experienced as threatening were in 2001 more frequently presented to an emergency department than in 1987. Tightness in the chest area in combination with hyperventilation was the condition most commonly presented [28]. Jaarsma-van Leeuwen et al.

demonstrated that from all self-referring patients in two-thirds of the cases there was no medical need [29].

The population-based referral rate of naevi increased (from 1.3 to 1.8 per 1000). People were made more conscious of the potential dangers of pigmented skin lesions and presented more pigmented skin lesion to their GP. GPs for their part were also sensitised to the potential dangers of nevi. The same applied to mamma-related problems, which were more frequently referred in 2001 than in 1987.

Changes in relation to general practices

• NHG guidelines

In most NHG guidelines, there is a section which give recommendations when to refer or not to refer a patient with a certain disease. Because these guidelines are influential among GPs, they will affect the referral rate for the concerning disease. These recommendations may result in some cases in fewer referrals, in other cases in more referrals; we will illustrate this with a few examples.

Braspenning et al. [30] found an adherence rate of 85% for performance indicators relating to referrals: most of the indicators advocated a restricted referral policy; the adherence to indicators that advocated not to refer were better followed than indicators that recommended referring a patient.

One of the guidelines about visus problems recommended uncomplicated visus problems to refer to the optician and not to the ophthalmologist. In our figures we found that the population-based rate in 2001 was halved compared with 1987. The episode-based rate dropped from 100% to 69%.

In the guideline about diabetes mellitus it was advised to refer all patients to the ophthalmologists for evaluation of the retina. The population-based referral rate for diabetes mellitus went up (from 1.2 per 1000 in 1987 to 2.5 per 1000 in 2001).

If all referrals (new and repeat referrals) are taken into account, in 2001 94.5% of all patients with diabetes mellitus were referred to the ophthalmologist.

In the guideline about imminent miscarriage it was advised not to refer the patient to secondary care but to adopt a "wait and see" policy [31]. The referral rate for spontaneous abortus went down from 1.3 to 0.3 per 1000. In 2004, a new revision of this guideline was issued; in this new edition more room was given to the preference of the patient. It would be interesting to know how this affected the referral rate .

It is plausible that one of the effects of the NHG guidelines was a reduction in the referral rate. However, another factor concerning general practitioners should also be considered.
The prolongation of the vocational training from one to three years can have equipped the new generation GPs with more and better skills. The guidelines play an important role in the vocational training. This combined effect will influence various aspects of the behavioural attitude of GPs among which their "referral behaviour".

• *Referrals to a paramedical discpline instead of a medical specialist (substitution)*
The emergence of the podotherapy as paramedical discipline might be an explanation that the referral rate of acquired deformities of limb (pes planus, halgus valgus, metatarsalgia) went down (from 1.7 per 1000 in 1987 to 0.7 per 1000 in 2001): most likely, persons who were in 1987 referred to an orthopaedic surgeon, were in 2001 referred to a podotherapist.

• *Fewer referrals because the intervention is done by GPs themselves*
Compared with 1987, GPs referred fewer patients with sebaceous cysts in 2001. The most likely explanation is that GPs removed sebaceous cysts more often themselves in 2001. In chapter 11 we saw that GPs performed in 2001 twice as many surgical procedures for all kind of skin tumours. This change in behaviour was probably brought about by a better financial renumeration for such an intervention. This means that the referral behaviour of GPs is also influenced by the health care system, in which they operate.

Changes in the health care system
• *Referrals to another specialty*
The emergence of new "supra-specialties" or "sub-specialties" like rheumatology, geriatrics and gastroenterology have caused that a proportion of the patients, who were in 1987 referred to internal medicine, were in 2001 referred to these supra-specialties. Such a shift is supported by our findings because the referral rate for internal medicine went steeply down, whereas the rates for geriatrics and gastroenterology went up.

• *Diagnostic facilities*
An example how better diagnostic facilities changed the referral behaviour of GPs can be deduced from the steep decline in referral rate of young children

(0 to 4 years) to the orthopaedic surgeon (from 11 to 3 per 1000). Most likely, children suspected of having dysplasia of the hip were referred to orthopaedics in 1987, while in 2001 GPs referred patients for an X-ray or/and an ultrasonography of the hips. Patients who were suspected having bile stones were in 1987 in most cases referred to a medical specialist, whereas in 2001 the GPs used ultrasonography to confirm the diagnosis.
An example how better therapeutic facilities affected the referral rate can be found in the reduced referral rate for warts (from 1.4 per 1000 in 1987 to 0.6 per 1000 in 2001). In 2001 most GPs had liquid nitrogen at their disposal.

• *Different opinions in time*
Different opinions in time about the conditions that should be referred, play a role in the referral rate to medical specialists. We mentioned already that refraction errors, which were claimed by ophthalmologists in 1987, were in 2001 predominantly referred to opticians.

The author himself experienced how developments in secondary care influenced his referral rate. In the eighties the surgeons of the hospital he was referring to, started to operate upon patients with ankle distorsions. This became known in the region by patients. Many patients were no longer satisfied with a wait and see policy and wished to be referred. Fortunately, after a few years the surgeons omitted this policy of operating upon ankle distorsions, because the results were not satisfactory.

20.5 Conclusion

The GP can still be considered as gatekeeper. The number of new referrals to secondary care diminished between 1987 and 2001 by 17%. Various explanations were postulated; one of the most relevant being the influence of the guidelines issued by the Dutch college of General Practitioners.

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Part 4 General discussion and summary

21 General discussion

21 General Discussion

21.1 Introduction

The aim of this thesis was to describe changes that occurred between 1987 and 2001 in the health problems presented to GPs and in the interventions of GPs regarding these problems and to relate these changes to differences in the characteristics of the population and to differences in the characteristics of general practice between 1987 and 2001.
The following research questions formed the basis for this thesis;

1. Which health problems were presented to GPs in 1987 and 2001, what were the differences between 1987 and 2001 and to what extent were these between 1987 and 2001 related to changes in population and general practice characteristics?

2. What was the nature and volume of interventions (minor surgery, prescription, referrals) in 1987 and 2001, what were the differences between 1987 and 2001 and to what extent were these differences related to changes in population and general practice characteristics?

For answering these questions we made use of the several data collections of the first and the second Dutch National Survey of General Practice conducted in 1987 and 2001.

This chapter is structured as follows: we describe the most relevant changes between 1987 and 2001 and discuss possible explanations for these changes.
We will then reflect on methodological issues by discussing the strengths and the limitations of the studies presented in this thesis (section 4). Finally, implications and recommendations for daily practice and future research are formulated (section 5).

21.2 Main findings

In this section we will address our research questions by first giving the main results per question and subsequently by discussing these findings.

21.2.1 Presented health problems

Which health problems were presented to GPs in 1987 and 2001, what were the differences between 1987 and 2001 and to what extent were these differences related to changes in population and general practice characteristics?

We studied the presented new health problems at different levels of aggregation i.e at the *overall* level, at the level of *organ systems* and at *disease cluster* level, and at the level of disease.

A disease cluster is a collection of symptoms and diseases, which form together a meaningful level for analysis. We composed four disease clusters: *infectious diseases, musculoskeletal health problems, injuries, psychosocial problems* and various subclusters within these clusters.
Within the cluster infectious diseases we created four subclusters: respiratory tract infections, skin infections, infections of the eyes and urinary tract infections. Within the cluster musculoskeletal health problems we created the subclusters dorsopathies, health problems related to the upper extremities, repetitive stress Injuries and health problems related to the lower extremities. Within the cluster injuries we discussed two the subclusters: fractures and “sprains, strains and luxations”. Within the cluster psychosocial problems we constructed six subclusters: anxiety, depression, psychoses, sexual problems, substance abuse and behavioural problems.

At the *overall* level the incidence of health problems presented to GPs was in 2001 24% lower than in 1987.
In males the incidence was 29% lower, in females 19%. The ratio between the lowest and the highest socioeconomic group (SES) remained stable between 1987 and 2001 (lowest/highest 1.34 in 1987 and 1.37 in 2001.) The incidence rate decreased across all age groups between 1987 and 2001 except for the oldest age group, in which the rate remained stable.

At the level of organ systems the decline in incidence rates between 1987 and

2001 was most marked for health problems related to the *respiratory tract* (45% lower in 2001 than in 1987). In 1987, the incidence of problems of the *respiratory tract* was the highest of all organ systems (392 per 1000, representing 21% of all new health problems), whereas in 2001 respiratory tract problems were surpassed by health problems related to the *musculoskeletal system* (268 per 1000, representing 19% of all new health problems) and health problems related to the skin (241 per 1000, 17% of all new health problems). Musculoskeletal problems gained their first position in 2001, not by an increase in incidence compared to 1987, but by a smaller decrease in incidence (19%) than problems of the respiratory tract.

The incidence rates of each of the four disease *clusters* studied were lower in 2001 than in 1987. The sharpest drop in incidence occurred in *infectious diseases* (49%), followed by *injuries* (47%), *psychosocial problems* (24%) and *problems related to the musculoskeletal system* (19%).
Within the cluster *infectious diseases* the strongest decline in the incidence between 1987 and 2001 occurred in *respiratory tract infections* (51%), the incidence of *skin infections* remained stable, whereas the incidence of *infections of the eyes* rate increased by 60%.
The gap in incidence between the lowest and the highest SES group in 1987 and 2001 diminished considerably for respiratory tract infections and infectious diarrhoea; it remained about the same for skin infections and infections of the eyes; however, the gap became wider for urinary tract infections.
Within the *musculoskeletal system* we composed four subclusters. The incidence of *dorsopathies* was in 2001 8% higher than in 1987, the incidence of the cluster *upper extremities* problems 79% higher, the incidence of *repetitive stress injury (RSI)* 89% higher and the incidence of the cluster *lower extremities* problems was 39% higher.
We have to explain why the overall incidence rate of the musculoskeletal system was 19% lower in 2001 than in 1987, whereas the incidence rates of the studied clusters were higher in 2001 than in 1987. This is because injuries like fractures, strains and luxations are part of the musculoskeletal system in the ICPC classification. In chapter 11 we saw that the incidence rates for fractures went down by 38% and and the rates for strains and luxations by 62% between 1987 and 2001. Furthermore, there were a number of other health problems of the musculoskeletal system not included in the clusters, with a much higher rate in 1987 than in 2001. The two most noteworthy examples are muscle pain (L18; 56.2 per 1000 in 1987 and 11.3 per 1000 in 2001) and other

musculoskeletal diseases (L99; 36.3 per 1000 in 1987 and 14.3 per 1000 in 2001)

The rise in incidence of the cluster dorsopathies in 2001 was mainly caused by more than a doubling of the incidence of neck syndromes (from 8 per 1000 in 1987 to 19 per 1000 in 2001).

The incidence rates of health problems related to the upper extremities and RSI doubled in females. In 1987 the incidence rates in males and females were about similar in the four clusters, whereas in 2001 the rates in females were 22% to 38% higher than in males. The gap between the lowest and highest SES groups remained stable between 1987 and 2001 with a 55% to 70% higher rate in the lowest SES group.

The incidence of **injuries** was in 2001 almost 50% lower than in 1987. We found the same patterns in 1987 and 2001 regarding sex, age and SES.

The incidence of *psychosocial problems* was 24% lower in 2001 than in 1987. In spite of the overall lower incidence rate of psychosocial problems in 2001, some clusters within the psychosocial problems had higher rates in 2001 than in 1987. The incidence of *behavioural problems* in males younger than 25 years was in 2001 twice as high as in 1987, in females the incidence in the age group 5 to 14 years was twice as high in 2001 as in 1987. Within the category behavioural problems, in particular hyperkinetic disorders / overactivity and specific learning problems exploded in males under the age of 25 years with incidence rates 4 and 9 times higher in 2001 than in 1987, respectively .

Another subcluster where we found higher incidence rates in 2001 than in 1987 concerned the incidence of sexual problems in males of 65 years and older: we found a fourfold increase in 2001 compared with 1987.

Discussion

The incidence of health problems decreased by a quarter between 1987 and 2001. The confounding effect of age was eliminated by standardising the 1987 population to the age structure of the Dutch population in 2001.

In spite of the lower incidence of presented health problems in 2001, the number of face-to-face consultations went up by 10% from 3.6 in 1987 to 3.9 per person per year in 2001 [1]. We assume that this apparent contradiction can be explained by a higher number of consultations for chronic conditions. The management of chronic conditions, like for example diabetes mellitus and hypertension, became much more systematic under influence of the guidelines of the Dutch College of General Practitioners (NHG-Nederlands Huisartsen Genootschap) , resulting in a higher annual consultation rate.

Various factors may influence the difference in the incidence of presented morbidity between two time periods. In the first place, differences in morbidity can obviously be caused by *"real" changes in morbidity*. With a real change we mean that not only the morbidity presented to GPs underwent a change, but that the incidence among the population (presented and not presented health problems) changed. It seems unlikely that such a steep drop in the incidence of presented health problems between 1987 and 2001 is the result of a real change. An indication from our survey that this is highly unlikely is that overall the self-rated health between 1987 and 2001 remained similar (chapter 3). However, it is conceivable that for some specific diseases real changes in morbidity occurred between 1987 and 2001.

If changes in presented morbidity were not caused by "real" changes within the population, what might have created the distinct difference between 1987 and 2001?

Various factors may influence the difference in the incidence of presented morbidity between two time periods. Changes in incidence between two time periods may be caused by

- *Changes related to the population*
- *Changes related to general practice*
- *Changes in the characteristics of the health care system*
- *Methodological characteristics*

We will discuss each of these factors starting with the "real" changes in morbidity.

- Real changes

Some real changes could have been caused by changes in *vaccination policy* and by changes in *living conditions* between 1987 and 2001.

In 1996, the implementation of vaccination against influenza for all persons of 65 years and older and for specific groups at risk was laid in the hands of GPs. The proportion of vaccinated persons in high risk groups went up from 28% in 1991 to 75% in 2001. We observed an enormous drop in the incidence of influenza (chapter 8). It is unlikely that this drop in incidence can be explained exclusively by vaccination, but vaccination may have partly contributed to this decline. However, other explanations should also be considered. It is also possible that GPs were less inclined to code influenza-like symptoms as influenza in a vaccinated person.

Before 1987, infants were not vaccinated for mumps and haemophilus influenzae. Mumps was virtually eradicated after it was included in the vaccination scheme in 1987. The effect of the vaccination against haemophilus influenzae (implemented in 1993) is less easily to evaluate, but it is conceivable that it has contributed to the decrease in respiratory tract infections between 1987 and 2001.
Some morbidity differences between 1987 and 2001 could be caused by *changes in living conditions*.
The increase in skin and eye infections in the youngest age group may be due to more toddlers and children spending their days in day care centres (nurseries) in 2001 than in 1987 [2]. This will bring about closer contact with other children, which can result in more infections. However, how to explain the reduced presentation of respiratory tract infections in this age group? After all, the same mechanism (crowding) is operating, and this should result in a higher attack rate of respiratory tract infections for young children. Nevertheless, we established that the number of presented infections fell by 40% between 1987 and 2001.
A possible explanation could be that skin and eye infections are highly visible. When a child with such an infection is brought to the nursery, staff and parents of the other children are often worried that the infection will spread to other children. The parents will be pressured to seek medical treatment. On the other hand, respiratory tract infections are considered so much part of the daily life of toddlers, that their occurrences give rise to less anxiety and to less pressure to seek medical aid. In addition, when children with respiratory tract infections would be barred, in the “high season” very few children would attend the day care centres.
A possible reason for the rise in eye infections from the age of 14 years onwards is the increasing number of people that wear contact lenses. In 2001, the Health Council of the Netherlands issued a report on the risks of contact lenses [3]. In 1999, more than ten per cent of the population of twelve years and older were wearing contact lenses amounting to a total of 1.4 million people. At least six per cent will develop contact lens related eye problems. For the Dutch situation this would mean about 80,000 new cases every year.
The rate of fungal infections was in 2001 higher than in 1987. Several explanations can be postulated for this rise. Firstly, plastic pants and synthetic footwear were more frequently used in 2001 than in the eighties [4]. An additional reason for the higher incidence rates could be that in the nineties new drugs became available for fungal infections and this was accompanied by

intensive marketing campaigns directed at doctors and patients.
The reduction of infectious diarrhoea was also described by Fleming et al [5] (using data from the Weekly Returns Service of the Royal College of General Practitioners); improvements in hygienic living conditions could be a contributory explanation, although other factors should be considered as well.
The gap in incidence rate between the highest and lowest SES group was in 2001 less than in 1987. Traditionally, hygienic conditions are worse in the lower SES groups. The diminishing gap might be an indication that the lower SES groups caught up in hygienic living conditions.

- Changes related to the population

Changes concerning the population can be demographical or can be related to differences in health seeking behaviour.
Differences in the composition of the population can create changes in the presented morbidity. For the difference in age structure between 1987 and 2001, we adjusted by standardising the population of 1987 to the population of 2001.
The most notable changes in the composition of the population between 1987 and 2001 were a higher proportion of persons with a higher educational attainment and a higher proportion of persons with a non-Western background.
In general, persons with a higher educational level enjoy a better health and, as Cardol et al demonstrated [6], had in 2001 lower expectations than in 1987 regarding GP care for minor ailments. It is plausible that the combination of a higher educational level with lower expectations regarding GP care contributed to a lower number of presented health problems.

Persons with a non-Western background are on average less healthy than persons with a Western background. In general, their beliefs about the benefits of GP's care for minor ailments compared with self-care were stronger than in persons with a Western background.
However, also in persons with non-Western background this belief in the benefit of GP care was much lower in 2001 than in 1987 [6].
The higher proportion of persons with a non-Western background would have an increasing effect on the incidence of presented health problems between 1987 and 2001, however, this is counteracted by a lower belief in the benefit of GP care in 2001 than in 1987, and by a higher educational level of this group in 2001 compared to 1987; our study did not enable us to assess the net effect of these changes.
Part of the fall in the overall incidence may be explained by patients bypassing

their GPs for certain conditions. In the Netherlands this is in particular possible for injuries and sexually transmitted infections.
An indication that GPs were more frequently bypassed for fractures in 2001 as compared with 1987 can be found when comparing the incidence figures of fractures of the two National Surveys with the incidence of fractures in the Continuous morbidity Registration (CMR) Nijmegen. An important difference is that in Nijmegen all known morbidity is registered, whereas in the national Surveys only the morbidity presented to the GP is recorded. In the CMR Nijmegen also the diagnoses of those patients were registered, who bypassed the GP, and from whom the GP received a report from the emergency department. In the CMR, the annual incidence of fractures was about similar between 1986-1990 and 1999-2003, whereas in our study the incidence was 38% lower in 2001 than in 1987. It seems justified to conclude that the lower incidence in 2001 can be attributed to the fact that patients bypassed their GP more often in 2001 than in 1987.
In conclusion, from the side of the population two factors played most likely a role in the lower incidence in 2001 compared to 1987: a better health status because of a higher educational attainment and a change in health seeking behaviour.

- Changes related to general practice

Factors related to GPs and general practice may also influence the incidence of health problems. We described how the professionalisation of GPs progressed. The postgraduate vocational training was extended from one to three years. The Dutch College of General Practitioners published between 1988 and 2001 more than 80 guidelines about important subjects in the field of general practice. Because infectious diseases are an important part of the daily work of GPs, many guidelines regarding infections were issued: e.g children with fever, acute coughing, sore throat, otitis media acuta and serosa, rhinosinusitis, urinary tract infections, sexually transmitted infections. In addition to the guidelines the College of General Practitioners developed more than 40 patient leaflets which promoted a reserved approach to drug treatment. The subjects of these leaflets are common complaints and conditions with a self-limiting course, such as coughing and influenza. Their aim is to increase patient knowledge, thereby assisting in the decision making process about seeing the doctor or not. Two thirds of all Dutch GPs have a display with these leaflets in their practice.
In Dutch general practice there has always been a policy of restraint in

prescribing medication. The natural course of ailments is considered of major importance and there is preference for non-pharmacological advice above pharmacological intervention.
This tendency was already present in 1987 and resulted in a different way of treating a number of diseases compared to neighbouring countries.
The NHG guidelines joined this tendency and stressed the limited place of antibiotics in the treatment of many infections.

The reactions of GPs to presented health problems influence subsequent consultation behaviour of their patients. If a GP prescribes an antibiotic for a respiratory tract infection or an otitis media, the next time, when suffering from the same symptoms the patient will consult again, whereas, if a GP advocates a “wait and see” policy with an explanation, the chance that the patient will consult a next time with these symptoms is diminished [i,7].
It is quite conceivable that guidelines and leaflets changed the attitudes of both doctors and patients resulting in a lower level of presentation of infections in general practice; GPs were more restrained in the prescribing of antibiotics and patients were less inclined to present minor ailments to their GP. This can be seen as a demedicalisation of respiratory tract infections.
This is contrary to the popular notion that the threshold for visiting a GP would have been lowered between 1987 and 2001 because of an increased consumerism [8].

Obviously, we should always be aware that changes in incidence rates of infections between two periods can be caused by variation in epidemics. However, because we considered a broad range of infections, it is unlikely that an epidemic of one of the infectious diseases would affect the overall incidence of infections to a large extent.
The decrease in the incidence of psychosocial diagnoses between 1987 and 2001 might be explained by a combination of patient related factors and by GP related factors.
It might indicate a decreased tendency of patients to attend their GP for psychosocial problems. This would be in accordance with the overall reduction

[i] Practices that prescribe antibiotics to a smaller proportion of patients presenting with acute respiratory infections have lower consultation rates for these conditions. Practices that succeed, over time, in reducing antibiotic prescribing also experience reductions in consultation rates for these conditions

in incidence rate between 1987 and 2001 for most of the organ systems, but it seems to be at odds with the higher scores in 2001 on General Health Questionnaire-12 [i,9] (indicating more mental problems) and the increased inflow of patients to institutions of ambulatory mental health care [10]. However, a higher score on the GHQ-12 does not necessarily result in higher demand for GP care; people may prefer to solve their problems themselves or make use of informal, non-professional care. The higher influx of patients to institutions of ambulatory mental health care may indicate that patients with serious psychosocial problems could find their way to professional care.

From the side of GPs, a reduced “task perception” with regard to psychosocial problems between 1987 and 2001 might have played a role in the lower incidence of psychosocial problems. The reduced task perception could have resulted in GPs less readily considering physical symptoms for which no medical explanation could be found as somatic expressions of psychosocial problems. An indication that GPs were less disposed to record psychosocial diagnoses is our finding that the incidence of ten common symptom codes, which are usually described as medically unexplained physical symptoms, was 73% higher in 2001 compared with 1987.

According to Verhaak, the reduced task perception might be considered as a defence mechanism against the increasing workload at which GPs reacted in two ways[9]; on the one hand they were in 2001 less inclined than in 1987 to consider presented health problems as psychosocial problems, on the other hand they referred more patients with psychosocial problems to ambulatory mental health care.

Within the framework of our study, it is impossible to quantify the relative contribution of patient and GP related factors to the decline in the incidence of psychosocial problems.

The availability of pharmacological treatment for a condition gives rise to more patients consulting their GP for that particular condition. Patients are informed about treatment options by their environment and by the media. GPs, on their part, tend to diagnose and record patients symptoms more readily when treatment is available.

As we demonstrated, some subclusters within the psychosocial problems had higher rates in 2001 than in 1987: it concerned mainly behavioural problems and sexual problems in males. Most likely, in both cases this was caused by the

[i] When the cut-off point of the GHQ-12 was laid between 1 and 2, 16.8% of the responders scored above threshold in 1987, while this figure was 22.8% in 2001.

emergence of new forms of treatment. Children with behavioural problems were in 1987 seldomly treated with drugs, whereas in 2001 treatment with methylphenidate had become common. For sexual problems in males there was in 1987 no pharmacological treatment available, in 2001 sildenafil could be prescribed for penile erectile dysfunction.

- Changes related to the health care system

Changes in the health care system may have a tremendous impact on the presentation of health problems to GPs.
When patients need a prescription to obtain a medicament or to get a medicament reimbursed, they will consult their GP and the GP will record and classify the presented health problem before prescribing the medicament.
For a number of drugs the need for a prescription was abolished between 1987 and 2001. For example, in 1987, patients needed a prescription for obtaining a drug against oxyuriasis, a common minor ailment among children. In 2001, no prescription was needed any more for this drug, and so there was no need to present this condition to the GP with as result a enormous decrease in the presented incidence of oxyuriasis (from 13.7 per 1000 in 1987 to 1.3 per 1000 in 2001).
Between 1987 and 2001 there was also a change in the reimbursement for a number of medicaments.
Some antitussive drugs, that in 1987 didn't need a prescription but were reimbursed on prescription, were in 2001 not reimbursed anymore even when prescribed by a health care provider. We presume that this is one of the reasons of the drop in the presentation of respiratory tract infections.

- Methodological characteristics

In chapter 6, we described the similarities and the changes of the first (1987) and the second (2001) National Survey. Later in this chapter we will address these changes again. At this point, it suffices to say that it is highly unlikely that the established changes in incidence between 1987 and 2001 can explained by the methodological changes between the first and the second National Survey.
The described shift from “symptom” diagnoses to “disease” diagnoses between 1987 and 2001 does not alter the morbidity pattern on a higher level of aggregation (on a higher level of aggregation symptom and disease diagnoses are merged) and therefore cannot be an explanation for the difference in incidence between 1987 and 2001.

In conclusion, the decline in incidence rate between 1987 and 2001 cannot be attributed to one explanation. It is an interplay of at least three factors; *characteristics of the population, characteristics of general practice and characteristics of the health care system.*

Our study doesn't enable us to give an exact assessment of the contribution of each of this three factors to the fall in incidence between 1987 and 2001. The interaction of the three factors will be different for every organ system and for every disease (sub)cluster.

Our postulated explanatory factors provided at the most a framework in which the findings could be considered, and at best circumstantial evidence. In this sense our study was more descriptive than of an explanatory nature.

21.2.2 Interventions

What was the nature and volume of interventions (minor surgery, prescription, referrals) in 1987 and 2001, what were the differences between 1987 and 2001 and to what extent were these differences related to changes in population and general practice characteristics?

We studied the following interventions: minor surgical procedures, prescribing medicines and referral to secondary care.

Minor surgical procedures

Minor surgical procedures were performed as frequently in 1987 as in 2001. However, the nature of the surgical procedures performed most frequently shifted between 1987 and 2001 from treating wounds to removing skin tumours.

Prescribing medicines

The prescription of medicines increased considerably. The average number of prescriptions per patient was in 2001 more than one and a half times higher than in 1987: this increase in prescriptions occurred in particular in the age group 65 years and older, the average number of prescriptions in the age group 0 to 24 remained stable. The increase between 1987 and 2001 was equally distributed across the sexes and the SES groups; females received in both years 50% more prescriptions than males, just like the lower SES group in comparison with the highest SES group.

The pharmacological treatment of *hypertension* intensified between 1987 and 2001. Few people with established hypertension remained untreated (28% vs. 9%), and on average more drugs per patient were prescribed; whereas in 1987 the mean number of drugs per patient was 1.0, this was 1.6 in 2001. If patients were treated for hypertension, in 1987 two thirds of them were on monotherapy, in 2001 43% was on monotherapy.

The pharmacological treatment of *coronary heart disease* (CHD) and *heart failure* underwent revolutionary changes. Whereas the treatment in 1987 focused mainly on symptomatic treatment, in 2001 preventive medicines came to the fore for treating the underlying factors. Preventive medicines included lipid lowering drugs, antithrombotics, RAAS inhibitors and betablocking agents. This caused an increase of the number of pharmacological agents prescribed. In 2001, almost half of all CHD patients were using four or more types of drugs, whereas this was 2% in 1987.

The use of *antidepressant* drugs exploded between 1987 and 2001. In 1987, seven persons per 1000 of the population received at least one prescription, against 42 per 1000 in 2001.
The number of prescriptions rose by a factor four. The increase in the prescribing of antidepressants was mainly the result of the introduction of the serotonin reuptake inhibitors (SSRIs).

Referral to secondary care

Between 1987 and 2001 the *referral rate* to secondary care decreased by 17% from 188 per 1000 persons in 1987 tot 156 per 1000 in 2001. The steepest decline in referral rates occurred in paediatrics, surgery and internal medicine, whereas there was an increase in referral rates for rehabilitation medicine, gastroenterology and rheumatology.
The referral rate in males decreased more than the rate in females between 1987 and 2001 (21% versus 14%). The referral rates to the various medical specialties showed a mixed pattern for both sexes.
One of the most significant differences occurred in the referrals to the lung specialist. While the referral rate for males dropped by 32% between 1987 and 2001, it increased by 40% for females; females were referred almost as frequently as males to the lung specialist in 2001.
In psychiatry the referral rates of males and females came closer; in 1987 the female/male ratio was 1.57 against 1.16 in 2001.

Discussion

- Minor surgical procedures

The shift in minor surgical procedures from treating wounds to removing skin tumours might be caused by two tendencies: the public education programmes about skin cancer resulted in a greater alertness of patients and doctors for skin tumours and nevi, whereas more patients bypassed their GP after an injury, as we explained previously when discussing the changes in the incidence of fractures.

- Prescribing medicines

The increase in the number of prescriptions between 1987 and 2001 seems at odds with our previous remark that Dutch GPs were restrained in the prescribing of medication. Does this mean that Dutch GPs threw overboard their frugality in prescribing?
For some indications this seems the case; it applied in particular to the treatment of a number of chronic diseaseas and in the prescribing of antidepressants.

For a number of chronic diseases there was a shift, between 1987 and 2001, from symptomatic treatment to a more proactive attitude where treatment was aimed at preventing recurrences and complications.
Especially opinions about the treatment of cardiovascular disorders and diabetes mellitus, among other things, underwent revolutionary changes between 1987 and 2001, because of the emergence of new classes of medicines like statins and ACE inhibitors.
Between 1987 and 2001 scientific evidence accumulated that treating cardiovascular risk factors in vascular compromised patients- like patients with diabetes mellitus, patients with hypertension, and patients with previous cardiovascular events - reduced mortality and new vascular accidents.
The consequences of this knowledge were laid down in practice guidelines published by the Dutch College of General Practitioners.
Because of the high standing of these guidelines among GPs, and the way the content of these guidelines was communicated to GPs, the recommendations of these guidelines were put into practice by GPs; GPs started to treat and monitor patients with these disorders more systematically. The entrance of the computer in general practice between 1987 and 2001 facilitated this systematic approach. It made the follow-up of patients with chronic diseases easier. The intensification of treatment involved all patient groups, but the difference

between 1987 and 2001 was in particular striking for the elderly. In 1987, treating systolic hypertension in elderly, for example, was considered risky because reducing the systolic blood pressure might induce a stroke in patients who also had subclinical cerebrovascular disease, whereas, in 2001 hypertension in the elderly was treated in the same vein as in younger age groups. The net result of the guidelines regarding cardiovascular disorders and diabetes was that more patients were eligible for treatment and that the average number of prescriptions per patient rose sharply.

One potential negative aspect of this trend remained underexposed so far. The disease-specific guidelines frequently recommend prescribing different types of drugs. However, adhering to the disease-specific recommendations may easily result in polypharmacy, in particular in the elderly; as the incidence of multiple chronic illnesses rises in the elderly, so does the number of drugs used to manage these illnesses. We demonstrated that almost half of all CHD patients were using four or more types of drugs for this condition, whereas this was 2% in 1987.

It is not uncommon that elderly people are using five or more different types of drugs and taking more than 10 dosages of medication per day. Elderly people are known to be at increased risk for the side-effects of interactions of medicines.
In chapter 3 we demonstrated that the prevalence rate of self-rated health "(very) good" was similar in 1987 and 2001 in the Dutch population, however, it was much lower in the age group 65 and older, in particular in women from the lowest and middle SES groups. Could it be that the increase in polypharmacy in 2001 in the older age groups contributed to the decrease in persons that rated their health as (very) good?
The question arises whether what is good for the disease, is always best for the patient, when multiple chronic diseases coexist [11] .
Health care that is increasingly both driven and evaluated by protocols derived from studies of single disease conditions seems likely to disadvantage people with complex and overlapping health problems [12]. An urgent need exists to know more about the optimal treatment of multiple morbidity. How should the care of different diseases be prioritised in situations where treatments are incompatible or the burden of treatment becomes too great? In older patients with multimorbidity we should focus more on disability management than on trying to achieve optimal treatment for each individual disease.

The huge increase in prescribing antidepressants was mainly brought about by selective serotonin reuptake inhibitors (SSRIs).
This increase could not be explained by a higher incidence rate of depression, but was a consequence of a higher proportion of patients with depression being treated with an antidepressant, an extension of the indications for the use of antidepressants and patients being treated for a longer period with anti-depressants. Clearly, the threshold for starting treatment with antidepressants was lower in 2001 than in 1987.
Due to or associated with the development and the marketisation of the SSRIs, depressions and other psychiatric diseases were no longer considered to be caused by psychological and social mechanisms, but more and more as brain disease caused by a deficiency of serotonin, which made treatment with SSRIs a logical choice.
The NHG guidelines regarding depressions and anxiety were beacons of common sense in their treatment recommendations. Nevertheless, there was a steep rise in prescribing antidepressants.
Clearly, it is difficult for GPs and patients alike to steer clear of external influences. The prescribing pattern is always an interaction between doctors and patients. However, this interaction does not take place in a void. Both parties are influenced by external parties as health authorities, pharmaceutical industry, insurance companies, scientists and, last but not least, the media.The first serotonin selective reuptake inhibitor was fluoxetine (Prozac®). It came on the market in 1987 and became a big success in the USA not in the least thanks to the book “Listening to Prozac” of psychiatrist Kramer [13]. Fluoxetine became known as a “mood brightener” and in the USA it was for some time a life style drug. In the Netherlands, fluoxetine was propagated by publicist Emma Brunt [14]. In her crusade against the perceived undertreatment of depression, she referred to her own experience of seven years psychotherapy for depression without result and the favourable effect of fluoxetine on her condition: “logical “, she states,”as long as there was a biochemical deficiency state in my brain”.
This notion of depression as deficiency state was vigorously promoted by pharmaceutical companies. The message delivered to doctors and consumers was that depressed people needed SSRI antidepressants to elevate their “depleted serotonin levels,” just as diabetics require insulin. Along with promoting the “serotonin deficiency theory”, drug manufacturers embarked on strategies to expand the market for depression by extending the meaning of depression to include all forms of “dysphoria” or sadness, and by expanding

the use of SSRIs for a range of new “disorders” (e.g. anxiety states) that drug companies helped to influence or define. Social Anxiety Disorder quickly became America’s third most common mental illness [15].
In hindsight the theory that depression was caused by a serotonin deficiency proved to be far too simplistic. In current conceptualizations of the neurobiology of depression, monoaminergic dysregulation is viewed more as an associated factor than as a primary cause. Also, a critical revaluation of the SSRIs showed that the their favourable effects were much less positive than previously found.
This marketing strategy, however, can be considered as succesfull in retrospect, as can be seen from the huge increase in the number of prescriptions for SSRIs.

- Referrals to secondary care

Behind a 17% overall decrease in referral rate between 1987 and 2001, differential changes were hidden.
We will discuss the most important changes in referral rates between 1987 and 2001 within the following framework: *changes related to the population*, *changes related to general practice* and *changes in the characteristics of the health care system*

  - Changes related to the population

The reduction in surgical referrals between 1987 and 2001 is at least partly caused by an increasing number of patients who bypassed their GP after they sustained an injury and presented their injury directly to an emergency department. In 2001, the incidence rate of fractures presented to the GP was 38% lower than in 1987. In section 2.1 of this chapter we saw that in the CMR Nijmegen there was no difference in the incidence of fractures in those periods and that this was most likely related to the fact that in the CMR also the diagnoses of those patients were registered who bypassed the GP and from whom the GP received a report from the emergency department.

The differences in referral rates to the various medical specialisms between 1987 and 2001 were not uniformly distributed across males and females.
One of the most significant differences between the sexes occurred in the referrals to the lung specialist. While the referral rate for males dropped by 32% between 1987 and 2001, it increased by 40% for females; females were referred almost as frequently as males to the lung specialist in 2001. Most

likely females caught up because their smoking behaviour resembled that of males from the seventies onwards, resulting in lung problems like chronic bronchitis, emphysema and lung carcinoma as can be seen in smokers.

In psychiatry the referral rates of males and females came closer; in 1987 the female/male ratio was 1.57 against 1.16 in 2001. Most likely, in 2001 relatively more male adolescents were referred to a psychiatrist than in 1987 because of behavioural problems. Because most GPs themselves don't start with prescribing methylphenidate, a referral is necessary for starting treatment with methylphenidate.

Some remarkable shifts in referral rates between the *lowest* and *highest* SES groups occurred between 1987 and 2001 for psychiatry and urology.
In 1987, in psychiatry the referral rate in the lowest SES group was 124% higher than in the highest SES group; in 2001 the difference between these two groups was statistically not significant.
It is important to remark that a referral to a psychiatrist is only one of the possibilities for referral for psychological problems. Patients with the same kind of problems can be referred to the ambulatory mental health care or a primary care psychologist. It is possible that the reputation of the ambulatory mental health care decreased between 1987 and 2001 and that particularly people from the highest SES group preferred to be referred to a secondary care psychiatrist.
In 1987, the lowest SES group had a 44% higher rate In urology than the highest SES group, in 2001 the rate in the lowest group was 17% lower than in the highest groups. We assume that this reversal was caused by an increased referral rate in males of the highest SES group for sterilisation (the referral rate for sterilisation nearly doubled).

- Changes related to general practice

In most NHG guidelines there is a section of recommendations when to refer or not to refer a patient with a certain disease. Because these guidelines are influential among GPs, they will affect the referral rate for the disease. These recommendations may result in some cases in less referrals, in other cases in more referrals.
In general, in most guidelines a restricted referral policy is advocated. The influence of the NHG guidelines can be illustrated with the guideline about imminent miscarriage. In this it was advised not to refer the patient to secondary care but to adopt a “wait and see” policy. The referral rate for spontaneous abortus went down from 1.3 to 0.3 per 1000.
Opinions about treatment and referral can change over time. In 1987, there was a tendency to operate on patients with ankle distorsions, later on this was abandoned. Such a change in policy also affects the referral rate for that particular condition.

Referrals to allied primary care health services instead of a medical specialist (substitution) will have contributed to lower referral rates in 2001 than in 1987.
In 1987, uncomplicated refractive visus problems were in most cases referred to the ophthalmologist, whereas in 2001 most were referred to an optician. This change was also recommended in the NHG guideline regarding eye problems [16,17] .
The emergence of podotherapy might be an explanation that the referral rate of acquired deformities of the lower limb (pes planus, halgus valgus, metatarsalgia) went down (from 1.7 per 1000 in 1987 to 0.7 per 1000 in 2001): persons, who in 1987 would most likely be sent to an orthopaedic surgeon, were in 2001 referred to a podotherapist.

- Changes in the characteristics of the health care system

Referrals to some medical specialties declined much more than the average, and referrals to other specialties were even higher in 2001 than in 1987. The emergence of new “supra-specialties” or “sub-specialties” like geriatrics and gastroenterology had as a consequence that a proportion of the patients, who were in 1987 referred to internal medicine, were in 2001 referred to these supra-specialties. Such a shift is supported by our findings because the referral rate for internal medicine went steeply down, whereas the rates for geriatrics and gastroenterology went up.

Better diagnostic and therapeutic facilities enabled GPs to refer fewer patients to secondary specialistic care. Patients who were suspected of having dysplasia of the hip or bile stones were in 1987 in most cases referred to a medical specialist, whereas in 2001 the GPs used ultrasonography to confirm or to dismiss the diagnosis.
An example of how better therapeutic facilities affected the referral rate can be found in the reduced referral rate for warts (from 1.4 per 1000 in 1987 to 0.6 per 1000 in 2001): in 2001 most GPs had liquid nitrogen at their disposal. In 2001 more skin tumours were removed by GPs than in 1987, partly because of better equipment and partly because of a better remuneration.

Conclusion

With regard to interventions we saw a mixed pattern. Overall, more prescriptions were issued in 2001 than in 1987. On the one hand, this was a desirable development insofar it concerned a correction on the undertreatment of a number of chronic condition such as cardiovascular disorders; the treatment recommendations of the NHG guidelines regarding these conditions certainly played an important role in the increased prescription rate. On the other hand, we can't exclude that prescription rates increased also for conditions, where this was not so desirable. Prescribing antidepressants might be an example. Although the optimal rate for prescribing of antidepressants is difficult to establish, the sharp increase between 1987 and 2001 has passed most likely the optimum.
GPs referred fewer patients in 2001 than in 1987. Like the decreased incidence rate of diseases, this can't be explained by an all-encompassing factor. We studied the referral rate on the level of the specialism referred to and found a different mix of factors influencing the referral rate for the various specialties.

21.3 Summary of main findings

The incidence of health problems presented to GPs was in 2001 **24% lower** than in 1987, whereas the number of face-to-face consultations was 10% higher in 2001 than in 1987 [1] . The average number of prescriptions per patient was in 2001 more than one and a half times higher than in 1987: this increase in prescriptions occurred in particular in the age group 65 years and older, the average number of prescriptions in the age group 0 to 24 remained stable.
GPs had to manage more patients with more chronic diseases in 2001 and these

chronic diseases were treated more intensively in 2001 than in 1987. GPs worked fewer hours in 2001 than in 1987 (58.6 vs 53.4). GPs achieved this by organising their work more efficiently. GPs delegated in 2001 more technical medical tasks to their practice assistants than in 1987, and their task scope with respect to psychosocial problems narrowed between 1987 and 2001.
Between 1987 and 2001, the *referral rate* to secondary care decreased by 17% from 188 per 1000 persons in 1987 tot 156 per 1000 in 2001. GPs retained their central position within the Dutch health care system; on the one hand as gatekeepers, on the other hand as main providers of health care to the Dutch population. Both in 1987 and 2001, three quarters of the Dutch population reported the previous year at least one consultation with their GP [1]; 35% of the population reported at least one consultation with a medical specialist in 1987, and 38% in 2001.

21.4 Methodological considerations

The strong point of the two National Surveys is that they are providing us with unique, large scale, representative information about morbidity in general practice. Data on the national scale were collected on the relation between the need, demand and supply of care in general practice. The participating GPs and their practice population were selected in such a way that they constituted a representative sample of Dutch GPs and the Dutch population.
The morbidity data could be linked to a variety of patient and GP background characteristics collected via patient registration, patient health interviews/questionnaires and practice questionnaires/ practice audits. All these data sets could be linked to each other by means of a unique anonymous patient and practice identifier.
These two National Surveys together with the National Studies in the UK are unparallelled in their scope. Before these surveys, the only information available was from small groups of university-linked GPs. Most basic data about morbidity, consultations and interventions in general practice were not available. The two National Surveys formed the basis for many theses, publications and policy papers.

An understanding of how the data have been collected and processed is needed for a correct interpretation of the results presented in this thesis.
It is important to realise that morbidity figures of the NS1 and NS2 refer to the

health problems presented by patients to their GPs and how the GPs interpret these health problems.

We will first address two intrinsic weaknesses of these surveys and subsequently we will discuss some issues related to methodological differences between the NS1 and the NS2.

The first weakness is that the registered morbidity reflects the assessment of the GP at the time of the closing of the episode of care.

As stated previously, the morbidity registration of the two National Studies was episode oriented, meaning that different consultations concerning the same health problem were linked to one episode. If there were several consultations in a single episode, the chronologically last diagnosis made during the registration period, was considered the diagnosis of the episode.

The closing of an episode of care can be influenced by the duration of the registration period. At the end of the registration period all open episodes are closed automatically. What this means for the registered morbidity is illustrated in figure 1.

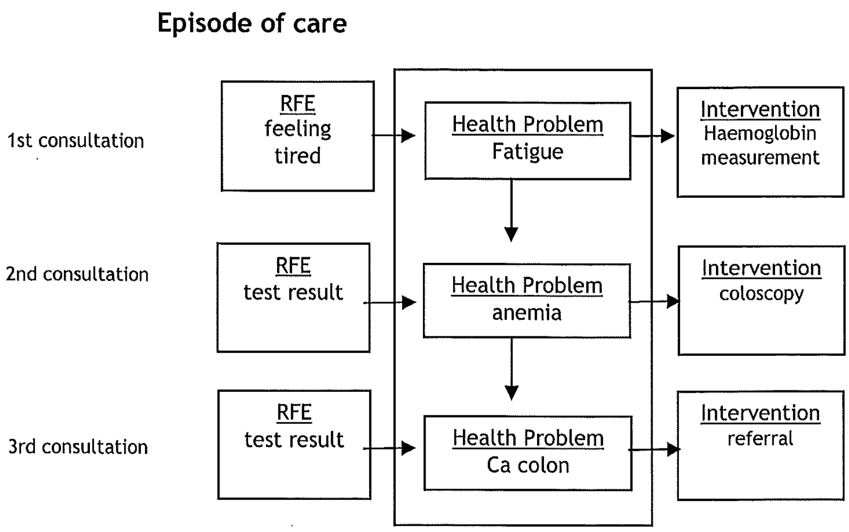
If all three visits of a patient occur within the registration period, the episode name is colon carcinoma. If only the first two visits fall within the registration period the episode name is anemia, if only the first visit falls within the registration period the episode name is fatigue.

One can think of many variations on this theme. If a patient is referred to a medical specialist with abdominal pain, the final diagnosis of colon carcinoma may be made after the end of the registration period which means that name of the episode will be abdominal pain.

In particular diseases with a relative long diagnostic route, such as malignancies, run the risk that the final diagnosis is not included in the episode of care. Quantitatively such diseases form only a minority, but there occurs a selective loss of information about these serious diseases.

However, the effect of the registration period is less than could be expected because in 1987 79% of all new episodes consisted of only one consultation and in 2001 74%. This difference between 1987 and 2001 is surprisingly small and indicates that the greater part of the episodes in general practice irrespective of the registration period comprises one consultation only.

Figure 1



RFE= Reason For Encounter

The second weakness is typical to all large scale morbidity registrations in general practice.
If a large number of GPs participate in recording and classifying all presented morbidity during a relatively short period, achieving consistency in classifying diagnoses is a potentially weak point. Recording and classifying morbidity requires a great deal of effort of the participating GPs, who are in principle not well versed in ICPC coding and for whom patient care and not morbidity recording is the first priority [i].
Consistent coding is easier to achieve within a small group of dedicated GPs. However, what is won in consistency with a small group, is lost in

[i] Patients are seen in a ten minute consultation and sometimes this is the only opportunity to label the illness. During a consultation, sometimes a definitive diagnosis is produced, however, on many occasions the prognosis for the patient as estimated by the doctor is much more important than the diagnosis in itself, in particular in the case of self-limiting diseases. For GPs the medical record is primarily aimed at laying down the reason for encounter, examinations, investigations and intended interventions. From the perspective of GPs the medical record is a tool in the process of providing patient care and not a tool for epidemiological purposes.

representativeness. In the Netherlands, small groups of dedicated, often university-linked GPs are prepared to spend considerable efforts and time in recording morbidity on a continuous base. However, such groups cannot claim to be representative for the GP population, and often their practice population is not representative for the Dutch population.
The diversity in diagnostic recording has been discussed by Crombie [18]. He concluded from studies of the data collected during the second National Morbidity Survey in the U.K that individual doctors are consistent from year to year in assigning disease codes within chapters of the International Statistical Classification of Diseases and that if the population at risk is sufficiently large, variations between ICD chapters cancel out. The populations of the NS1 in 1987 and NS2 in 2001 can be considered as large enough to cancel out variations on the level of organ systems and on the level of disease clusters.

The NS1 and NS2 differed on three important points with regard to recording and coding diagnoses. In 1987, the morbidity registration was performed on specially designed registration forms, whereas in 2001 it was part of the electronic record; in 1987 coding of the presented morbidity was carried out centrally by trained clerks, who checked and, where necessary, discussed diagnoses with the GP concerned, whereas in 2001 the presented morbidity was coded by GPs themselves; in 1987, patient contacts were recorded during three months, in 2001 during 12 months.
The different coding practices in 1987 and 2001 probably resulted in 2001 in a higher proportion of the presented health problems being coded as “symptom diagnoses”, while in 1987 the clerks used more often “disease diagnoses”.
At first sight it seems surprising that central coding by clerks resulted in a higher proportion of disease diagnoses than peripheral coding by GPs. However, one should keep in mind that the clerks were trained and instructed to code on the highest level of understanding, whereas the coding of the GPs was part of their daily practice. We discussed the consequences of this in chapter 6.
These coding differences should be kept in mind when comparing disease specific incidence rates. To account for these differences in coding behaviour, we composed, where possible, clusters from related symptom and disease codes and presented incidence rates on the level of clusters and organ systems.
The difference in registration period - three months in 1987 and twelve months in 2001 - prevented us from presenting prevalence rates of morbidity.

To compare the incidence rates of the NS1 with the rates of NS2, we multiplied the three months incidence rate by four. We have to take into account that converting a three-months incidence to an annual incidence rate may give rise to a small underestimation of the incidence in the NS1 (see chapter 6). However, because 79% of the new episodes consisted of only one contact with the GP, this makes the distorsion of minor importance especially in the light of the large differences between the incidence rates of 1987 and 2001.

21.5 Implications and recommendations

Dutch GPs are gatekeepers to secondary health care for their listed practice populations with universal access. Dutch general practice data on episodes of care and and interventions are, by their nature, a proxy for general population's demand, clinical need, and supply [19].

Describing the changes in the population, in general practice and in the health care system provided us with a background for the differences we found between 1987 and 2001 in incidence rates, prescription rates and referral rates. These rates are important in their own right for making probability diagnoses [20], disease monitoring, conducting scientific research and evaluating health care policy.

In this thesis we established that compared to 1987 the following changes occurred in 2001: the incidence rate of presented health problems was lower, the prescription rate of medicines was higher, the referral rate to secondary care lower, and the self-rated health in the elderly was worse especially in the lowest and middle SES group.

Implications

Below we will draw some conclusions and we will describe the implications of our findings for general practice; we also give some recommendations for a, possibly, new National Survey.

Implication for general practice

- We found that the self-rated health of elderly persons from the lowest and middle SES groups deteriorated considerably between 1987 and 2001.

Whatever the cause of this decline in self-rated health might be, it should focus the attention on the elderly of the lowest SES groups not only from the side of GPs. As stated previously, it is unlikely that the lower self-rated health can exclusively be contributed to a worse health status of the elderly. Other factors should be considered like an increased social isolation due to diminished social cohesion and trust in particular in disadvantaged areas. This is a social question, which should not only have the attention of GPs, but of welfare organisations and politicians as well. GPs can act as whistle-blower by bringing under attention of welfare institutions those elderly people who are suspected being in dire straits.

From the point of view of GPs, the question arises whether the polypharmacy to which many elderly were subjected contributed to their diminished well-being. As we pointed out previously in this chapter, because chronic diseases in elderly were treated more vigorously with drugs in 2001 than in 1987 in accordance with disease specific guidelines, polypharmacy occurred much more in 2001 than in 1987. It is possible that in elderly with multiple concurrent diseases, optimal treatment of each singular disease leads to a diminished well-being.

GPs should be alert on the possible negative effects of pharmocological treatment on the well-being of elderly, the more so because treatment is often not aimed at relieving symptoms, but on preventing events. Our finding surely calls for further investigations.

- Though it is important that patients have realistic expectations about GP care, at the same time GPs should beware not to jeopardise the low access threshold they have for all patients .

Providing reassurance to worried patients lies at the heart of general practice. A balance should be sought between free access with a low threshold and information and education about when to consult.

The overall incidence rate of diseases presented to GPs went down; the decline in incidence was particularly steep for respiratory tract infections. This runs contrary to the notion that, because of an ever increasing consumerism, patients tend to visit their GPs for all kinds of trivialities.

Increasing the knowledge of patients about common complaints and self-limiting conditions appears to be effective. This knowledge can be transferred by leaflets, but also during the consultation. The reaction of GPs to a presented health problem moulds in considerable degree the health seeking behaviour of a patient for the same problem in future. In this way the demand for GP care can be controlled.

- We feel that the presented information in this thesis warrants the recommendation to put more emphasis on psychosocial problems in daily practice in future, in postgraduate vocational training and in continuing medical education.

The lower incidence rate of presented psychosocial problems to GPs in 2001 compared to 1987 and the higher scores in 2001 on GHQ-12 (indicating more mental problems) and the increased inflow of patients to institutions of ambulatory care, raises questions about the role of GPs in the recognition and treatment of psychosocial problems. Nevertheless, the greatest part of the care for patients with psychosocial problems takes place in general practice: only 6% of all patients, who were diagnosed with psychosocial problems by GPs were referred to primary and secondary mental health services in 2001 [21].
However, this does not preclude that psychosocial problems might have been underdiagnosed in 2001 as compared with 1987. We established a reduced "task perception" of GPs with regard to psychosocial problems between 1987 and 2001 [22] (see chapter 3).
Noordman et al showed that in 2001 GP and patient did not talk about psychosocial problems in two out of the three patients, who consulted their GP with a complaint they ascribed to stress or worry (worries) [23]. Though we don't have such data about 1987, these results seem to confirm that the attention of GPs with regard to psychosocial problems decreased.
In the seventies and the eighties, in postgraduate vocational training and in continuing medical education of GPs much attention was given to psychosocial problems. According to many GPs, in those years the emphasis was too much focused on psychosocial problems leading to a disregard for common somatic diseases; GPs ran the risk to move in the direction of social work and to alienate themselves from their medical background.
As a reaction GPs started in the nineties to pay more attention to their "core business": the detection and treatment of common and chronic diseases. This trend was enforced by the emergence of the NHG guidelines. A number of of these guidelines dealt with frequently occurring chronic diseases like diabetes mellitus, hypertension, cardiovascular disorders, asthma, COPD. GPs spent much time in implementing the recommendations of these guidelines, which amounted to improving the detection, the logistics and the management of these disorders.
This shift in priorities between the nineties and the previous period In the

seventies and the eighties, in postgraduate vocational training and in continuing medical education of GPs much attention was given to psychosocial problems. was reflected in the communcation style of GPs. Bensing et al found that GPs had in 2001 a more task-oriented communication style in 2002 compared to 1987, but were in 2001 less engaged in partnership building, for instance by asking for patients' opinions, asking for clarification of patients' words [24] .
Though GPs have been striving to integrate the somatic and psychosocial aspects in 1987 as well as in 2001, subtile changes in priorities may have developed between 1987 and 2001.

- GPs should try to prevent to be judged on performance indicators derived from NHG guidelines by third parties , such as health insurance companies. Higher adherence rates to guidelines is often considered to be evidence of improved quality of care [25]. However, many pitfalls exist when converting guidelines into performance indicators [26]. By connecting performance indicators to financial incentives, the risk for perverse incentives arises.

The NHG guidelines are refering to the average patient ; they allow at best generalised statements about population averages, not what to do in individual cases or specific subgroups [i,27]. GPs should take the responsibility to deviate from the guidelines (if motivated) and to tailor them to the needs of the individual patient. Guidelines should not lead to “cookbook medicine”.
The NHG guidelines recommended for many chronic diseases a shift from symptomatic treatment to proactive treatment of underlying factors. In most cases this resulted in the recommendation to prescribe more drugs. Between 1987 and 2001 the prescription rate went up, indicating that the NHG prescription recommendations were largely implemented by GPs. However, when the current level of prescribing would be considered as the minimum adherence to the guidelines, external pressures on GPs could result in an tendency to implement the NHG prescription recommendations to all eligible patients. In particular, in the elderly with concurrent chronic diseases, adherence to disease-specific guidelines will often lead to polypharmacy.

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[i] Studies about the treatment of heart failure were in most cases performed in patient populations, whose mean age was below 70 years. In the NS2 the mean age of patients with heart failure was 78 years.

- In spite of an increase in patients' rights as stipulated in the medical treatment act of 1995 (Wet op geneeskundige behandelings overeenkomst), which aims, among other things, more shared informed decision taking, GPs managed to maintain their position as gatekeepers of the Dutch health care system. It might have been conceivable that patients with more legal rights endowed would have insisted more often on referral to medical specialists.

The *referral rate* to secondary care went down by 17% between 1987 and 2001. GPs deal with 96% of all contacts themselves without referring the patient [28], and they do that for less than 5% of the Dutch healthcare budget [29]. The gatekeeper role is associated with the function of doctor of first contact[30].

- *Electronic patient records*

Traditionally, medical records consisted of the notes made over time by one GP and were used as mnemonic device for that GP. Nowadays, electronic patient records (EPRs) in general practice serve as a tool by which all workers in general practice share medical information. Increasingly, more primary care workers are involved in patient care in general practice [31]. This is brought about by developments such as an increase in part-time work, delegating tasks to practice nurses and practice assistants, general practitioner specialisation and more extensive out-of-hours services [i]. This process of fragmentation of care did not solely affect the personal continuity of care, but made it also more difficult to achieve a comprehensive morbidity recording.
With the increasing number of persons involved in patient care, the recording of care acquired the highest priority in order to achieve informational and management continuity[ii] [32].

The new electronic patients record (EPR) systems require GPs and all their coworkers within the practice to assign an ICPC coded diagnosis to all patient contacts and to categorise these contacts in episodes of care. Episodes of care are the backbone of the database in the newly developed EPDs [33].

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[i] Since 2001 the *organisation of out-of-hours GP care* has shifted from practice-based services to large-scale general practitioner (GP) cooperatives. Currently more than 130 GP cooperatives in the Netherlands are active, generally with 40 to 120 full-time participating GPs, which cover over 90% of the entire Dutch population and serve between 50,000 and 500,000 people.

[ii] Studies about the treatment of heart failure were in most cases performed in patient populations whose mean age was below 70 years. In the NS2 the mean age of patients with heart failure was 78 years.

Patient contacts involve all actions performed in relation to a patient. Putting a signature under a repeat prescription is a patient contact and this contact should receive an ICPC coded diagnosis. Because the reason for a prescription is not always related to an existing health problem, but may have been prescribed to prevent a health problem, awarding a proper code can be difficult [i]. Correspondence about patients from other health care providers should also contain an ICPC coded diagnosis and should be linked to existing episodes of care or subsumed in new episodes of care.

Assigning all contacts to the appropiate episode of care will be time-consuming and requires extensive preparations, instructions and effort of GPs and their staff. Up till now, little attention has been paid to proper recording of morbidity, it was considered GPs' own sake. Informational and management continuity can only be achieved with a high quality of record keeping. However, the required effort is such a breach with the present practice of recording, that it should not be taken for granted that adequate recording will take place [34]. From own experience, we dare to say that high standard record keeping such as described above, will cost a participating GP and a practice assistant each at least half a hour per day extra. Such a time-consuming endeavor will only succeed if it will be facilitated not only by intensive information and counseling, but also resources should be made available to compensate for the extra time involved

Recommendations for a new National Survey

Since 2001, a number of important changes occurred both in general practice and in the health care system. This makes it necessary to update the information obtained by the NS2.

It would be advisable to design a new National Survey in such a way that the results are as much as possible comparable to those of the first and second National Survey. By combining the results of three National Surveys a long-term perspective of general practice care can be provided.

[i] This can be illustrated by a a depressive patient taking an antidepressant agent, who uses a proton inhitor for stomach protection and who asks for a repeat prescription of the proton pomp inhibitor by telephone or in writing. This contact should receive an ICPC coded diagnosis relating to the depresssion and not a ICPC coded diagnosis relating to the stomach. Because repeat prescriptions are usually dealt with by the practice assistant, he or she has to decide about the ICPC coded diagnosis to be given.

On the base of our experiences with the first and the second National Survey and the described changes since 2002, we venture to give some recommendations regarding a new National Survey.
A third National Survey should give due consideration to the following points.

- Duration of data collection
- The recording of morbidity
- Extending data collection to other primary care providers.

We will discuss each of these three points.

- *Duration of data collection*

What should be the optimal duration for a morbidity survey for obtaining the most reliable morbidity data especially with regard to the prevalence?
We claimed that we were not able to provide prevalence rates because in 1987 the duration of the registration was only three months and customarily prevalences rates are presented as annual rates.
However, Veltman demonstrated that even an one year registration period gives rise to an underestimation of the prevalence rate of many chronic conditions [35]. Episodes of care are sensitive for the duration of registration. The longer the registration period, the more reliable the episode construction. Veltman investigated what the optimal duration of morbidity registration should be for achieving the most reliable results [35]. He observed that in a one year registration period only half of the old (ongoing) episodes were brought back to the attention of the GP. He found that a registration period of four years was necessary to get a reliable impression of morbidity in general practice. The effect of underestimation doesn't apply to incidence rates, because all incident episodes are recorded; the problems that may arise with incidence rates is that sometimes the episode of care will be closed at the end of the registration period, when not yet a final diagnosis has been made.
The conclusion adopted from Veltman is that the optimal registration period for obtaining reliable prevalence rates is four years. An additional advantage of a longer registration period is that fewer episodes are being closed before the definitive diagnosis has been made so that the incidence of diseases with a long diagnostic trajectory have a greater chance to be included.
Obviously, a survey of four years would be impractible. This means that to obtain the most reliable prevalence figures, a new survey could best be embedded in an existing registration network.

- *The recording of morbidity*

Apart from the duration of registration, a reliable morbidity register is largely dependent on accurate recording of all relevant health problems. As we described in the previous paragraph, accurate and reliable recording of care information is not only important for research purposes, but for patient care as well. Increasingly, the registration requirements for daily practice converge with the requirements for research purposes: central in the structuring of contacts, is the construction of episodes of care. From the episodes of care important epidemiological figures can be derived like consultation rates, incidence rates, prevalence rates, prescription rates and referral rates.
For research purposes as well for practice management, it is important that all workers in general practice record information in the EPR under their own name and that they indicate the type of contact. The type of the contact may involve consultations at surgery, home visits, telephonic contact, repeat prescription contact, administrative contacts (like recording and processing correspondence of other health care providers).

Theoretically, the requirements of record keeping for research purposes and patient care are similar, but for the time being it will virtually be impossible that all general practices achieve the standard of recording described ìn the previous paragraph.
To gain insight into the consequences of optimal recording of all activities for the workload in general practice, this aspect could be made part of the prospective National Survey. Participants should meticulously measure in time all their activities related to the EPD. This could give added value to a new National Survey.

- *Extending data collection to other primary care providers*

When planning a morbidity survey in future, one should realise that not all health problems are exclusively presented in general practice, but that some health problems are also and exclusively presented in other parts (domains) of primary care.
This applied already in 1987 and 2001 for problems related to pregnancy and for psychological problems. Problems related to pregnancy are largely dealt with by midwifes; between 1987 and 2001 the proportion of GPs, who still practiced obstetrics declined. Both in 1987 and in 2001 patients with

psychological problems are allowed to address directly a social worker[i].

After the NS2 some policy changes occurred. From 2004 onwards occupational physicians were allowed to refer patients without involvement of the patients' GP to other health care providers.
From 2006 onwards, through a modification in the health care system, a new situation arose with regard to physical therapy. Before 2006 patients could only consult a physical therapist after being referred by a GP; after 2006, patients could directly consult a physical therapist without interference of a GP. In 2007 one third of all patients treated by physical therapists were not referred.
In conclusion, to obtain reliable data about all conditions presented in primary care, not only data from general practice should be used, but also data from other primary care providers. This is in particular important when comparing morbidity data from 2001 to data from after 2006.

[i] In 2004, 43% of all patients seen by social workers were not referred, 29% were referred by GPs, and 28% were referred by other parties. In 2001, 5 out of 1000 patients were referred by GPs to social workers.
http://www.nivel.nl/pdf/Capaciteit-hulpverlening-en-patientenstromen-in-de-eerstelijns-GGZ-2001-2006.pdf

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Chapter 22 Summary

Summary

This thesis aims to describe changes in frequency and nature of health problems presented to Dutch general practice between 1987 and 2001, and changes in the reactions of general practitioners to the presented health problems, and to relate these changes to changes in the characteristics of the population and of general practice.
To achieve this aim, we have made use of the data of the first and second Dutch National Survey of General Practice conducted in 1987 and 2001 respectively (NS1 and NS2).
Central in these surveys was the morbidity presented to GPs and their subsequent interventions, in combination with detailed demographic information about the practice population and information about GPs. Broadly speaking, the purpose of the two surveys was to gain insight, on national scale, into the presentation of health problems in general practice, in the actions of general practitioners (GPs) and in factors that influence the presentation of health problems as well as the diverse reactions of GPs to presented health problems.

We divided this thesis in four parts: part 1 deals with the sociodemographic and sociocultural changes in the population and in general practice between 1987 and 2001; part 2 studies the incidence rates of the health problems presented to general practitioners in 1987 and 2001; part 3 explores the various interventions performed by GPs as a result of the presented health problems; part 4 recapitulates and interprets the results of the previous parts.

PART 1 consists of six chapters, in which we describe the changes that occurred between 1987 and 2001 in the population and in general practice in the Netherlands. Furthermore, a detailed account is given of the first and second National Survey of General Practice, which provided the data for this thesis.

Chapter 1 gives background information on the main themes of this thesis and sets down the research questions of this thesis. It also provides information about the setting of general practice in the Netherlands.

In *chapter 2*, we focus on changes in the sociodemographic and sociocultural characteristics of the Dutch population between 1987 and 2001.
The population was ageing; the proportion of persons of 65 years and older increased from 12.4% in 1987 to 13.6% in 2001, the proportional contribution of the age group 45 to 64 years increased by more than 4%, whereas the proportional contribution of the age group 15 to 24 years decreased by more than 5%.
The proportion of non-Western immigrants increased from 5% to 9% of the population.
Economic prosperity, education and living in a welfare state allowed people more and more to choose between living arrangements, depending on their individual values and preferences. We found that socioeconomic status and the educational attainment rose between 1987 and 2001 and that more people were employed. The growth in employment rate translated into a positive trend for household income, fewer people lived in poverty. Fewer people chose to marry or to have children. The proportion of single person households grew from 13% in 1987 to 16% in 2001, the proportion of couples without children increased by nearly 10%.
Various changes in lifestyle occurred. The proportion of persons who smoked or used excessive alcohol decreased when we compare 2001 to 1987; however, the proportion of persons with obesity almost doubled.
Patients' attitudes towards the management of minor ailments influence their help seeking behaviour. Compared to 1987, fewer people were inclined to consult their GP for minor ailments in 2001.

Chapter 3 contains an in-depth study of changes in the lowest socioeconomic (SES) group in 1987 and 2001. We demonstrated that in 2001 the proportion of persons with a higher education in the lowest SES group more than doubled compared to 1987. This indicates that the relation between educational level and occupation was less firmly anchored in 2001 than in 1987.
However, at the same time the relative proportion of some of the disadvantaged groups (divorced, unemployed) increased in the lowest SES group.
On balance, the changes in the composition did not result in an accumulation of disadvantaged groups in the lowest SES group. The influx of people with higher educational qualifications between 1987 and 2001 could result in better health outcomes and health perspectives of the lowest SES group

In *chapter 4*, we use self-rated health (SRH) as a measure for the health status of the population and we described the changes in SRH between 1987 and 2001 in relation to sex, age and SES. Overall, there was no difference between 1987 and 2001 in the proportion of persons who rated their health as (very) good. Between males and females there were only small differences in SRH, both in 1987 and 2001. Obviously, self-rated health is strongly related to age: in the youngest age group, 97% had a (very) good SRH, in the age group 65 years and older this was 56%.
At first sight, health inequalities seemed not to have changed much between 1987 and 2001, however, when we consider age, sex and SES in combination, we found considerable changes between subgroups in 1987 and 2001.
The most significant changes between 1987 and 2001 took place in the age group 65 years and older. In this age group the proportion of persons who rated their health as (very) good remained stable for those in the highest SES group, whereas for those in the lowest and middle SES groups it decreased steeply; particularly, in females there was a strong decline in SRH.
This is a disappointing observation, taking into account the increasing level of welfare, the better material conditions for the retired and the unimpeded accessibility of health care for everyone. It shows how firmly socioeconomic health inequalities are anchored in our society. The causes of the increasing gap could be a relative deprivation as stated by Wilkinson, a loss of social cohesion in deprived areas, or a cultural determined changing attitude towards physical limitations, or a combination of any of these factors.

In *chapter 5*, we address changes in the general practice between 1987 and 2001. On average, the GPs in 2001 were older than those in 1987, and the proportion of female GPs was higher in 2001 than in 1987.
GPs professionalised between 1987 and 2001. The postgraduate vocational training was extended to 3 years. In 1989, the first NHG guidelines were published, in 2001, 78 NHG guidelines were on stage. The introduction of the computer between 1987 and 2001 provided GPs with an integrated information system; GPs were frontrunners in the medical world in using electronic patient record systems in their daily practice.
In 1995, the medical treatment agreement act laid down rules about patients' rights and doctors' obligations.
With more patients per GP and a 10% higher consultation rate in 2001 than in 1987, the demand for GP care increased between 1987 and 2001. However, we saw a distinct decline in the average number of working hours a week, even

when adjusting for the increase in part-time work between 1987 and 2001.
GPs achieved this reduction in working hours by organising their work more efficiently. A clear shift took place towards less labour-intensive and time-consuming contacts: fewer home visits were performed and more telephonic contacts.
Moreover, GPs delegated more tasks to practice assistants: e.g. in 1987 PAP smears were performed by 3% of al practice assistants, in 2001 53% of all practice assistants performed this task.
In 1987, no practice nurses were working in general practice. In 2001 one-quarter of the practices employed a practice nurse.
Moreover, the task scope of GPs has narrowed with respect to time-consuming contacts like psychosocial problems; in 2001, GPs considered psychosocial care less frequently part of their job than in 1987.
There were no signs that quality of care suffered from these developments; patient satisfaction with the communication of GPs increased slightly, whereas patient satisfaction with the way GPs practices were organised decreased slightly.

In *chapter 6* we describe the background, aim and design of the first and the second Dutch National Survey of General Practice (NS1 and NS2). Data at national level were collected on the relation between the need, demand and supply of care in general practice. General practice was used as point of entry in the 1987 and 2001.
Both surveys consisted of five data collections that took place within different (sub)populations: (1) Registration of all contacts between GPs and patients; (2) registration of sociodemographic background characteristics of the total practice population; (3) Patient health interview survey for information about self-reported health and use of health care (4) GP and practice assistant questionnaires; (5) Videotaping of GP-patient consultations during consultation hours of GPs.
The intention to make the data from the NS2 as much as possible comparable with those of the NS1, could be achieved to a considerable extent.
The two most important differences between NS1 and NS2 were

- a three months registration period in the NS1 versus a twelve month registration period in the NS2
- central coding of consultations in the NS1 by trained clerks and peripheral coding in the NS2 by the participating GPs.

Incidence rates and prevalence rates are usually calculated over a time-period of one year. To compare the incidence rates of the NS1 with the rates of NS2, we multiplied the three month incidence by four. We refrained from providing annual prevalence rates.

PART 2 consists of the chapters 7 to 12. In these chapters we compare the incidence rates of health problems presented to GPs in 1987 and 2001 and the changes are explored against the background outlined in PART 1.
We discussed the changes we found in morbidity and interventions between 1987 and 2001 within the framework of the following characteristics:

- *Changes related to the population*
- *Changes related to general practice*
- *Changes in the characteristics of the health care system*
- *Methodological changes*

We present the incidence rates at five levels:

- (1) overall level i.e. all new presented health problems;
- (2) level of ICPC rubrics i.e symptom codes vs. disease codes
- (3) level of organ systems (ICPC chapters) ;
- (4) at cluster level (a cluster is a collection of symptoms and diseases, which form together a meaningful unit for research);
- (5) at disease level.

In *chapter 7*, we present the incidence rates at the overall level(1), at the level of ICPC rubrics (2), and at the level of organ systems (3).
Overall, the incidence rate of health problems presented to GPs was in 2001 24% lower than in 1987; the rates were lower for all categories under study (sex, age and SES groups). The difference in incidence between males and females became larger, because the fall in incidence in males was larger than in females.
The incidence rates of all age groups were in 1987 lower than in 2001, with the exception of the age group 75 and older where the rate remained the same.
In 2001, fewer new health problems were coded with a disease diagnosis than in 1987: in 2001 53% of the health problems presented to GPs were coded as diseases against 71% in 1987.
The change in incidence rates between 1987 and 2001 was different for each organ system. The general decline in incidence rates between 1987 and 2001 was most marked for health problems related to the respiratory tract; the rate dropped in 2001 by 45% compared with 2001. In 1987, problems of respiratory

tract problems were the most frequently presented health problems of all organ systems (21.4%); in 2001, it dropped to the third place (15.3%) and was surpassed by symptoms and diseases of the musculoskeletal tract (19.2%). The incidence rate of skin-related problems moved up from the third place in 1987 to the second position (17.3%) in 2001.
It is unlikely that the 24% reduction in the overall incidence between 1987 and 2001, can be ascribed to a real decrease of morbidity in the population, but should be attributed to a combination of other factors.
Patient-related factors have most likely played an important role. In particular, the increase in the size of the highest socioeconomic group within the population and the more realistic expectations of patients toward the management of minor ailments in 2001, have contributed the fall in the incidence rate. Furthermore, patients bypassed their GPs more frequently in case of injuries and went directly to an emergency department.
Factors relating to GPs and general practice were the publication of practice guidelines (NHG), campaigns with patient information leaflets of the Dutch College of GPs and an increased professionalisation.
Changes in the health insurance system influenced the presentation of health problems to GPs. For a number of drugs the need for a prescription was abolished between 1987 and 2001. It concerned some antitussive, pain-relieving and antihelmintic drugs.
We mentioned already the most important methodological change between the first and the second National Survey: in 1987 the health problems were coded centrally, and in 2001 peripherally. This has influenced the incidence rates of symptom codes and disease codes in 1987 and 2001. GPs were in 2001 more reluctant to assign a disease code to a presented health problems than the trained clerks in 1987. However, this difference has not affected the overall incidence rate and the rates of the organ systems.

In *chapter 8*, we describe the incidence rates of the infectious diseases. Overall, the incidence rates of infectious diseases went down by 39% from 667 per 1000 in 1987 and 405 per 1000 in 2001.
The strongest decline in incidence rates between 1987 and 2001 occurred in respiratory tract infections (51%) and in gastrointestinal infections (47%), whereas the incidence rate of skin infections remained stable, and the incidence rate of infections of the eyes increased by 60% between 1987 and 2001.

In *chapter 9*, we examined the incidence rates of the musculoskeletal health problems with the following subclusters: dorsopathies, health problems related to the upper extremities, health problems related to RSI, health problems related to the lower extremities.
The incidence rate of musculoskeletal health problems presented to GPs went down by 19% between 1987 and 2001.
When we look at the identified clusters we found that the incidence rate of dorsopathies remained about similar, but that within this cluster the rate of neckproblems was in 2001 two times higher than in 1987. The incidence rate of problems related to the upper extremities went up by 79% in 2001 and the rate of repetitive stress injuries by 89%. The incidence rate of problems related to the lower extremities was in 2001 39% higher than in 1987.

In *chapter 10*, we study the incidence of the carpal tunnel syndrome in general practice in 1987 and 2001 and relate the incidence to the role of occupational and non-occupational factors. This is the only chapter in which we study the incidence rate at the level of disease.
In 2001, the incidence rate of carpal tunnel syndrome was 1.5 times higher than in 1987, but the difference was not statistically significant after subdividing by age and sex. In both years the female/male ratio was 3:1. Incidence rates were related to the job level of women, but not of men.

In *chapter 11*, we describe the incidence rates of injuries. The incidence rate of injuries presented to GPs was in 2001 nearly 50 per cent lower than in 1987. The incidence rate of fracture decreased by 38%, the rate of sprains, strains and (sub)luxations by 62%. We made plausible that this decrease was brought about by patients going directly to the emergency department thereby bypassing the GP,

In *chapter 12*, we investigated the incidence rates of psychosocial problems. In 2001, the incidence rate of the total of all psychosocial problems was 24% lower than in 1987.
We distinguished a number of subclusters within the cluster psychosocial problems. We will present the most conspicuous findings.
Between 1987 and 2001 the incidence rate of anxiety decreased by 37%, the rate of depression decreased by 14%.
The incidence rate of sexual problems were similar in 1987 and 2001. However, when comparing the rates in males and females, we saw in males in

2001 an increase of 41% compared to 1987 and in females a decrease of 34%. Whereas the incidence rates in males and females were about the same in 1987, the rate in 2001 was in males twice as high as in females. This increase in males is undoubtedly brought about by the development and coming into the market of sildafenil (Viagra®), a fosfodiesterase type 5-inhibitor, which promotes penile erections.
The incidence rate of behavioural problems in persons younger than 25 years went up by 69% when we compare 2001 with 1987. The rise was more marked in males (116%) than in females (24%). An explanation could be that more male adolescents were referred with behavioural problems to assess whether they should be treated with methylphenidate.
The incidence rate of sleep disturbance was more than two times higher in 2001 than in 1987.
The incidence rate of ten medically unexplained physical symptoms was 73% higher in 2001 than in 1987. Apparently, GPs were in 2001 more hesitant to classify and code somatic complaints and symptoms as psychosocial than in 1987. We established a reduced "task perception" of GPs with regard to psychosocial problems between 1987 and 2001. The reduced task perception can be considered as a defence mechanism to clamp down on the workload. GPs reacted in two ways. On the one hand they seem to have become more reluctant to recognise psychological problems as such, on the other hand they referred more patients to the ambulant mental care. Nevertheless, the greatest part of the care for patients with psychosocial problems took place in general practice: only 6% of all patients who were diagnosed with psychosocial problems by GPs were referred to primary and secondary mental health services in 2001.
GPs have been striving to integrate the somatic and psychosocial aspects in 1987 as well as in 2001; however, subtile changes in priorities may have developed between 1987 and 2001.

PART 3 consists of the chapters 13 to 20. In this part we present the prescription and referral rates of GPs in 1987 and 2001.

In *chapter 13* we give an general introduction about interventions and in *chapter 14* we clarify the background of drug prescribing in general practice.

In *chapter 15*, we compare the volume of of drug prescriptions by GPs in 1987 and 2001. The mean number of prescriptions per patient was in 2001 38%

higher than in 1987. The increase between 1987 and 2001 was equally distributed across the sexes and the socioeconomic groups. The steepest increase occurred in the age group 65 and older, whereas below the age of 15 the number of drug prescriptions went even down in 2001.

In *chapter 16*, the prescribing pattern for hypertension in 1987 and 2001 is explored. The pharmacological treatment of hypertension intensified between 1987 and 2001. Fewer people with established hypertension remained untreated, and on average, more drugs per patient were prescribed. There was no important difference in the treatment of hypertension between the sexes and between lowest and the highest SES group.

Chapter 17 studies the pharmacological treatment of coronary heart disease (CHD) in 1987 and 2001. This treatment of underwent important changes. Whereas the treatment in 1987 focused mainly on symptomatic treatment (nitrates and diuretics), in 2001 preventive medicines as lipid lowering drugs, antithrombotics and RAAS inhibitors came to the fore.
In 1987, the mean number of drugs per patient was 1.3, whereas this was 3.2 in 2001; almost half of all CHD patients were using four or more types of drugs in 2001 against 2.3% in 1987. The proportion of untreated patients declined from 22.2% to 6.4%.

Chapter 18 deals with the treatment of heart failure (HF) in Dutch general practice in 1987 and 2001. Between 1987 and 2001 the insights in the treatment of HF changed considerably. In 1987 heart failure was considered principally as a static hemodynamic disorder; later it became clear that heart failure has a dynamic character in which neurohormonal compensation mechanisms (renine-angiotensin-aldosterone system) are activated resulting in progressive damage to the heart.
In 1987, the most important drugs for the treatment of heart failure were diuretics (70%) and digoxin (38%).
In 2001, one or more diuretics were used by 86% of all patients; renine-angiotensin-aldosterone system inhibitors) were prescribed in about half of the cases (6.9% in 1987); betablockers in 32% (8.4% in 1987); digoxin in 25% and spironolactone in 20% (5.9% in 1987) .
In 2001, 18% of all patients received the “optimal” triple treatment of a diuretic, RAAS-I, and a betablocker. We found no significant differences for gender, age and socioeconomic status.

In *chapter 19*, we scrutinise the prescription of antidepressants in general practice in 1987 and 2001.
The use of antidepressant drugs increased sharply between 1987 and 2001. The number of prescriptions rose by a factor four.
We attempted to find the mechanisms which were responsible for the huge increase in the prescribing of antidepressants between 1987 and 2001. We found no indication in our data that more patients were suffering from depression in 2001 than in 1987. However, we established that patients with a depression were treated with antidepressant medication in a higher proportion in 2001, that antidepressants were used for a wider range of conditions, and that patients on antidepressant medication were treated for a longer period. The surge in prescribing antidepressants was mainly brought about by the prescription of SSRIs.

In *chapter 20*, we examined the general practitioners' rate of new referrals to medical specialists in 1987 and 2001.
Between 1987 and 2001, the overall referral rate to secondary care decreased 17% from 188 per 1000 persons in 1987 tot 156 per 1000 in 2001.
The steepest decline in referral rates occurred in paediatrics, surgery and internal medicine, whereas there was an increase in referral rates for rehabilitation, gastroenterology and rheumatology.
The changes in referral rates between 1987 and 2001 to the various specialties showed a mixed pattern for sex and socioeconomic groups. This was mainly related to changes in lifestyle. In females, for example, the referral rate to the lung specialist increased by 28%, whereas the rate in males dropped by 37%. Most likely, females caught up because their smoking behaviour resembled that of males from the seventies onwards, resulting in lung problems like chronic bronchitis and emphysema as can be seen in smokers .

In *chapter 21* we recapitulate the findings of this thesis.
The incidence of health problems presented to GPs was in 2001 24% lower than in 1987. In spite of the lower incidence of presented health problems in 2001, the number of face-to-face consultations went up by 10% from 3.6 in 1987 to 3.9 per person per year in 2001.
We assume that this apparent contradiction can be explained by a higher number of consultations for chronic conditions. GPs had to manage more patients with more chronic diseases in 2001 and these chronic diseases were

treated more intensively in 2001 than in 1987 under influence of the guidelines of the Dutch College of General Practitioners (NHG-Nederlands Huisartsen Genootschap)
GPs worked fewer hours in 2001 than in 1987 (58.6 vs 53.4). GPs achieved this by organising their work more efficiently. GPs delegated in 2001 more technical medical tasks to their practice assistants than in 1987, and their task scope with respect to psychosocial problems narrowed between 1987 and 2001.

The decline in incidence rate between 1987 and 2001 can be attributed to an combination of patient-related, GP-related and health care system related factors. In this chapter we discussed this under the heading of chapter 7.

The average number of prescriptions per patient was in 2001 38% higher than in 1987: this increase in prescriptions occurred in particular in the age group 65 years and older, the average number of prescriptions in the age group 0 to 24 remained stable.
The increase in the number of prescriptions between 1987 and 2001 seems at odds with the notion that Dutch GPs were restrained in the prescribing of medication. However, one should put this increase in perspective and look at the qualitative aspects of the prescribing. A shift occurred between 1987 and 2001 from symptomatic treatment to the treatment of risk factors in a number of common chronic diseases and this resulted in a rise in the number of prescriptions. This is an indication that the recommendations of the NHG guidelines were followed.

Between 1987 and 2001, the *referral rate* to secondary care decreased by 17% from 188 per 1000 persons in 1987 tot 156 per 1000 in 2001. GPs retained their central position within the Dutch health care system.

Finally, we expressed as our opinion, that a new National Survey would be advisable, because of the important changes that occurred both in general practice and in the health care system since 2001.
It would be advisable to design a new National Survey in such a way that the results are as much as possible comparable to those of the first and second National Survey. By combining the results of three National Surveys a long-term perspective of general practice care can be provided.
We formulated a number of recommendations for such a new National Survey.
A new National Survey could best be embedded in an existing registration

network, because a longer registration period produces more reliable prevalence rates.

For research purposes as well for practice management, it is important that all contacts with general practice are recorded. A contact should be broadly defined: it involves consultations at the surgery, home visits, telephonic contact, repeat prescription contact and administrative contacts like recording and processing correspondence of other health care providers.

Recording and processing correspondence of other health care providers is of the utmost importance. It enables GPs to correct the final diagnosis of an episode of care, and to include episodes of care that would otherwise not have been recorded because the patient bypassed the GP and went directly to another health care provider.

Samenvatting

(Summary in Dutch)

Samenvatting

In dit proefschrift beschrijven we in eerste plaats de frequentie en aard van de in 1987 and 2001 gepresenteerde gezondheidsproblemen in de huisartspraktijk, en analyseren we de verschillen tussen deze twee perioden. In de tweede plaats beschrijven we de reacties van huisartsen op de aangeboden gezondheidsproblemen, en analyseren we de verschillen daarin tussen 1987 en 2001. In onze analyses trachten we vervolgens verbanden te leggen tussen de gevonden verschillen en de sociodemografische en socioculturele veranderingen, die zich in de Nederlandse bevolking en binnen de huisarts-geneeskunde hebben voorgedaan tussen 1987 and 2001.
Voor dit doel maakten we gebruik van gegevens van de eerste en tweede Nationale Studie naar ziekten en verrichtingen in de huisartsenpraktijk, die in respectievelijk 1987 en 2001 werden uitgevoerd. Centraal in deze twee studies stond de aan de huisarts gepresenteerde morbiditeit en de daaruit voortvloeiende interventies door de huisarts, in combinatie met gedetailleerde informatie over de praktijkpopulatie en de deelnemende huisartsen.

We hebben dit proefschrift in vier delen onverdeeld: deel 1 behandelt de sociodemografische en socioculturele veranderingen in de bevolking en in de huisartsgeneeskunde tussen 1987 en 2001, deel 2 gaat over de incidenties van aan de huisarts gepresenteerde gezondheidsproblemen in 1987 en 2001, deel 3 beschrijft de diverse interventies van huisartsen op de aangeboden gezondheidsproblemen in 1987 en 2001, en deel 4 geeft een nabeschouwing van de bevindingen uit voorgaande delen.

Deel 1 van dit proefschrift bestaat uit zes hoofdstukken, waarin we de veranderingen beschrijven, die zich in Nederland tussen 1987 en 2001 hebben voorgedaan in de bevolking en in de huisartsgeneeskunde. Verder wordt een uitgebreide beschrijving gegeven van de eerste en tweede Nationale Studie.

Hoofdstuk 1 bevat achtergrondinformatie over de te behandelen thema's in dit proefschrift en de onderzoeksvragen. Er wordt ook aandacht besteed aan de plaats van de huisartsgeneeskunde binnen de Nederlandse gezondheidszorg.

Hoofdstuk 2 gaat in op de sociodemografische en socioculturele veranderingen tussen 1987 and 2001 in de Nederlandse bevolking.

De bevolking werd gemiddeld ouder; het percentage 65-plussers nam toe van 12.4% tot 13.6%; het percentuele aandeel van de leeftijdsgroep 45 tot 64 jaar nam toe met meer dan 4%, terwijl het aandeel van de leeftijdsgroep 15 tot 24 jaar afnam met meer dan 5%.
Het aandeel van niet-Westerse immigranten binnen de Nederlandse bevolking steeg van 5% naar 9% tussen 1987 en 2001; het opleidings niveau en socioeconomische status van de bevolking was in 2001 hoger dan in 1987, en meer mensen hadden een betaalde baan. De groei in arbeidsparticipatie leidde tot een hoger inkomen van de huishoudens in 2001 vergeleken met 1987, waardoor de armoede afnam. Het hogere opleidings- en welvaartsniveau, en het leven in een verzorgingsstaat, heeft mensen meer en ruimere mogelijkheden gegeven om hun leven naar eigen waarden en voorkeur in te richten. Mensen waren minder geneigd te trouwen, het aandeel van eenpersoons huishoudens ging omhoog van 13% in 1987 tot 16% in 2001. Het aantal samenlevende paren, dat kinderloos bleef, nam toe met bijna 10%.
Er deden zich verschillende veranderingen in leefstijl voor tussen 1987 en 2001. Zo waren er in 2001 minder personen die rookten of overmatig alcohol gebruikten dan in 1987; maar het aandeel van mensen met ernstig overgewicht (Body Mass Index > 30) verdubbelde.
Uit onderzoek door middel van enquêtes bleek dat in 2001 minder mensen het nodig vonden de huisarts te consulteren bij niet-ernstige klachten dan in 1987. Dit is een indicatie voor een verandering in het hulpzoekgedrag van de bevolking.

Hoofdstuk 3 geeft gedetailleerd de sociodemografische veranderingen weer, die tussen 1987 en 2001 optraden binnen de laagste socioeconomische groep. De indeling in socioeconomische groepen is gebaseerd op het laatst uitgeoefende beroep.
Binnen de laagste socioeconomische groep was in 2001 het percentage personen met een hoog opleidingsniveau (HBO of hoger) twee keer zo hoog als in 1987. Tegelijkertijd nam het percentage mensen uit kwetsbare groepen (zoals werklozen en gescheiden mensen) toe.
Per saldo concluderen we dat de veranderingen binnen de laagste socioeconomische groep tussen 1987 en 2001 niet heeft geleid tot een accumulatie van achtergestelde groepen. Het grotere aandeel van personen met een hoog opleidingsniveau in de laagste socioeconomische groep in 2001 vergeleken met 1987, kan van invloed zijn op de veranderingen in de gezondheidstoestand binnen de laagste socioeconomische groep tussen 1987 en

2001, omdat een hoger opleidingsniveau in het algemeen gepaard gaat met een betere gezondheidstoestand in vergelijking met een lager opleidingsniveau.

In *Hoofdstuk 4* staan de veranderingen in de gezondheidstoestand van de bevolking tussen 1987 en 2001 centraal. We gebruikten de zelf-gerapporteerde gezondheid als maat voor de gezondheidstoestand van de bevolking. We vergeleken de zelf-gerapporteerde gezondheid in 1987 met die in 2001, waarbij is gelet op geslacht, leeftijd en socioeconomische groep.
Gemiddeld over de hele bevolking is het percentage mensen, dat hun gezondheid als goed of zeer goed bestempelt, gelijk gebleven tussen 1987 en 2001. In beide jaren waren er tussen mannen en vrouwen slechts kleine verschillen in de zelf-gerapporteerde gezondheid. Vanzelfsprekend was de zelf–gerapporteerde gezondheid sterk afhankelijk van leeftijd: in 2001 ervaarde 97% van de jongste leeftijdsgroep de eigen gezondheid als (zeer) goed, in de leeftijdsgroep 65 jaar en ouder ervaarde 59% de gezondheid als (zeer) goed.
Hoewel in de bevolking als geheel er geen verschil is tussen de zelf-gerapporteerde gezondheid in 1987 en 2001, verandert dit beeld als we de zelf-gerapporteerde gezondheid uitsplitsen naar leeftijd, geslacht en socioeconomische groep. De grootste verandering deed zich voor in de leeftijdsgroep van 65 jaar en ouder. In deze leeftijdsgroep bleef in de hoogste socioeconomische groep het percentage mensen dat hun gezondheid in 1987 and 2001 als goed of zeer goed bestempelde gelijk, terwijl in de laagste en middelste socioeconomische groep in 2001 veel minder mensen een (zeer) goede gezondheid rapporteerden dan in 1987. Dit verschijnsel deed zich het sterkste voor bij vrouwen. Als mogelijke oorzaken van deze achteruitgang in zelf-gerapporteerde gezondheid noemen we een relatieve deprivatie zoals beschreven door Wilkinson, een verlies aan sociale samenhang in achterstandswijken en een veranderende houding ten aanzien van lichamelijke beperkingen, of een combinatie van deze factoren.

Hoofdstuk 5 doet verslag van veranderingen binnen de huisartsgeneeskunde tussen 1987 en 2001. Huisartsen waren in 2001 gemiddeld ouder dan in 1987 en het aandeel vrouwen binnen de beroepsgroep was hoger.
Er trad een sterke professionalisering op tussen 1987 en 2001. De beroepsopleiding werd verlengd naar twee jaar in 1988 en in 1994 naar drie jaar. In 1989 werden de eerste standaarden van het Nederlands Huisartsen-

genootschap (NHG) gepubliceeerd: in 2001 waren er 78 beschikbaar. Daarnaast waren huisartsen waren voorlopers in het integreren van de computer in de dagelijkse praktijk.
In 1995 trad de wet op de Geneeskundige Behandelingsovereenkomst (WGBO) in werking. Deze wet bevat "dwingendrechterlijke" bepalingen die de rechten en plichten regelen van hulpverlener en patiënt.
De druk op de huisartsenzorg nam in 2001 toe ten opzichte van 1987. Het aantal ingeschreven patiënten per full-time equivalent huisarts steeg met 10%. Ook het gemiddeld aantal face-to-face huisarts-patiëntcontacten nam met 10% toe.
Tegelijkertijd daalde het aantal uren dat een huisarts gemiddeld per week werkte van 58 uur in 1987 naar 53 uur in 2001 (gecorrigeerd voor het grotere aantal part-time werkende huisartsen in 2001).
Huisartsen slaagden er in 2001 in om meer contacten in een kortere werkweek te realiseren door hun werkzaamheden efficiënter te organiseren. Er trad een verschuiving op naar minder tijdsintensieve contacten: er werden minder huisvisites afgelegd en er werden meer problemen telefonisch afgehandeld. Bovendien werden meer taken naar praktijkassistenten gedelegeerd: zo werden bijvoorbeeld in 1987 baarmoederhals uitstrijkjes slechts door 3% van alle praktijkassistenten verricht, terwijl in 2001 53% van alle praktijkassistenten uitstrijkjes maakten. Ook waren er in 1987 nog geen praktijkverpleegkundigen werkzaam binnen de huisartsenpraktijk, terwijl in 2001 in een kwart van alle praktijken een praktijk verpleegkundig werkzaam was.
Ook trad er tussen 1987 en 2001 enige verandering op in de taakopvatting van huisartsen. In 2001 beschouwden huisartsen een aantal psychosociale taken in mindere mate deel van hun werk dan in 1987.
Er zijn geen aanwijzingen dat de kwaliteit van de zorg onder deze ontwikkelingen heeft geleden. De tevredenheid van patiënten over de manier waarop huisarts communiceerden was in 2001 iets hoger dan in 1987; daarentegen was de tevredenheid van patiënten over de praktijkorganisatie in 2001 iets lager dan in 1987.

Hoofdstuk 6 stelt de achtergronden, doel en opzet van de eerste en tweede Nationale Studie naar ziekten en verrichtingen in de huisartsenpraktijk aan de orde. Op nationaal niveau zijn gegevens verzameld over de relatie tussen de behoefte aan, vraag, en aanbod van de huisartsgeneeskundige zorg. Hierbij is de huisartspraktijk gebruikt als ingang voor de gegevensverzameling. Bij de

opzet van de tweede Nationale Studie is de vergelijkbaarheid met de eerste Nationale Studie een belangrijk aandachtspunt geweest.
In beide studies werden vijf soorten gegevens verzameld:

1. Gegevens over de gezondheidsproblemen gepresenteerd tijdens alle contacten tussen de huisarts (praktijk) en de patiënt.
2. achtergrondskenmerken van alle personen, die in de aan de eerste en tweede Nationale Studie deelnemende huisartspraktijken waren ingeschreven
3. zelfgerapporteerde gegevens over gezondheid, zorggebruik en determinanten daarvan
4. gegevens over huisartsen en ondersteunend personeel
5. video-opnames van consulten tussen huisarts en patiënt.

Er zijn twee belangrijke verschillen tussen de eerste en de tweede Nationale Studie. Ten eerste is er een verschil in de duur van de morbiditeits registratie: deze was voor de NS1 drie maanden en voor de NS2 twaalf maanden.
Dit verschil in registratie periode leidde ertoe dat we ons in het proefschrift moesten beperken tot de vergelijking van de incidentiecijfers in 1987 en 2001. Een vergelijking van prevalentiecijfers uit 1987 en 2001 was door het verschil in registratieperiode niet mogelijk.
Ten tweede is er een verschil in de wijze waarop de aangeboden morbiditeit is gecodeerd. De codering van de aangeboden morbiditeit werd in 1987 centraal door (para)medisch geschoolde en speciaal getrainde veldwerkers gedaan met behulp van de ICPC (International Classification of Primary Care), in 2001 hebben de deelnemende huisartsen zelf de gezondheidsproblemen gecodeerd met de ICPC.

Deel twee bestaat uit de hoofdstukken 7 tot en met 12. In deze hoofdstukken vergelijken we de incidenties van de aan de huisarts gepresenteerde gezondheidsproblemen in1987 en 2001 met elkaar.
In dit proefschrift brengen we de veranderingen in morbiditeit en interventies tussen 1987 en 2001 in verband met de volgende factoren:

- *Veranderingen in kenmerken van de bevolking*
- *Veranderingen binnen de huisartsgeneeskunde*
- *Veranderingen in kenmerken van het gezondheidszorgstelsel*
- *Methodologische kenmerken van de beide Nationale studies.*

In de meeste gevallen zullen veranderingen in morbiditeit niet door één factor, maar door een combinatie van deze factoren veroorzaakt worden.

De incidentiecijfers uit 1987 en 2001 zijn op vijf verschillende niveaus gepresenteerd:

1 het totaal van alle gepresenteerde gezondheidsproblemen ;
2 op het niveau van ICPC rubrieken: een gezondheidsprobleem kan zowel als symptoom of klacht als ziekte worden gecodeerd
3 op het niveau van orgaan systemen;
4 op clusterniveau: een cluster is een verzameling ziekten en symptomen, die samen een zinvolle eenheid voor onderzoek vormen
5 op afzonderlijk ziekteniveau.

Hoofdstuk 7 behandelt de incidentiecijfers op het niveau van het totaal aantal gepresenteerde gezondheidsproblemen (1), op het niveau van symptomen en ziekten (2) en op orgaansysteemniveau (3).
De incidentie van alle gepresenteerde gezondheidsproblemen was in 2001 24% lager dan in 1987. Het verschil tussen mannen en vrouwen werd groter, omdat de incidentie bij mannen meer daalde tussen 1987 en 2001 dan bij vrouwen .
Er werden in 2001 minder gezondheidsproblemen als ziekte en meer als symptoom gecodeerd dan in 1987: in 2001 kreeg 53% van de gepresenteerde problemen een ziektecode, in 1987 was dit 71%.
De veranderingen die zich in de incidentiecijfers hebben voorgedaan tussen 1987 en 2001 verschillen per orgaansysteem.
De grootste daling in incidentiecijfers tussen 1987 en 2001 deed zich voor bij aandoeningen van de luchtwegen; de incidentie liep terug met 45%. In 1987 stonden ze aan de top van de meest gepresenteerde gezondheidsproblemen; in 2001 stonden aandoeningen van het bewegingsapparaat bovenaan.
De afname van de incidentie van 24% van het totaal van de gepresenteerde gezondheidsproblemen duidt waarschijnlijk niet op een werkelijke daling van de morbiditeit in de bevolking, maar werd door andere factoren bepaald.
V*eranderingen in kenmerken van de bevolking* hebben zeer waarschijnlijk geleid tot de afname van het aantal gepresenteerde gezondheidsproblemen. Met name de toename van de omvang van de hoogste socioeconomische groep tussen 1987 en 2001, en de afname van de neiging van mensen om de huisarts te consulteren bij niet-ernstige klachten kunnen de afname van het aantal gepresenteerde gezondheidsproblemen tussen 1987 en 2001 verklaren. Verder is voor een aantal gezondheidsproblemen het hulpzoekgedrag in die zin veranderd, dat patiënten in 2001 vaker de huisarts passeerden en zich

rechtstreeks tot een andere hulpverlener wendden dan in 1987. Dit gebeurde vooral bij ongevallen en bij sexueel overdraagbare aandoeningen. Deze veranderingen hebben een bijdrage geleverd aan de lagere incidentie in 2001 vergeleken met 1987.

Op *huisartsniveau* hebben de NGH standaarden en in het verlengde daarvan de toegenomen professionaliteit er mogelijk toe bijgedragen, dat patiënten dankzij een betere voorlichting in 2001 minder snel de huisarts consulteerden dan in 1987 .

Ook *veranderingen in het verstrekkingenpakket* spelen een rol. Een aantal van de zelfzorgmiddelen, die in 1987 nog vergoed werden, werden in 2001 niet meer vergoed. Het betreft o.a antiwormmiddelen en antihoestmiddelen.

De belangrijkste *methodologische verandering* tussen de eerste en tweede Nationale studies noemden we reeds: in 1987 werd er centraal gecodeerd, in 2001 "perifeer". Dit is van invloed geweest op de ziekte en symptoom codes in 1987 en 2001. Huisartsen waren in 2001 terughoudender met het toekennen van ziektecodes aan de gepresenteerde gezondheidsproblemen dan de getrainde veldwerkers in 1987. Maar dit is niet van invloed geweest op de incidentie van alle gezondheidsproblemen samen en op de incidentie van orgaan systemen.

Hoofdstuk 8 geeft de incidentiecijfers van verschillende infectieziekten. De incidentie van het totaal van de infecties daalde met 39%. De sterkste daling deed zich voor bij infecties van de luchtwegen (51%) en bij infecties van het maagdarm kanaal (47%). De incidentie van huidinfecties bleef stabiel tussen 1987 en 2001, terwijl de incidentie van infecties van de ogen met 60% omhoog ging.

Een deel van de daling in de incidentie van infecties berust op een werkelijke afname van infecties in de bevolking. In de eerste plaats spelen de verschillen in de vaccinatieprogramma's van 1987 en 2001 een rol.

In 1996 kwam de implementatie voor vaccinatie tegen influenza voor alle personen van 65 jaar en ouder en voor risicogroepen in handen van huisartsen. Het percentage gevaccineerden steeg van 28% in 1991 tot 75% in 2001.

Voor 1987 werden kinderen niet gevaccineerd tegen bof en haemophilus influenzae. Bof kwam vrijwel niet meer voor na vaccinatie in 1987. Het effect van de vaccinatie tegen haemophilus influenzae (gestart in 1993) is moeilijker te evalueren, maar het is denkbaar dat het heeft bijgedragen aan een vermindering van het aantal luchtweginfecties.

Ook veranderingen in leefomstandigheden kunnen hebben bijgedragen aan verschillen tussen 1987 en 2001. De toename van huid- en ooginfecties in de jongste leeftijdsgroep kan samenhangen met het feit dat in 2001 een groter deel van de jonge kinderen in kinderdagverblijven werd ondergebracht dan in 1987. De stijging in incidentie van ooginfecties bij personen vanaf 15 jaar hangt waarschijnlijk samen met het toenemend aantal mensen met contactlenzen. In 2001 droeg meer dan 10% van de bevolking van 15 jaar en ouder contactlenzen.

Hoofdstuk 9 gaat over veranderingen in de incidenties van aandoeningen van het bewegingsapparaat tussen 1987 en 2001. We hebben de volgende ziekteclusters in het bewegingsapparaat onderscheiden: rug- en nekaandoeningen, aandoeningen van de bovenste extremiteiten, gezond-heidheidsproblemen gerelateerd aan "repetitive stress injuries" en aandoeningen van de onderste extremiteiten. De incidentie van alle aandoeningen van het bewegingsapparaat bij elkaar daalde met 19%; de incidentie van rugproblemen bleef ongeveer gelijk; die van nekproblemen was in 2001 meer dan twee keer zo hoog als in 1987; de incidentie van aandoeningen van de bovenste extremiteit steeg met 79% tussen 1987 en 2001 en de incidentie van aandoeningen van de onderste extremiteit steeg met 39%. De incidentie van 'repetitive stress injuries' (RSI) was in 2001 89% hoger dan in 1987, bij vrouwen zelfs meer dan twee keer hoger. Een verklaring voor dit verschil zou kunnen zijn, dat vrouwen in 2001 vaker buitenhuis werkten (52%) dan in 1987 (35%) en dat de nek en armen met de intrede van de computer thuis en op het werk meer belast werden. De aandacht die in de media aan RSI werd besteed, zal zeker er ook toe hebben bijgedragen, dat patiënten zich vaker tot de huisarts wendden met nek en armklachten.

Hoofdstuk 10 gaat over de incidentie van het carpale tunnel syndroom en over de relatie tussen de incidentie van het carpale tunnel syndroom en beroepsfactoren. De incidentie van het carpale tunnel syndroom was in 2001 anderhalf keer hoger dan in 1987. De vrouw/man ratio was in beide jaren 3:1. Bij vrouwen werd een relatie tussen de incidentie van het carpale tunnel syndroom en werk gevonden, bij mannen werd een dergelijke relatie niet aangetoond. Vrouwen in de lagere beroepsgroepen hadden een anderhalf keer zo grote kans om het carpale tunnel syndroom te krijgen als vrouwen in de hogere beroepsgroepen. Een verklaring dat er bij vrouwen wel een relatie gevonden werd tussen werk en het carpale tunnel syndroom en bij mannen niet, zou kunnen zijn dat in de lagere beroepsgroepen vrouwen gemiddeld meer polsbelastend werk verrichten dan mannen en/of dat vrouwen naast hun werk met huishoudelijk werk hun polsen meer belasten dan mannen.

De incidentie van ongevallen wordt in *hoofstuk 11* beschreven. De incidentie van aan huisarts gepresenteerde ongevallen daalde met bijna de helft tussen 1987 en 2001. Voor fracturen was de daling 38%, voor verstuikingen en (sub)luxaties 62%. We maakten aannemelijk dat deze daling vooral het gevolg is dat patiënten in 2001 vaker dan in 1987 rechtstreeks naar de Eerste Hulpafdeling van het ziekenhuis gingen.

Hoofdstuk 12 beschrijft de incidentie van psychosociale problemen. De incidentie van psychosociale problemen was in 2001 24% lager dan in 1987. De incidentie van angststoornissen verminderde met 37%, de incidentie van depressieve stoornissen verminderde met 14% tussen 1987 en 2001.
Sexuele problemen kwamen in 2001 even vaak voor als in 1987. Maar als we de incidentie van mannen en vrouwen in 1987 en 2001 vergelijken, dan zien we dat de incidentie bij mannen in 2001 met 41% toenam en bij vrouwen met 34% verminderde.Terwijl er in 1987 geen verschil was tussen mannen en vrouwen, was in 2001 de incidentie bij mannen twee keer hoger dan bij vrouwen. De toename in incidentie bij mannen kwam tot stand door een zeer sterke toename bij mannen van 65 jaar en ouder. De stijging bij mannen wordt ongetwijfeld veroorzaakt door het op de markt komen in 1998 van Sildenafil (Viagra®)- een fosfodiësterase type 5-remmer, die erecties bij mannen stimuleert.
De incidentie van gedragsproblemen bij personen jonger dan 25 jaar lag in 2001 69% hoger dan in 1987. De stijging was veel sterker bij mannen (116%) dan bij vrouwen (24%).
Slaapproblemen werden in 2001 twee keer zo vaak gepresenteerd als in 1987.
De incidentie van medisch onverklaarde lichamelijke klachten steeg tussen 1987 en 2001 met 73%.
We merkten al op dat huisartsen zich in 2001 een beperktere rol bij psychosociale problemen toekenden dan in 1987. Deze taakbeperking kan gezien worden als een verdedigingsmechanisme tegen de hoge werkdruk. Huisartsen reageerden op twee manieren op deze hoge werkdruk: enerzijds waren ze mogelijk minder geneigd lichamelijke klachten, die niet verklaard konden worden, als psychosociaal te bestempelen, anderzijds werden meer patiënten naar de ambulante geestelijke gezondheidszorg verwezen.

Deel 3 beslaat de hoofdstukken 13 tot en met 20. In dit deel worden cijfers over interventies gepresenteerd met name prescriptie- en verwijscijfers.

Hoofdstuk 13 geeft een algemene introductie over de diverse soorten van interventies binnen de huisartspraktijk, terwijl in *hoofdstuk 14* de achtergronden van het voorschrijven van medicijnen worden toegelicht.

Hoofdstuk 15 behandelt het voorschrijfgedrag van huisartsen in 1987 en 2001. Het gemiddeld aantal voorschriften per patiënt was in 2001 38% hoger dan in 1987. De sterkste stijging deed zich voor bij mensen van 65 jaar en ouder, terwijl onder de 15 jaar in 2001 het gemiddeld aantal voorschriften lager was dan in 1987.

Hoofdstuk 16 geeft het voorschrijfpatroon bij patiënten met hypertensie weer. Patiënten met hypertensie werden in 2001 intensiever behandeld dan in 1987. Patiënten kregen gemiddeld meer medicijnen voorgeschreven en minder patiënten bleven zonder behandeling. In 1987 was 66% van de patiënten op monotherapie en kreeg 4% drie of meer soorten geneesmiddelen voor de hypertensie, in 2001 was dit respectievelijk 43% en 19%.

Hoofdstuk 17 gaat over de behandeling van patiënten met coronaire hartziekten (CHZ) in 1987 en in 2001. Tussen deze twee perioden vonden belangrijke veranderingen plaats in de behandeling van CHZ. Was de behandeling in 1987 vooral symptomatisch gericht, in 2001 was er een belangrijke plaats weggelegd voor preventieve geneesmiddelen zoals cholesterolverlagende middelen, bloedverdunnende middelen en remmers van het renine-angiotensine-aldosteron systeem. In 1987 kregen patiënten met CHZ gemiddeld 1,3 verschillende soorten geneesmiddelen voorgeschreven voor deze aandoening tegen 3,2 verschillende soorten in 2001. Bijna de helft van alle patiënten met CHZ gebruikten vier of meer geneesmiddelen voor hun kwaal in 2001, in 1987 was dit 2,3% van de patiënten. Het aantal onbehandelde patiënten nam af van 22,2% in 1987 tot 6.4% in 2001.

Hoofstuk 18 gaat over de behandeling van hartfalen. Hartfalen werd in 1987 als een statische hemodynamische ziekte beschouwd, in 2001 onderkende men dat hartfalen een dynamisch karakter heeft, waarbij neuro-humerale compensatiemechanismen (renine angiotensine aldosteron systeem) worden geactiveerd, die de belasting voor het hart nog verder vergroten en die het

hart progressief verder aantasten.
In 1987 waren diuretica (70%) en digoxine (38%) de belangrijkste geneesmiddelen voor de behandeling van hartfalen. In 2001 werd bij 86% van alle patiënten met hartfalen een diureticum voorgeschreven; de helft van de patiënten kreeg een RAAS remmer (6.9% in 1987); 32% van de patiënten een betablokker (8.4% in 1987); 25% van de patiënten kreeg digoxine; en 20% van de patiënten kreeg spironolacton (5.9% in 1987). In 2001 kreeg 18% van alle patiënten met hartfalen de "optimale" behandeling met een diureticum, een RAAS remmer en een betablokker (0.7% in 1987).

Hoofdstuk 19 gaat over het voorschrijven van antidepressieve middelen in de huisartspraktijk in 1987 en 2001.
Het aantal voorschriften van antidepressiva steeg met een factor vier tussen 1987 en 2001.
In de twee Nationale Studies werden geen aanwijzingen gevonden dat huisartsen in 2001 meer depressieve mensen op het spreekuur zagen dan in 1987. Maar wel waren er aanwijzingen dat in 2001 een groter deel van de patiënten met een depressie met een antidepressivum behandeld werd dan in 1987, namelijk 43% van de patiënten in 1987 en 75% in 2001. Ook waren er aanwijzingen dat antidepressiva vaker voorgeschreven werden bij niet-depressieve patiënten. Ook bleek dat als eenmaal een antidepressivum voorgeschreven werd, patiënten in 2001 langer dan in 1987 behandeld werden met antidepressiva. De sterke stijging van antidepressiva werd vooral veroorzaakt door een toename in het aantal voorschriften van selectieve serotonine-heropnameremmers.

Hoofdstuk 20 gaat over nieuwe verwijzingen van huisartsen naar medische specialisten in 1987 en 2001. Het percentage patiënten dat naar de tweedelijn verwezen werd nam af met 17% van 188 per 1000 in 1987 naar 156 per 1000 in 2001.
Op het niveau van specialismen, deed de grootste daling in verwijscijfer zich voor bij kindergeneeskunde, chirurgie en interne geneeskunde, terwijl daarentegen het verwijscijfer steeg voor revalidatie, gastro-enterologie en reumatologie.

Hoofstuk 21 recapituleert de bevindingen uit dit proefschrift nog eens en plaats ze in breder verband. De incidentie van aan de huisarts gepresenteerde gezondheidsproblemen nam in 2001 met 24% af ten opzichte van 1987.

Ondanks deze lagere incidentie, steeg het aantal face-to-face consulten met 10% tussen 1987 en 2001 (van 3,6 naar 3,9 per persoon per jaar).
Deze schijnbare tegenspraak kan verklaard worden door het gemiddeld hogere aantal consulten per patiënt voor chronische aandoeningen. Onder invloed van de standaarden van het Nederlandse Huisartsen Genootschap (NHG) gingen huisartsen chronische ziekten als b.v. diabetes mellitus, hypertensie en astma op een meer systematische en protocollaire manier behandelen en dit resulteerde in meer huisarts-patiënt contacten.
Hoewel huisartsen in 2001 meer patiëntcontacten hadden dan in 1987, werkten ze gemiddeld per week minder uren (58,6 in 1987 tegen 53,4 in 2001). Ze wisten dit te bereiken door hun werk efficiënter te organiseren. Ze delegeerden meer taken naar de praktijkassistentes en brachten enige beperking aan in de behandeling van psychosociale problemen.

De daling in gepresenteerde morbiditeit tussen 1987 en 2001 kan ons inziens worden toegeschreven aan een interactie van patiënt- en huisartsfactoren en aan veranderingen in het vergoedingensysteem. In dit hoofdstuk bespraken we deze factoren onder de samenvatting van hoofdstuk 7.
De daling in gepresenteerde morbiditeit staat haaks op de wijdverbreide mening dat patiënten huisartsen in toenemende mate voor elk wissewasje consulteren vanwege een toenemend consumentisme.
Een goede voorlichting aan patiënten over de betekenis van allerlei klachten en symptomen bij veel voorkomende self-limiting aandoeningen, lijkt een effectieve methode te zijn om de vraag naar medische hulp binnen de perken te houden. Hierbij moet echter wel in het oog worden gehouden dat het geruststellen van bezorgde patiënten één van de belangrijkste opdrachten is van de huisartsgeneeskunde. Er moet een evenwicht worden gevonden tussen een laagdrempelige toegang tot de huisarts en een realistisch verwachtings-patroon bij patiënten over wat de huisarts voor ze kan betekenen.

We maakten hierboven gewag van de terughoudendheid van de Nederlandse huisarts bij het voorschrijven van geneesmiddelen. Op het eerste gezicht lijkt dit in tegenspraak met de toename in het gemiddeld aantal voorschriften per patiënt in 2001: dit lag in 2001 38% hoger dan in 1987. Deze toename van het aantal voorschriften deed zich vooral voor bij de leeftijdsgroep 65 jaar en ouder (meer dan anderhalf keer hoger), bij de jongste leeftijdsgroep (0 tot 24) bleef het aantal voorschriften hetzelfde.
Maar het is hier van belang te kijken naar het kwalitatieve aspect van het

voorschrijven. Onder invloed van de NHG standaarden trad er tussen 1987 en 2001 bij chronische aandoeningen een verschuiving op van symptomatische behandeling naar preventieve behandeling van risicofactoren en dit resulteerde in een sterke toename van het aantal prescripties per patiënt.
Dit is een indicatie dat de aanbevelingen van de NHG-standaarden in dit opzicht opgevolgd werden.
Bij ouderen met meerdere chronische ziekten kan de optimale behandeling van elke ziekte afzonderlijk, leiden tot een hoeveelheid en combinatie van geneesmiddelen, die het welzijn aantasten. Huisartsen moeten, waar nodig, de verantwoordelijkheid nemen van de NHG-standaarden af te wijken en de therapie toesnijden op de individuele patiënt.

Het verwijscijfer naar de tweedelijns geneeskunde daalde met 17% tussen 1987 en 2001. Huisartsen behielden hun centrale positie binnen systeem van de Nederlandse gezondheidszorg.

Tenslotte, houden we een pleidooi voor een nieuwe Nationale Studie, omdat er zich sinds 2001 belangrijke veranderingen hebben voorgedaan in het Nederlandse gezondheidszorgstelsel en binnen de huisartsgeneeskunde.
De opzet van zo'n studie zou zo veel mogelijk moeten aansluiten bij die van de eerste en tweede Nationale Studie, om de resultaten zo veel mogelijk vergelijkbaar te maken. Door de resultaten van drie Nationale studies met elkaar te combineren, wordt een lange termijn ontwikkeling van de huisartsgeneeskunde geschetst.

Een nieuwe Nationale studie kan het best worden ingebed in een bestaand registratie netwerk. Dit maakt een langere registratieperiode mogelijk; het is bekend dat dit vooral voor prevalenties leidt tot betrouwbaarder cijfers.
Voor zowel wetenschappelijk onderzoek als voor de dagelijkse praktijkvoering, is het van belang dat gegevens over alle contacten die tussen een patiënt en de huisarts(praktijk) plaatsvinden worden geregistreerd. Het betreft niet alleen face-to-face contacten tussen huisarts en patiënt, maar ook telefonische contacten, herhaalmedicatie en het vastleggen van correspon-dentie van andere hulpverleners in het electronische
patiëntendossier.
Vooral dit laatste is erg belangrijk. Het stelt de huisarts in staat de uiteindelijke diagnose van een zorgepisode zo nodig bij te stellen en eventueel

zorgepisodes aan het electronisch patiëntendossier toe te voegen op basis van gegevens van andere hulpverleners die de patiënt heeft geraadpleegd.

Appendices

Appendix 7.1

Incidence rates by ICPC rubric per organ system in 1987 and 2001 (per 1000 per year); ratio disease/symptom codes in 1987 and 2001; and 2001/1987 ratio's of symptoms and diseases

	1987			2001			2001/1987	
	symptoms	diseases	*Disease/ symptom*	symptoms	diseases	*Disease/ symptom*	*symptoms*	*Diseases*
	/1000	/1000	*ratio*	/1000	/1000	*ratio*	*ratio*	*ratio*
A	32.4	63.1	*1.95*	45.7	33.8	*0.74*	*1.41*	*0.54*
B	4.2	11.7	*2.79*	4.0	8.3	*2.06*	*0.96*	*0.71*
D	45.6	98.3	*2.16*	62.0	41.8	*0.67*	*1.36*	*0.43*
F	7.4	58.9	*8.00*	17.3	36.1	*2.08*	*2.35*	*0.61*
H	3.8	102.9	*27.29*	13.7	73.0	*5.31*	*3.65*	*0.71*
K	7.5	62.1	*8.26*	16.7	35.3	*2.12*	*2.22*	*0.57*
L	127.0	202.9	*1.60*	167.7	100.2	*0.60*	*1.32*	*0.49*
N	23.5	25.2	*1.07*	28.8	11.7	*0.41*	*1.22*	*0.46*
P	36.3	37.8	*1.04*	33.6	18.7	*0.56*	*0.92*	*0.49*
R	48.4	343.2	*7.10*	68.3	146.0	*2.14*	*1.41*	*0.43*
S	108.8	152.1	*1.40*	96.8	144.5	*1.49*	*0.89*	*0.95*
T	4.2	15.4	*3.70*	5.9	13.6	*2.30*	*1.43*	*0.89*
U	6.4	53.8	*8.39*	11.9	36.7	*3.08*	*1.86*	*0.68*
W	19.2	21.3	*1.11*	23.0	14.7	*0.64*	*1.20*	*0.69*
X	31.0	29.8	*0.96*	36.0	18.1	*0.50*	*1.16*	*0.61*
Y	4.0	11.5	*2.89*	9.4	7.0	*0.75*	*2.37*	*0.61*
Z	27.8	-	-	16.9	-	-	*0.61*	-
all	537.1	1290.0	*2.40*	657.8	739.7	*1.12*	*1.22*	*0.57*

A= General and unspecified; B=Blood Organs and Immune Mechanism; D=Digestive system; F=Eye; H=Ear; K=Cardiovascular; L=Musculoskeletal; N=Neurological; P=Psychological; R=Respiratory;S=Skin; T=Endocrine,Metabolic and Nutritional; U=Urological; W=Pregnancy,Family planning; X= Female Genital; Y=Male Genital; Z=Social problems

Appendix 7.2 Incidence rate per organ system (ICPC chapter) by age

	1987							2001						
	Age groups							Age groups						
ICPC	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	≥75	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	≥75
A	287	99	97	78	69	82	120	200	55	75	59	63	100	185
B	23	17	19	17	10	13	20	16	10	14	11	9	13	28
D	250	145	127	132	135	146	174	195	72	87	89	99	139	179
F	80	53	68	65	66	69	80	88	42	40	43	56	76	90
H	294	133	64	85	94	113	124	246	92	49	60	85	110	129
K	4	4	18	43	103	174	268	7	3	12	33	75	136	200
L	85	189	324	370	405	336	342	69	143	234	275	345	346	350
N	18	23	41	54	60	59	63	29	30	36	38	44	54	69
P	20	22	59	92	92	79	92	25	26	40	58	60	59	90
R	964	400	346	356	340	353	362	578	178	188	185	188	229	247
S	378	311	321	247	217	209	234	366	256	259	214	216	252	297
T	17	11	15	17	24	29	32	15	7	10	14	28	39	40
U	31	25	45	51	72	108	146	24	19	44	38	48	93	158
W	0	2	91	88	2			10	4	84	78	4	0	1
X	4	12	85	96	60	23	23	9	14	75	79	57	25	22
Y	17	14	13	18	14	14	16	20	12	10	18	17	23	18
Z	8	8	19	30	39	35	41	4	4	11	20	22	20	30
	2480	1468	1751	1842	1801	1842	2136	1902	966	1268	1311	1417	1714	2131

Appendix 8.1 All ICPC codes referring to infectious diseases

Clusters	*ICPC codes*	*Description of ICPC codes*
General	A03, A70-A78, A92,	A03 fever,A70 Tuberculosis generalised, A71 Measles, A72 Chickenpox, A73 Malaria, A74 Rubella, A75 Infectious mononucleosis, A76 Viral exanthem other, A77 Viral disease other/NOS, A78 Infectious disease other/NOS A92 Toxoplasmosis
Immune mechanism	B70-B71, B90	B70 Lymphadenitis acute, B71 Lymphadenitis non-specific, B90 HIVinfection/AIDS
Gastrointestinal	D11,D22, D70-D73, D88	D11 diarrhoea, D22 worms, D70 Gastrointestinal infection, D71 Mumps, D72 Viral hepatitis, D73 Gastroenteritis presumed infection, D88 appendicitis
Eye	F02-F03, F70, F72- F73,	F02 Ree eye F03 Eye discharge F70 Conjunctivitis infectious, F72 Blepharitis/stye/chalazion, F73 Eye infection/inflammation other
Ears	H70-H74 (excl H71)	H72 Serous otitis media, H73 Eustachian salpingitis, H74 Chronic otitis media
Cardiovascular	K70-K71	K70 Infection of circulatory system, K71 Rheumatic fever/heart disease
Musculoskeletal	L70	Infections musculoskeletal system
Neurological	N70-N73	N70 Poliomyelitis, N71 Meningitis/encephalitis, N72 Tetanus, N73 Neurological infection other
Upper respiratory tract infections	R05,R07, R72-R77,R90, H71	R05 cough, R07 nasal congestion, R72 Strept. Throat, R74 acute Upper respiratory infections , R75 Sinusitis acute/ chronic, R76 Tonsillitis acute, R77 Laryngitis/ tracheitis acute, R90 Hypertrophy tonsils/adenoids H71 Acute otitis media/myringitis
Lower respiratory tract infections	R70-71, R78 R80, R81R90	R70 respirat tuberculosis, R71 whooping cough, R78 Acute bronchitis/bronchiolitis, R80 Influenza, R81 Pneumonia,
Other Resp. infections	R83,	R83 Respiratory infection, other
Skin infections	S03, S09-S11, S70-S76, S84-S85, S90, S95 R73	S03 warts, S09 Infected finger/toe, S10 Boil/carbuncle, S11 Skin infection post-traumatic, S70 Herpes zoster, S71 Herpes simplex, S72 Scabies/other acariasis, S73 Pediculosis/skin infestation other, S74 Dermatophytosis, S75 Moniliasis/ candidiasis skin, S76 Skin infection other, S84 Impetigo, S85 Pilonidal cyst/fistula, S90 Pityriasis rosea S95 Molluscum contagiosum , R73 Boil/abscess nose,
Endocrine	T70	T70 endocrine infection
Urinary tract infections	U70-U71	U70 Pyelonephritis/pyelitis, U71 Cystitis/urinary infection other,
Pregnancy related	W70-W71	W70 Puerperal infection/sepsis,W71 Infection complicating pregnancy
STD female	X70-X71, X73 X74, X90, X91, X92 U72, X84/r, X85/r, Y99/r	X70 Syphilis female, X71 Gonorrhoea female, X73 Genital trichomoniasis female, X74 Pelvic inflammatory disease, X90 Genital herpes female, X91 Condylomata acuminata female, X92 Chlamydia infection female U72 Urethritis X84/r vaginitis X85/r cervcitis, Y99/r other genital disease female
STD male	Y70-Y72 Y76 U72	Y70 Syphilis male, Y71 Gonorrhoea male, Y72 Genital herpes male, Y76 Condylomata acuminata male Y03 urethral discharge U72 Urethritis, Y74 epididymitis Y99/r other genital disease
Other female and male genital infections	X72, X84, Y73-Y75	X72 Genital candidiasis female, X84 vaginitis Y73 Prostatitis/ seminal vesiculitis, Y74 Orchitis/epididymitis, Y75 Balanitis

Appendix 8.2

Proportional contribution of specific codes to upper respiratory tract infections in 1987 and 2001

ICPC code	1987 %	2001 %
R74-R05-R07 Cold-cough-sneezing	62	61
R75 sinusitis	13	15
R76 ac.tonsillitis	9	7
R77 laryngitis	5	3
R90 chron tonsillitis	1	1
H71 ac.otitis med	10	11
All upper respiratory tract infections	100	100

Appendix 9.1

Incidence rates of health problems related to the lower extremities per ICPC code in 1987 and 2001 (per 1000) with 2001/1987 ratio and female/male ratio in 1987 and 2001

					Female/male	
		1987	**2001**	*2001/1987*	*1987*	*2001*
		/1000	/1000	*ratio*	*ratio*	*ratio*
L13	Hip	0.8	5.1	*6.38*	*1.3*	*1.8*
L14	Leg/thigh	2.3	8.5	*3.70*	*1.4*	*1.4*
L15	Knee	2.5	13.8	*5.52*	*0.7*	*1.0*
L16	Ankle	0.5	3.3	*6.60*	*0.7*	*1.1*
L17	Foot/toe	2.9	13.7	*4.72*	*1.1*	*1.4*
	Symptoms	**9.0**	**44.4**	*4.93*	*1.0*	*1.3*
L77	Sprain/strain of ankle	13.3	8.0	*0.60*	*0.8*	*1.1*
L78	Sprain/strain of knee	9.1	3.7	*0.41*	*0.7*	*0.8*
L96	Acute internal damage knee	5.2	1.6	*0.31*	*0.6*	*0.6*
L97	Chronic internal damage knee	1.2	3.3	*2.75*	*0.8*	*1.1*
L89	Osteoarthrosis hip	3.1	1.2	*0.39*	*1.8*	*1.7*
L90	Osteoarthrosis knee	5.2	1.9	*0.37*	*2.5*	*2.4*
	Diseases	**37.1**	**19.7**	*0.53*	*0.9*	*1.1*
	LOWER EXTREMITY	**46.1**	**64.1**	*1.39*	*1.0*	*1.2*

Appendix 11.1
New episodes and incidence rates of injuries per ICPC code

		1987 cases	/1000	2001 cases	/1000
	Trauma/big wounds				
A80	Trauma/injury NOS	329	**3.8**	1004	2.7
A81	Multiple trauma/injuries	9	**0.1**	8	0.0
		338	3.9	1012	2.7
	Skin				
S18	Laceration/cut	1375	15.7	4782	12.7
S16	Bruise/contusion	693	8.2	2176	5.8
S17	Abrasion/scratch/blister	337	3.9	1383	3.7
S14	Burn/scald	262	3.0	927	2.5
S13	Animal/ human bite	222	2.6	785	2.1
S12	Insect bite/sting	397	4.6	1795	4.8
S19	Skin injury other	755	8.6	662	1.8
		4041	46.4	12510	33.4
	Foreign bodies				
D79	Foreign body digestive system	23	0.3	81	0.2
F76	Foreign body in eye	586	6.8	1179	3.1
H76	Foreign body in ear	38	0.5	115	0.3
S15	Foreign body skin	159	1.9	511	1.4
R87	Foreign body nose/larynx/bronch	26	0.3	88	0.2
		832	9.8	1974	5.2
	Strains/Sprains/Luxations				
L77	Sprain/strain of ankle	1183	13.3	3025	8.0
L78	Sprain/strain of knee	797	9.1	1400	3.7
L79	Sprain/strain of joint NOS	3973	46.3	1257	3.3
L81	Injury musculoskeletal NOS	131	1.7	4618	12.3
L80	Dislocation/subluxation	181	2.0	287	0.8
L96	Acute internal damage knee	449	5.2	589	1.6
		6714	77.6	11176	29.7
	Fractures				
L72	Fracture: radius/ulna	173	2.0	482	1.3
L73	Fracture: tibia/fibula	104	1.2	234	0.6
L74	Fracture: hand/foot bone	312	3.7	775	2.1
L75	Fracture: femur	67	0.8	183	0.5
L76	Fracture: other	221	2.6	727	1.9
		877	10.3	2401	6.4
	Head				
N79	Concussion	251	2.8	551	1.5
N80	Head injury other	28	0.3	313	0.8
		279	3.1	864	2.3

Appendix 11.1 continued

		1987 cases	/1000	2001 cases	/1000
	Eye				
F75	Contusion/haemorrhage eye	231	2.8	528	1.4
F79	Injury eye other	68	0.8	168	0.4
		299	3.4	696	1.9
	Poisoning				
A84	Poisoning by medical agent	74	0.9	109	0.3
A86	Toxic effect non-medicinal substance	65	0.8	103	0.3
		139	1.7	212	0.6
	Other injuries				
A82	Secondary effect of trauma	72	0.9	19	0.1
A88	Adverse effect physical factor	91	1.1	303	0.8
B76	Ruptured spleen traumatic	1	0.0	5	0.0
B77	Injury blood/lymph/spleen other	0	0.0	9	0.0
D80	Injury digestive system other	5	0.1	20	0.1
H76	Foreign body in ear	38	0.5	115	0.3
H77	Perforation ear drum	64	0.7	202	0.5
H78	Superficial injury of ear	12	0.1	83	0.2
H79	Ear injury other	18	0.2	60	0.2
N81	Injury nervous system other	15	0.2	71	0.2
R88	Injury respiratory other	14	0.2	84	0.2
U80	Injury urinary tract	5	0.1	18	0.0
W75	Injury complicating pregnancy	0	0.0	15	0.0
X82	Injury genital female	11	0.1	22	0.1
Y80	Injury male genital	18	0.2	19	0.1
		364	4.4	1045	2.8
	All	**13845**	**160.4**	**31775**	**84.5**

Appendix 12.1

Clusters of psychosocial problems

Psychological (P) problems			
	"Cluster anxiety'	P12	Bedwetting/enuresis
P01	Feeling anxious/nervous/tense	P13	Encopresis/bowel training problem
P02	Acute stress reaction/crisis	P21	Hyperkinetic disorder /overactivity
P74	Anxiety disorder/anxiety state	P22	Child behaviour symptom/complaint
P79	Phobia/compulsive disorder	P23	Adolescent behav.Sympt/complt.
	Cluster "Depression"	P24	Specific learning problem
P03	Feeling depressed		**Psychoses**
P73	Affective psychosis	P70	Dementia
P76	Depressive disorder	P71	Organic psychosis other
	Sexual problems	P72	Schizophrenia
P07	Sexual desire reduced	P73	Affective psychosis
P08	Sexual fulfilment reduced	P98	Psychosis NOS/other
P09	Sexual preference concern		**Not in a cluster**
X04	*Painful intercourse female*	P04	Feeling/behaving irritable/angry
X24	*Fear of sexual dysfunction female*	P05	Senility, feeling/behaving old
Y07	*Complaints potency male*	P06	Sleep disturbance
Y08	*Other Sexual dysfunction male*	P10	Stammering/stuttering/tic
Y24	*Fear of sexual dysfunction male*	P25	Phase of life problem adult
	Substance abuse	P27	Fear of mental disorder
P15	Chronic alcohol abuse	P28	Limited function/disability (p)
P16	Acute alcohol abuse	P29	Psychological symptom/complt other
P17	Tobacco abuse	P75	Somatization disorder/hypochondria
P18	Medication abuse	P77	Suicide/suicide attempt
P19	Drug abuse	P78	Neuraesthenia/surmenage
	Behavioural problems	P80	Personality disorder
P11	Eating problem in child	P85	Mental retardation
T06	*Anorexia nervosa*	P99	Psychological disorders, other

Appendix 12.1 continued

"Fear of diseases"			
A25	Fear of death/dying	N26	Fear cancer neurological system
A26	Fear of cancer NOS	N27	Fear of neurological disease other
A27	Fear of other disease NOS	R26	Fear of cancer respiratory system
B25	Fear of aids/HIV	R27	Fear of respiratory disease, other
B26	Fear cancer blood/lymph	S26	Fear of cancer of skin
B27	Fear blood/lymph disease other	S27	Fear of skin disease other
D26	Fear of cancer of digestive system	X23	Fear of sexually transmitted disease
D27	Fear of digestive disease other	X24	Fear of sexual dysfunction female
F27	Fear of eye disease	X25	Fear of genital cancer female
H27	Fear of ear disease	X26	Fear of breast cancer female
K24	Fear of heart disease	Y24	Fear of sexual dysfunction male
K25	Fear of hypertension	Y25	Fear sexually transmitted dis. male
K27	Fear cardiovascular disease other	Y26	Fear of genital cancer male
L26	Fear of cancer musculoskeletal	Y27	Fear of genital disease male other
L27	Fear musculoskeletal disease other		
Social problems			
Z01	Poverty/financial problem	Z13	Partner's behaviour problem
Z02	Food/water problem	Z14	Partner illness problem
Z03	Housing/neighbourhood problem	Z15	Loss/death of partner problem
Z04	Social cultural problem	Z16	Relationship problem with child
Z05	Work problem	Z18	Illness problem with child
Z06	Unemployment problem	Z19	Loss/death of child problem
Z07	Education problem	Z20	Relationship prob. parent/family
Z08	Social welfare problem	Z21	Behaviour problem parent/family
Z09	Legal problem	Z22	Illness problem parent/family
Z10	Health care system problem	Z23	Loss/death parent/family member
Z11	Compliance/being ill problem	Z24	Relationship problem friend
Z12	Relationship problem with partner	Z29	Social problem NOS

Appendix 12.2

Ten common medically physically unexplained symptoms

A04	Fatigue	K04	Palpitations
D01	Abdominal pain	L01	Neck complaints
D02	Epigastric pain	L03	Low back complaints
D09	Nausea	N01	Headache
K01	Heart pain	S02	Pruritus

Appendix 20.1
Referral rates (per 1000 per year) in 1987 and 2001 per specialty by age group

Specialty	Year	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y	Standar-dised
	1987	20.5	24.4	31.3	32.1	37.1	36.4	43.5	32.5
Surgery	2001	12.2	9.8	15.0	18.3	26.6	34.0	33.3	20.6
	1987	55.5	30.0	16.4	14.6	18.7	19.7	20.0	20.8
ENT	2001	44.0	18.4	12.6	11.7	17.7	28.3	34.6	18.3
	1987	18.4	17.5	14.7	15.5	24.4	32.0	26.6	19.8
Ophthalmology	2001	13.9	12.5	6.3	7.8	19.1	38.6	50.3	16.0
	1987	1.3	1.6	9.0	13.8	28.7	49.1	65.5	20.0
Internal medicine	2001	0.2	0.4	6.5	9.9	17.2	26.4	33.1	12.1
	1987	11.1	9.9	17.7	18.3	18.6	19.0	12.1	16.6
Orthopaedics	2001	3.1	4.7	10.9	13.9	20.2	25.1	22.7	14.7
	1987	0.0	0.2	31.2	60.8	22.4	12.8	10.2	30.4
Gynaecology/Obstetr	2001	0.9	0.6	13.7	43.2	21.1	12.0	10.3	22.4
	1987	7.9	12.9	17.1	16.1	14.8	16.3	17.9	15.1
Dermatology	2001	7.9	8.0	15.9	15.1	18.0	23.8	25.0	15.9
	1987	1.3	2.0	7.6	13.7	20.4	23.9	24.0	13.7
Neurology	2001	1.2	1.5	5.4	10.9	18.3	24.5	24.8	12.2
	1987	1.3	0.5	0.9	3.5	13.0	23.3	24.0	7.6
Cardiology	2001	0.7	0.2	1.0	2.9	11.5	21.9	24.2	7.0
	1987	3.4	2.3	3.3	7.4	8.6	11.4	15.3	7.1
Urology	2001	4.2	2.4	2.5	8.6	8.4	14.6	13.7	7.5
	1987	55.2	16.4	0.8	0.2	0.4	0.5	0.2	5.5
Paediatrics	2001	36.8	14.4	1.0	0.0	0.0	0.0	0.0	3.8
	1987	0.2	0.9	1.9	2.7	6.1	7.1	8.0	3.7
Respiratory medicine	2001	0.2	0.3	1.0	2.1	4.2	9.4	8.9	3.1
	1987	0.4	0.7	2.4	4.9	3.4	2.4	0.7	3.0
Psychiatry	2001	0.9	1.9	3.7	4.7	2.3	1.8	1.2	3.0

Appendix 20.1 continued

Specialty	Year	0-4y	5-14y	15-24y	25-44y	45-64y	65-74y	>=75y	Standar-dised
	1987	1.1	1.0	4.1	3.3	2.1	2.1	0.7	2.5
Reconstructie surgery	2001	0.7	1.4	3.9	3.3	4.0	3.1	2.0	3.1
	1987	0.0	0.1	0.7	1.8	3.0	2.8	1.1	1.7
Rheumatology	2001	0.0	0.0	0.9	2.4	5.1	4.2	4.0	2.7
	1987	0.0	0.0	0.3	0.8	1.0	1.4	1.6	0.7
Gastroenterology	2001	0.0	0.0	0.4	1.1	2.0	2.6	2.3	1.2
	1987	0.2	0.4	0.8	0.9	1.1	0.7	1.4	0.8
Rehabilation	2001	0.2	0.4	0.9	1.9	2.2	2.2	2.0	1.6
	1987								0.0
Geriatrics	2001	0.0	0.0	0.0	0.0	0.0	1.0	4.5	0.4

Appendix 20.2

TOP-5 REFERRAL DIAGNOSES PER SPECIALTY-

Referral rates 1987 and 2001 (per 1000 per year), ranking 1987 and 2001

Internal medicine, Respiratory medicine, Cardiology

Health problem	Referral rate 1987 /1000	Referral rate 2001 /1000	Ranking 1987	Ranking 2001	P value
Internal medicine	**18.6**	**12.1**			
Functional Gastrointest complaints	1.58	1.93	1	1	***
Coronary heart disease	0.98	0.02	2	120	***
Diabetes mellitus	0.84	0.52	3	3	***
Disease digest.system other	0.73	0.13	4	16	***
Hypertension	0.63	0.44	5	4	NS
Diarrhoea all forms	0.41	0.36	8	5	NS
Weak/Tiredness	0.29	0.69	15	2	***
Top-5 (%)	26%	33%			
Respiratory medicine	**3.4**	**3.1**			
COPD	0.84	0.7	1	1	NS
Lower Resp Tract Infection	0.71	0.32	2	4	***
Asthma	0.43	0.44	3	2	NS
Respir disease other	0.34	0.06	4	9	***
Malignant neopl.lung	0.33	0.14	5	6	***
Upper Respir. Tract Infection	0.17	0.37	6	3	***
Shortness of breath	0.01	0.27	21	5	***
Top-5 (%)	73%	67%			
Cardiology	6.8	7.0			
Coronary heart disease	3.68	1.93	1	1	***
Heart disease other	0.65	0.15	2	14	***
Heart failure	0.60	0.38	3	4	**
Hypertension	0.21	0.28	4	7	**
Atrial fibrillation	0.17	0.61	5	2	***
Palpitation	0.07	0.29	16	5	***
Pain attributed to heart	0.06	0.42	17	3	***
Top-5 (%)	78%	52%			

Chi-square *** p <0.001; ** p>=0.001 and p<0.01 ; * p>=0.01 and p<0.05

Appendix 20.2 continued

Internal medicine, Respiratory medicine, Cardiology

Internal medicine

In both years functional complaints of the gastrointestinal tract were in top position. Patients with coronary heart diseases were in 1987 regularly referred to the internal specialist, in 2001 this happened hardly. In 2001 ICPC code A04 (fatigue) was second in ranking (referral rate 0.70 per 1000) whereas it was in the 14th position in 1987 (referral rate 0.28 per 1000).
The top-5 included in 1987 merely 24 percent of all referrals to internal medicine and in 2001 33 percent. This indicates that compared with other medical specialties, the referral diagnoses to internal medicine are very heterogeneous.

Respiratory medicine

In 1987 and 2001 COPD, asthma and lower respiratory tract infections were in leading positions; in 2001 upper respiratory tract infections rose from the 6th to the 2nd position. Shortness of breath, an ICPC “symptom” code (R02), came in the top-5 in 2001, whereas the diagnostic code “other respiratory disease” (ICPC code R99), dropped from the 4th place to the 9th place.
The top-5 included about 70 percent of all referred diagnoses to respiratory medicine. The spectrum of referred disorders to lung specialist is small.

Cardiology

Unsurprisingly, coronary heart diseases were on top in 1987 and 2001, but the referral rate in 1987 was higher than in 1987 (3.26 and 1.98 per 1000). However, when we total up the referrals for coronary heart diseases and the ICPC symptom codes K01 (pain attributed to heart) and K02 (tightness of heart), the referral rates were much closer with a rate of 3.32 per 1000 in 1987 and a rate of 2.71 per 1000 in 2001.

Appendix 20.2 continued
TOP-5 REFERRAL DIAGNOSES PER SPECIALTY

Referral rates 1987 and 2001 (per 1000 per year), ranking 1987 and 2001
Rheumatology, Urology, Orthopaedics

Health problem	Referral rate		Ranking		
	1987 /1000	2001 /1000	1987	2001	P value
Rheumatology	1.5	2.7			
Rheumatoid arthritis	0.63	0.48	1	2	NS
Musculoskel.disease other	0.27	0.19	2	3	NS
Shoulder problems	0.11	0.11	3	7	NS
Joint symptoms	0.09	0.64	4	1	***
Osteoarthritis	0.07	0.13	5	5	**
Hand/finger symptoms	0.02	0.14	14	4	***
Top-5 (%)	69%	59%			
Urology	6.7	7.5			
Sterilization[a]	1.79	3.32	1	1	***
Benign Prostatic Hypertrophya (Y85-Y06)	1.51	1.79	2	2	NS
Urine tract infection	0.71	0.68	3	3	NS
Other Genital disease male a	0.57	0.23	4	14	***
Prostatitisa	0.55	0.23	5	13	***
Phimosis/redundant prepuce	0.50	0.59	7	5	NS
Blood In Urine	0.20	0.50	13	5	***
Top-5 (%)	44%	53%			
Orthopaedics	16.5	14.7			
Other Muscul/Connective Disorder	2.24	0.72	1	9	***
Acute injury Meniscus/Ligament Knee	2.22	0.94	2	5	***
Low backpain	1.94	1.12	3	3	***
Acquired deformity of limb	1.50	0.56	4	11	***
Distorsion	1.29	0.71	5	10	***
Shoulder problems	0.53	1.49	7	2	***
Knee symptoms	0.37	2.00	10	1	***
Chronic derangement knee	0.33	1.06	11	4	***
Top-5 (%)	56%	45%			

[a] denominator all males of 1987 (N=160499) and 2001 (N=120228)
Chi-square *** p <0.001; ** p>=0.001 and p<0.01 ; * p>=0.01 and p<0.05

Appendix 20.2 continued

Rheumatology, urology,Orthopaedics

Rheumatology

With the exception of hand/finger symptoms the top-5 of referral diagnoses in 1987 and 2001 were rather similar. In 2001 joint symptoms were at top position as against rheumatoid arthritis in 1987

Urologie

The ranking of the top four most referred diagnoses were the same in 1987 and 2001.
The most common reason for referral was sterilisation in males, but the referral rate in 2001 was almost twice as high as in 1987. Prostate problems occupied the second place with a significantly higher rate in 2001.

Orthopaedics

What strikes most when studying the referral rates to orthopaedics is that there were large differences in the rates and the ranking of the various diagnoses. Acute injuries of the knee were the most common reason for referral in 1987. When combining ICPC code L96 (acute injury knee) and ICPC code L15 (Knee symptoms) the referral rate in 1987 was 2.69 per 1000 and 3.00 per 1000 in 2001 (Chi-square 4.59, P=0.032). The referral rate for shoulder problems was in 2001 more than three times higher than in 1987 (1.53 and 0.48 per 1000)

Appendix 20.2 continued
TOP-5 REFERRAL DIAGNOSES PER SPECIALTY

Referral rates 1987 and 2001 (per 1000 per year), ranking 1987 and 2001
Gynaecology, Paediatrics, Dermatology

Health problem	Referral rate 1987 /1000	Referral rate 2001 /1000	Ranking 1987	Ranking 2001	P value
Gynaecology[b]	15.8	11.1			
Pregnancy Confirmed	4.43	2.36	1	1	***
Uterovaginal Prolapse	1.72	1.28	2	3	***
Fibroid/Myoma (Uterus.Cervix)	1.61	0.93	3	7	***
Sterilisation	1.41	1.13	4	4	*
Spontaneous Abortion	1.34	0.34	5	15	***
Sub/Infertility	1.06	1.64	7	2	***
Postmenopausal bleeding**	0.39	1.12	21	5	***
Top-5 (%)	67%	68%			
Paediatrics[c]	6.1	3.8			
Lower Resp Tract Infection	2.47	0.96	1	5	***
Upper Respir. Tract Infection	2.46	1.02	2	4	***
Asthma	1.60	1.16	3	2	NS
Diarrhoea all forms	1.36	0.93	4	6	*
Functional Gastrointest complaints	0.99	1.52	5	1	*
Urinary tract infection	0.56	1.11	13	3	**
Heart murmur	0.55	0.96	14	5	*
Top-5 (%)	27%	27%			
Dermatology	**15.2**	**15.9**			
Dermatitis all forms	3.11	2.92	**1**	**1**	NS
Warts	1.25	0.64	**2**	**7**	***
Varicose veins	0.89	1.14	**3**	**3**	***
Malign.Neopl.Of Skin	0.83	0.88	**4**	**4**	NS
Skin disease other	0.78	0.78	**5**	**5**	NS
Naevus/mole	0.76	1.24	**6**	**2**	***
top-5 (%)	45%	44%			

denominator all females of 1987 (N=173017) and 2001 (N=121479)
[c] denominator children 0 to 14 years; in 1987 64528, in 2001 42781
Chi-square *** p <0.001; ** p>=0.001 and p<0.01 ; * p>=0.01 and p<0.05

Appendix 20.2 continued

Gynaecology, Paediatrics,Dermatology.

Gynaecology

The referral rate for spontaneous abortus went down from 1.34 to 0.34 per 1000. The referral rate of fertility problems increased from 1.06 per 1000 in 1987 to 1.64 per 1000 women in 2001, resulting in a second position on the list.

Paediatrics

In 1987 the lower and upper respiratory tract infections were on the first and second position (referral rates 2.47 and 2.46 respectively), but they dropped to respectively the 5th and the 4th position in 2001 (referral rate 0.96 and 1.02 respectively). In 2001 the referral rate of functional gastrointestinal complaints was number one with a referral rate of 1.52 per 1000 as against 0.99 per 1000 in 1987 (5^{th} position). Urinary tract infections increased from 0.56 per 1000 in 1987 (13th place) to 1.11 per 1000 in 2001 (3th place).
The top-5 referral diagnoses comprise 27% of all referrals to the paediatrician indicating that paediatricians see a wide range of health problems.

Dermatology

Dermatitis (all forms) was by far the most common reason for referral with no significant difference in the rates of 1987 and 2001. The referral rate for warts was in 2001 half from the rate in 1987 (1.38 vs. 0.65). Naevi were in 2001 more often referred than in 1987 (1.26 vs. 0.78 per 1000, ranking 2 in 2001, ranking 4 in 1987.

Appendix 20.2 continued

TOP-5 REFERRAL DIAGNOSES PER SPECIALTY

Referral rates 1987 and 2001 (per 1000 per year), ranking 1987 and 2001

Neurology, Psychiatry

Health problem	Referral rate 1987 /1000	Referral rate 2001 /1000	Ranking 1987	Ranking 2001	P value
Neurology	**12.9**	**12.2**			
Low backpain all forms	2.85	2.39	1	1	NS
Other Disease. Neurolog .System	1.44	0.15	2	21	***
Stroke/Cerebral Vasc.Acc.	1.35	0.51	3	6	***
Carpal Tunnel Syndrome	0.68	A	4	2	***
Epilepsy.All Types	0.61	0.31	5	10	***
Headache	0.34	0.69	8	3	***
Vertigo, dizziness	0.30	0.51	9	5	***
Neck problems	0.26	0.61	11	4	***
top-5 (%)	54%	42%			
Psychiatry	**3.0**	**3.0**			
Depression	0.96	0.91	1	1	0.96
Anxiety	0.46	0.55	2	2	0.46
Neurasthenia/surmenage	0.25	0.12	3	6	0.25
Other psychological disorders	0.20	0.16	4	3	0.20
Other psychosis	0.14	0.05	5	10	0.14
Relationship problem with partner	0.07	0.12	6	4	NS
Personality disorder	0.01	0.12	23	5	***
top-5 (%)	66%	62%			

Chi-square *** p <0.001; ** p>=0.001 and p<0.01 ; * p>=0.01 and p<0.05
NS: p>=0.05

Appendix 20.2 continued

Neurology, Psychiatry

Neurology

Low back pain is the leading reason for referral in 1987 and 2001. We saw an increase in the referral rate of the carpal tunnel syndrome (from 0.63 per 1000 in 1987 to 0.91 per 1000 in 2001). Headache occupied the 8th place in 1987 (0.35 per 1000) and the 3rd place in 2001 (0.71 per 1000). Neck problems appeared also in the top-5 in 2001; with a rate of 0.61 it was on the 4th place. The referral rate of CVA (K90) decreased by 58% from 1.21 per 1000 in 1987 to 0.51 per 1000 in 2001.

Psychiatry

Depressions and anxiety states were in both years on the first and second position; between 1987 and 2001 there was not a statistically significant difference in the referral rates of these two conditions. The referral rate of neurasthenia was in 2001 half as high as in 1987.

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Dankwoord

Met de voltooiing van dit proefschrift sluit ik een huisartscarrière van 30 jaar af. Aan de basis van mijn late wetenschappelijke loopbaan staat de huisartsengroep van de Continue Morbiditeitrsegistratie (CMR) uit Nijmegen.
Toen ik terugkwam in Nederland na een aantal jaren in de Tropen te hebben gewerkt, en mij in 1980 in Dalfsen als huisarts vestigde, was ik een vreemdeling in huisartsenland. Om vat te krijgen op mijn dagelijks werk en inzicht in de aangeboden morbiditeit, begon ik alle patiëntcontacten met de ICHPPC te coderen.
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Curriculum vitae

François Johannes Matthias Bongers, the author of this thesis, was born in Zwolle on December 15th 1943. He obtained his Gymnasium-bêta certificate in 1963 at the Celeanum Gymnasium in Zwolle.
His medical education took place at the Faculty of Medicine of the University of Groningen.
After graduation in 1972, he prepared for a posting in tropical countries by working as house officer in the Tjongerschans hospital in Heerenveen. For his graduation as tropical doctor he followed a course in tropical medicine at Royal Tropical Institute in Amsterdam.
He worked from 1974 to 1978 for the Kenyan Government. He was first posted six months in Kakamega Provincial Hospital as medical officer and was later appointed as district medical officer of the Nandi district in Kapsabet.
After returning to the Netherlands, he worked in 1979 in the psychiatric hospital Dennenoord in Zuidlaren.
In 1980, he settled as general practitioner in the group practice of Dalfsen. He was involved in regional postgraduate training programs and one of the founders of MCC-KLIK (Medical Coordination Centre).
Frans Bongers is married with Ellen Sauer and has three children.